CHAPTER - III
METHODOLOGY OF THE STUDY

3.1.0 INTRODUCTION

The success of any research work depends upon the proper methodology of the study. Since the nature of a problem is different from the nature of other problems, so it is worthwhile to use the proper methodology according to the nature of the problems. The researcher had used the experimental method to study the present problem. This methodology section of the present problem includes the following points for discussion.

1) Setting.
2) Sample / participants.
3) Design of the experiment.
4) Materials / tools used.
   (i) Instructional tools.
   (ii) Testing / measuring tools.
5) Techniques of data analysis.

3.2.0 SETTING

The present study was concerned with the elementary level. This study was conducted on class–VI students of Demonstration Multi-purpose (D.M.) school, Regional Institute of Education, Bhubaneswar, and Kendriya Vidyalaya (K.V.) No.1, Unit–9, Bhubaneswar. Both the schools are co-educational institutions. Students from Class–I to class–XII study in both the schools. Both the schools are affiliated to CBSE, New Delhi and are English Medium Schools. Both the schools are situated in the middle part of the Bhubaneswar City. Both the schools admit the students from varied backgrounds. Both the schools are well equipped with better infrastructural facilities. The distance between these two schools (K.V. No.-1, Bhubaneswar, and D.M. School, Bhubaneswar) is approximately 1.5 kilometers. The students’ strength of K.V. No.1 is about 1500, whereas the students’ strength of DM School is about 1200.

3.3.0 SAMPLE / PARTICIPANTS OF THE STUDY

It is not feasible for a researcher to conduct a study on whole population. That is why, the researcher generally studies a representative part of the whole
population and s/he generalizes the result of the study on whole population. The representative part on which the researcher conducts his / her study is known as sample.

While selecting the sample, a researcher generally follows the different procedures / methods / techniques for sample selection. In the present study, the researcher had followed the purposive sampling method in order to select the sample. That means, for the present study, the researcher had taken these two schools (K.V. No.-I, Bhubaneswar, and D.M. School, Bhubaneswar) purposively for the experiment.

Out of three sections (i.e., Sec.-A, Sec.-B and Sec.-C) of Class-VI in DM School, two sections (i.e. Sec.-A and Sec.-B) were taken for experiment. Similarly, out of three sections (Sec.-A, Sec.-B and Sec.-C) of Class-VI in K.V. No.-1, two sections (i.e., Sec.-A and Sec.-C) were taken for experiment. The details of the sample of the present study are given in Table-3.1.

<table>
<thead>
<tr>
<th>Name of the School</th>
<th>Name of the Section</th>
<th>Number of students experimented in all the stages of experiment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.M. School, Regional Institute of</td>
<td>A</td>
<td>25</td>
</tr>
<tr>
<td>Education (NCERT), Bhubaneswar.</td>
<td>B</td>
<td>27</td>
</tr>
<tr>
<td>K.V. No.-1, Unit-IX, Bhubaneswar.</td>
<td>A</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>112</td>
</tr>
</tbody>
</table>

At the beginning of the experiment, 136 students were in all in the sampling group in the above-mentioned four sections. But 112 students were studied in all the stages of experiment / completed all the formalities of experiment. All these 52 students of DM School constituted the members of control group wherein all these 60 students of K.V. No.1 constituted the members of experimental group. These 112 students comprised the sample of the final study.

3.4.0 DESIGN OF THE EXPERIMENT

The present piece of research is an experimental type of research. Here the researcher has tried to observe the impact of 'Multi-dimensional activity based
Integrated approach upon the development of cognitive and creative abilities in social studies of elementary school children.

3.4.1 MEANING AND INTERPRETATIONS OF THE KEY WORDS / SENTENCES / CONCEPTS USED IN THE STUDY

The meaning and interpretations of the some of the key words / sentences / concepts used in the present study are:-

a. Important variables used in the present study

Two important types of variables were identified and used in the present study. Such variables are :-

(i) Independent variables, and
(ii) Dependent variables.

**Independent Variables** : Present study aimed at studying the effect of multi-dimensional activity based integrated approach upon the cognitive and creative abilities in social studies of VI th grade elementary school children. In the present study, control group was taught through Traditional Method of Teaching (TMT) and the experimental group was taught through Multi-dimensional Activity based Integrated approach (MAI). Both the TMT and MAI were considered as the independent variables of present study.

**Dependent Variables** : Generally the effects of independent variables are studied in terms of dependent variables. In the present study, the cognitive and creative abilities in the subject area of social studies were considered as dependent variables. Present study attempted to study the effect of multi-dimensional activity based integrated approach upon cognitive changes and creative changes of VI th grade elementary school children through the teaching of social studies. So cognitive abilities in the social studies area and creative abilities in the social studies area of VI th grade children were considered as the dependent variables of the present study.

b. Controlling the intervening variables

There are certain variables, which can not be measured directly but may have some direct effect upon the dependent variables. The
present researcher always tried to keep away / control such variables and did not want to observe the effect of such variables on dependent variables. Such variables are called intervening variables. It is very difficult to control such variables completely. However, they are controlled to some extent either by experimentally or statistically. There were many intervening variables which might have affected the present study, were socio-economic status of the students / teacher, nature of the lesson, teacher competency, physical and academic environment of the school, environment of the classroom, tuition of the students, contamination effects, study habits etc. But the researcher had taken proper care for controlling such variables.

c. Specific topics to be taught

In order to bring cognitive changes and creative changes among VIth Grade elementary school students through the teaching of social studies, six chapters from VI th grade elementary social studies text book (the text book which was running / implemented in the academic session 2004-2005 by CBSE in its affiliated schools) were selected. The details of the chapters of social studies book along with their appropriate content areas used in the present study for cognitive and creative development of the treatment groups are given in Table-3.2.

TABLE-3.2
DETAILS OF THE CHAPTERS USED IN THE PRESENT STUDY

<table>
<thead>
<tr>
<th>Name of the subject</th>
<th>Name of the content areas</th>
<th>Name of the chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Studies</td>
<td>Geography</td>
<td>1. India – our country.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Our climate, natural vegetation and world life.</td>
</tr>
<tr>
<td></td>
<td>History</td>
<td>1. India’s cultural contact with the outside world.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Major Religions.</td>
</tr>
<tr>
<td></td>
<td>Civics</td>
<td>1. How people in cities meet their needs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Caring for things belonging to us all.</td>
</tr>
</tbody>
</table>
d. Treatment Groups

Any experimental situation is generally concerned with two types of groups. They are experimental groups and control groups. In an experimental situation, there may be one or more than one control group and one or more than one experimental group. In the present study, there were only one experimental group and one control group. The description of such groups are given below:

**Experimental Group** : Sixty students from the two sections (29 students from Sec.-A & 31 students from Sec.-C) of Class-VI of K.V. No.1 constituted the experimental group.

**Control Group** : Fifty-two students from the two sections (25 students from Sec.-A & 27 students from Sec.-B) of Class-VI of D.M., School constituted the control group of the present study.

e. Tests used in the experiments

An experimental situation is concerned with different types of tests. Such types of tests are pre-test, post-test, delayed post-test etc. The types of tests required for an experimental situation change according to the requirements of that particular experimental situation. In the present study, the experimenter had used two types of tests, i.e., pre-test and post-test.

Also, it is to remember that, in the present study, the researcher had used the same test as the pre-test and post-test. In the present study, the researcher had used two tests, i.e. (i) a cognitive ability test in social studies and (ii) a creative ability test in social studies. The researcher in the present study had used the same cognitive ability test in social studies as the pre-test and post-test, as well as, had used the same creative ability test in social studies as the pre-test and post-test. Pre-tests were administered before the treatments were given and post-tests were administered after the treatments were given.

3.4.2 METHODS FOLLOWED FOR CONTROLLING THE EXPERIMENTAL SITUATIONS

Every possible attempt was made by the researcher to control those factors, which would create biasness in the present experiment. Along with using
statistical controlling procedure, the researcher also followed the following attempts to control those factors, which would create biasness.

**Firstly** – The researcher himself provided treatments to both the control group and experimental group. It generally happens that the attitude and competence of the teachers may create treatment effect. So in order to control the inter-group variation in treatment referring to the teacher competency, the researcher himself performed the experiment in all the groups.

**Secondly** – Efforts were made to maintain all the other experimental conditions of both the groups equal except the treatment. Also the researcher was cautious against any variations in the experimental condition except treatment which may affect outcomes of the results of the group.

**Thirdly** – The subjects of both the groups were requested to maintain good attendance for the experimental period. Sample mortality was taken in to account. The subjects who were irregular or non-serious in both the group were kept outside the sample.

**Fourthly** – The experimental process was controlled by keeping the classroom environment, experimental situation, mode of testing, duration of the experiment etc. same for all the group.

**Fifthly** – Every effort was made by the researcher to maintain a sympathetic, encouraging and friendly climate in the experimental situation in order to reduce socio-personal differences among the subjects.

**Sixthly** – The researcher had taken due care to base the testing and non-testing goals on specified objectives, so that those might not become the source of biasness.

### 3.4.3 DESIGN OF THE STUDY

Though most of the researchers equate the subjects of control group and experimental group or follow the randomization method for selecting samples for control group and experimental group before the treatment, but many a time, such methods / procedures create a lot of problems in the normal functioning of the system. For example, if the students of a class / school would be selected for control group and experimental group through randomization method for
treatment, then, it would hamper in the normal functioning of the class / school or the class / school would be disturbed. So, it is wise in many cases to provide treatment without disturbing the class / school. Unequated or non-randomized methods of selecting the sample would be fruitful for this kind of study. In this kind of study, the researcher himself / herself selects the sample for control group and experimental group purposively. In such kind of study, analysis of co-variance method generally is used to adjust the post-test scores of the control and experimental groups with their pre-test scores to control the differences between the groups at the beginning of the study.

In the present study, the researcher had used 'non-randomized / unequated two group pre-test and post-test design'. The paradigm of design of the present study is given in Table–3.3.

**TABLE–3.3**

**PARADIGM OF THE DESIGN**

<table>
<thead>
<tr>
<th>Purposively assigned treatment groups</th>
<th>Pre-test</th>
<th>Independent Variables</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG</td>
<td>$O_1$</td>
<td>Teaching through MAI</td>
<td>$O_2$</td>
</tr>
<tr>
<td></td>
<td>$P_1$</td>
<td></td>
<td>$P_2$</td>
</tr>
<tr>
<td>CG</td>
<td>$O_1$</td>
<td>Teaching through TMT</td>
<td>$O_2$</td>
</tr>
<tr>
<td></td>
<td>$P_1$</td>
<td></td>
<td>$P_2$</td>
</tr>
</tbody>
</table>

The details of the abbreviations used in the above table are given below:

- **EG** - Experimental Group
- **CG** - Control Group
- $O_1$ - Pre-test on cognitive abilities in social studies.
- $P_1$ - Pre-test on creative abilities in social studies.
- **MAI** - Multi-dimensional activity based integrated approach.
- **TMT** - Traditional method of teaching.
- $O_2$ - Post-test on cognitive abilities in social studies.
- $P_2$ - Post-test on creative abilities in social studies.

The details of the design of the study is given in chart – 3.1.

### 3.4.4 PROCEDURE OF EXPERIMENT

The procedures followed in the present experiment are as the followings:

**a. Selection of treatment groups**

Purposively Sec.-A & Sec.-B students of Class–VI, D.M. School, RIE, Bhubaneswar were selected for control group, whereas, Sec.-A & Sec.-C students of class–VI, K.V. No.-1, Unit-9, Bhubaneswar were selected for experimental group.
b. Administration of the pre-test

All the subjects of control group and experimental group were administered two pre-tests, i.e. a pre-test on cognitive abilities in social studies and a pre-test on creative abilities in social studies.

c. Assigning treatment to the groups / experimentation

After the pre-tests were administered to both the groups, treatments were given to both the control group and experimental group. The control group was taught through TMT approach, wherein, the experimental group was taught through MAI approach. The basic objective of both the approach was to develop cognitive and creative abilities in the area of social studies among the treatment groups. Without disturbing the normal classrooms, the treatments were given. That means, both the sections of (i.e., Sec.-A & Sec.-C) Class-VI of K.V. No.1 were taught through MAI approach separately without being pooled together. Similarly, both the section, (Sec.-A & Sec.-B) students of D.M. School were taught through TMT approach separately without being pooled together. The experiment was continued for six months. The specific topics taught through MAI approach to the experimental group and taught through TMT approach to the control group for their cognitive and creativity development in the subject area of social studies are already given in Table No.3.2.

d. Administration of the post-tests

After the experiment had been conducted, all the subjects of control group and experimental group were administered two post-tests. Such post-tests were a post-test on cognitive abilities in social studies and a post-test on creative abilities in social studies. In the present study, the same test of cognitive ability in social studies was used as both pre-test as well as post-test, also, the same test of creative abilities in social studies was used as both pre-test as well as post-test.

e. Data Analysis

But when the data analysis was done, all the subjects under the control group (i.e., Sec.-A & Sec.-B of class-VI, D.M. School) were pooled together and all the subjects under experimental group (i.e. Sec.-A & Sec.-C of class-VI K.V. No.-1) were pooled together for analysis.
Chart 3.1

DESIGN OF THE STUDY

Social Studies Curriculum in Class – VI

Teaching Learning Areas: Geography, History and Civics

Specific Topics of History, Civics and Geography

Formulation of two purposively Selected Groups

Development of Pre-test on Creative abilities & Cognitive abilities; and Post-tests on Creative abilities and Cognitive abilities in social studies

Administration of both the Pre-tests to the experimental and control groups

Experimental Group

Teaching through MAI

Control Group

Teaching through TMT

Administration of both the Post-tests to the experimental and control groups

Applying the co-variance technique of data analysis for drawing appropriate conclusion
3.5.0 MATERIALS / TOOLS USED

The tools used in the present study were categorized into two broad groups. They are:

(i) Instructional tool
(ii) Measuring tools

3.5.1 INSTRUCTIONAL TOOLS

Instructional tools are such types of tools, which help for imparting the instruction & teaching. Two types of instructional tools were used in this present study. They were:

A. Multi-dimensional activity based integrated approach
B. Traditional method of teaching approach

A. DEVELOPMENT OF MULTI-DIMENSIONAL ACTIVITY BASED INTEGRATED APPROACH OF TEACHING - LEARNING

'Multi-dimensional activity based integrated approach' is a new and innovative teaching-learning strategy developed by the researcher himself. The researcher had developed this strategy in order to teach the students of experimental group for their cognitive and creativity development. The researcher defines the present strategy in the following words:

"Multi-dimensional activity based integrated approach is an approach of teaching-learning which allows the learner to use / practise a particular activity or a group of activities simultaneously coming from the one dimension of activities or many dimensions of activities (the dimensions of activities are - head related dimension, hand related dimension etc.) for the better learning of a particular topic / group of topics."

a What is Multi-dimensional Activity based Integrated Approach?

Activities are of different types. Those can be quiz, song, puzzle, drama, dance, model preparation, chart preparation, role playing, narrating and speaking, drawing the pictures, observation and reporting, creative use of materials, debate, discussions, story forming and story telling, creative writings, cross words, comments, music etc. There are thousands and thousands of activities used in our teaching-learning process for the betterment of our teaching learning.
Such activities can be categorized under three broad dimensions on the basis of their nature of tasks. Such broad dimensions are:

(i) Head related activities or head dimension.
(ii) Heart related activities or heart dimension, and
(iii) Hand related activities or hand dimension.

**Head related activities** – Head related activities are those activities in which the mental functioning is needed in a greater scale. The example of some of the head related activities are – puzzle, quiz, debate, finding the gaps, telling the stories and forming the stories etc.

**Hand related activities** – Hand related activities are those activities which require more functioning of the motor parts or physical parts of our body. The example of some of the hand related activities are – craft work, drama, model preparation, poster writing, art and drawing, role playing, sports and games etc.

**Heart related activities** – Heart related activities are those activities which are concerned more with the emotional / feeling aspects of the learners. Some of the heart related activities are – song, drama, recitation, drill, dance and music activities etc.

"Multi-dimensional activity based integrated approach is a teaching-learning strategy which allows the learner to practise a single activity or a group of activities simultaneously coming either from any one dimension of activities or from more than one dimension of activities (the dimensions mentioned in above-such as head related dimension, hand related dimension and heart related dimension) for the better learning of a particular topic / group of topics."

The activities followed in ‘multi-dimensional activity based integrated approach’ for teaching of different topics / subjects vary from topic to topic / subject-to-subject according to nature of the topics / subjects and the demands of the situations.
b. Nature of multi-dimensional activity based integrated approach of teaching-learning

The followings are some of the important nature and characteristics of multi-dimensional activity based integrated approach of teaching learning.

- This approach makes the learning very effective by following the principles of learning by doing, learning by playing and learning by problem solving, and learning by enjoying.
- This approach is primarily learner oriented, easier and enjoyable, and joyful and interesting.
- In this approach, the activities of teaching – learning change from topic to topic and subject to subject according to the nature of the topics, facilities available for teaching, needs of the learners, nature of the content materials available, demand of the situation and so on.
- This approach requires the active participation on the part of the children in teaching-learning process.
- This approach strengthens the relationship between past experiences of the child and the present learning.
- This approach provides better scope for applying the knowledge and skills of the learners in a meaningful way.
- This approach includes all types of skills including physical skills, mental skills and emotional skills.
- In this approach of learning the teacher acts as a friend, facilitator and guide of the learning process.
- This approach of teaching – learning is more a learning centered approach than the teaching cantered approach.
- Multi-dimensional activity based approach creates a caring classroom by developing following values / qualities on the part of the learner / learning process :-
➢ developing a sharing atmosphere in the teaching-learning process among the learners.
➢ creating awareness among the learners towards learning.
➢ developing a sense of self-respect and self-responsibility among the learners
➢ developing a sense of faith among the learners towards the learning.
➢ making the learning process purposive and goal oriented.

c. Need and importance of developing multi-dimensional activity based integrated approach

It is a fact that, the nature of one subject is different from the nature of another subject, the nature one unit under the same subject is different from other units, the nature of one topic under the same unit is different from other topics, and the nature of one learning paragraph / unit under the same topic is different from other learning paragraphs / units. It is also a fact that the nature of the learning materials and objectives of teaching learning change from situation to situation, time to time and place to place in accordance with demand of the society, philosophy of the country, local needs of the learners and the facilities available to it. In the process of teaching – learning, a student has to achieve a number of competencies in different areas of teaching learning in accordance with his / her changing needs for his/her all round development. But, no particular or specific strategy / activity / approach is appropriate for helping a student to achieve all the objectives of teaching – learning. Rather, it would be better if an eclectic / flexible approach would be followed in the process of teaching-learning. This eclectic / flexible approach of teaching-learning would change according to the change in time, place and demand of the situation and the like. Many of the researchers including Bloom (1971), Kohlberg (1976) and the others are agreed in themselves that no particular / specific strategy is appropriate for achieving all the
objectives of teaching learning. Considering the above points of discussion, the researcher has developed a new, flexible and eclectic approach of teaching – learning, i.e. "Multi-dimensional activity based integrated approach".

d. Uses and importance of multi-dimensional activity based integrated approach for developing cognitive and creative abilities in social studies

MAI approach is such a flexible, integrative and learner friendly approach of teaching learning developed by the researcher himself, which can be used / helpful for achieving different types teaching – learning objectives among the learners. At the same time this approach can be used for developing cognitive abilities, creative abilities, non-cognitive abilities etc. among the learners. But the important point to remember is that, when one will go for achieving cognitive abilities through the MAI approach, at that time s/he would follow / use / participate in such kinds of multi-dimensional activities for teaching – learning which would facilitate cognitive development. Similarly, when one will go for achieving the creative abilities through MAI approach, at that time s/he would follow / use / practise such kind of multi-dimensional activities for teaching-learning which would facilitate creative thinking. In this way the nature / types of activities followed in MAI approach change according to the change in objectives of teaching-learning. Also it is a fact that the nature / type of activities coming under MAI change not only according to the change in the objectives of teaching but also according to the change in the subject matters. For example, the activities followed in MAI approach for teaching of social-studies are not exactly similar with the activities used for teaching of general science, art and craft and so on. Likewise, the nature / types of activities change in accordance with objectives of teaching-learning, nature of the subject matters and so on.

In the present experiment, two types of objectives in the area of social studies had been emphasized for development through MAI
approach. Such objectives were (i) development of cognitive abilities in social studies, and (ii) development of creative abilities in social studies. Cognitive ability in social studies of the present study was understood in terms of knowledge, understanding, skill, and application; and in this cognitive thinking ability, the convergent thinking had the dominant role. That means, cognitive ability in the present study was defined in terms of knowledge, understanding, skill and application; and this cognitive ability was more understood in terms of convergent thinking than the divergent thinking. But, one can not say that divergent thinking ability was not at all there. Divergent thinking ability was also there but in a very lesser scale. Similarly, in the present study, creative ability in social studies was understood in terms of divergent thinking, which (divergent thinking) is further expressed by fluency, flexibility and originality. That means, in the present study creative ability was understood in terms of divergent thinking abilities. Such divergent thinking components were fluency flexibility and originality and this creative ability in social studies was more understood in terms of divergent thinking than the convergent thinking.

e. Examples of some of the multi-dimensional activities used for development of cognitive and creative abilities in the area of social studies

For the development of cognitive and creative abilities in the area of social studies, different multi-dimensional activities are generally being used. However, the nature of multi-dimensional activities used for cognitive development are somewhat different from the multi-dimensional activities used for creativity development. Here is given examples of some of the multi-dimensional activities used for cognitive development and multi-dimensional activities used for creative development in the area of social studies.

Examples of Multi-dimensional activities used for cognitive development in the area of social studies- The different multi-dimensional activities which can generally be used for cognitive development in the area of social studies are:
(i) Organising role playing / dramatization.
(ii) Story writing and story telling.
(iii) Cutting, pasting and arranging materials in order to display in the class.
(iv) Art, drawing & painting activities like drawing different pictures relating to the content, drawing the map of India etc.; and paint them.
(v) Preparing the models, charts etc.
(vi) Stitching works, picture stitching etc.
(vii) Dance and music activities, craft works etc.
(viii) Narrating and speaking the experiences, description through writing.
(ix) Collection, organization and preparations of materials.
(x) Performing songs, drill / recitation etc.
(xi) Identifying and recognizing the symbols, words, sentences etc.
(xii) Reading printed and hand written materials.
(xiii) Writing one word answer.
(xiv) Oral and performance activities.
(xv) Discussion / dialogue, riddle / quiz, developing comments etc.
(xvi) Project work.
(xvii) Creative use of materials.
(xviii) Exhibition.
(xix) Play way method.
(xx) Conducting experiment / project work / practical work / laboratory work etc.
(xxi) Puppet showing.
(xxii) Observations and reporting.
(xxiii) Games, funs, puzzles and cross words.
(xxiv) Problem solving / enquiry mode / discovery model.
(xxv) Environmental approach / field trip.
(xxvi) Inductive and deductive approach.
(xxvii) Peer to peer learning / cooperative learning.
(xxviii) Home work / writing assignment / continuous evaluation.
(xxix) Preparation and showing of flash cards and pictures, picture sorting etc.

(xxx) Poster seeing and poster preparation.

(XXXI) Pledge (solemn promise / prayer).

(XXXII) Ludo activity.

(XXXIII) Programmed instruction, Personal Learning Model (PLM), Self Learning Model (SLM), mastery learning model (MLM), objective based learning etc.

(XXXIV) Expository teaching-learning approach etc.

**Examples of some of the multi-dimensional activities used for creativity development in the area of social studies** - The different multi-dimensional activities which can generally be used for creativity development in the area of social studies are:

(i) Asking questions having divergent answers.

(ii) Complete the incomplete sentences with open-ended scenario.

(iii) Critical analysis and reporting, observation and reporting.

(iv) List the words, names, events and attributes.

(v) Open ended essay, open ended strategy etc.

(vi) Divergent questioning technique.

(vii) Finding out as much as similarities and dissimilarities.

(viii) Narrating and speaking the experience.

(ix) Drawing broad conclusions.

(x) Chorus Competition (Antakshari) / games / play, group competition, speech competition etc.

(xi) Brain storming.

(xii) Logical contradiction, debate, discussion etc.

(xiii) Suggesting the methods, principles, answers etc.

(xiv) Guessing as much as answers, differences, problems etc.

(xv) Writing the consequences.

(xvi) Home work / home assignment (open ended home assignment).

(xvii) Creative drama.

(xviii) School excursion and observation, craft work etc.

(xix) Story telling with regard to
• providing analogies found within a story.
• matching different stories to identify similarities.
• finding relationship between stories and every life situations or inter-personal issues.

(XX) Role playing.
(xx) Puzzle, games (chess etc.)
(xxii) Cross-words, comments.
(xxiii) Creative writing.
(xxiv) Synetics
(xxv) Remote association.
(xxvi) Using paradox and using analogies.
(xxvii) Simulations.
(xxviii) Finding the gaps.
(xxix) Delphi process, nominal group techniques etc.
(xxx) Reflective thinking.
(xxxi) Poster preparation etc.
(xxxii) Divergent use of materials etc.

f. Design of the multi-dimensional activities for cognitive and creative development in social studies

In order to develop cognitive and creative abilities in social studies, a number of multi-dimensional activities had been designed in the present study. In order to develop cognitive and creative abilities in social studies a design was followed in the present study. The name of such design is "Multi-dimensional Activity based Integrated approach of teaching-learning Design". This design included different types of activities including all the head related, heart related and hand related activities. Similarly, the activities included in the design were meant for developing different types of abilities among the learners such as cognitive ability, non-cognitive ability, creative ability and so on. But, the most important point to remember in this design is that, on the basis of aims and objectives of teaching learning, the activity or activities would be chosen by the user and such activity or activities would be implemented. For example, for the development of cognitive ability
among the learners only such activity or activities would be chosen and implemented by the user, which would facilitate(s) cognitive development. Some of the cognitive related activities were stated in earlier page(s) of this chapter. For the development of creative ability among the learners, only such activity / activities would be chosen and implemented by the user which would facilitate(s) the creative thinking ability. Some of the creativity related activities also mentioned in the earlier pages of this chapter. For the development of both cognitive and creative activities among the learners simultaneously the user would choose such activity or activities which would develop cognitive and creative abilities simultaneously; or would choose activities both from cognitive related area(s) and creativity related area(s) of activity / activities. In case, for the development of non-cognitive ability / abilities, the user would choose such activity or activities which would develop / facilitate ability or abilities related to non-cognitive area(s). It is to remember that one cannot categorise the different activities under different heads just like watertight compartments. This categorisation is flexible and changeable. This categorisation is based on the point of emphasis of the objectives / purposes. For example, when an activity is much related with the cognitive aspect, then we can say it is cognitive area related activity. Similarly, when an activity is much related with the creativity area, then one can say it is creativity related activity. The activities which related much with non-cognitive area, one can say such activities are non-cognitive area related activities. In the similar fashion, activities can be divided into head related activities, hand related activities and heart related activities. However, in the present study only those activities were chosen and used in the experiment, which would facilitate development of cognitive ability in social studies and development of creative abilities in social studies. The detail design of the activities is given in Chart no.-3.2. While such design had been made, the topics of social studies taken for experiment were redesigned / modified according to the objectives of the study.
CHART – 3.2
MULTI-DIMENSIONAL ACTIVITY BASED INTEGRATED APPROACH OF TEACHING-LEARNING DESIGN

Social Studies curriculum at Class-VI stage

Areas to be covered
- Geography: Facts, Concepts, Generalisation etc.
- Civics: Facts, Concepts, Generalisation etc.
- History: Facts, Concepts, Generalisation etc.

Through activities
- Hand related activities
- Head related activities
- Heart related activities

Dimensions/ aspects of activities
- Finding the gaps
- Developing riddle
- Reflective thinking
- Open ended essay
- Logical contradiction
- Dialogue & discussion
- Divergent questioning
- Book / picture reading
- Creative use of material
- Writing the consequence
- Drawing broad conclusions
- Open ended home assignment
- Using paradox and using analogies
- Assigning the questions having divergent answers

Types of activities
- Project
- Gesture
- Playway
- Exhibition
- Dramatisation
- Brain storming
- Demonstration
- Creative writing
- Puppet showing
- Body movement
- Preparation of material
- Conducting experiment
- Drill
- Debate
- Craftwork
- Crosswords
- Role playing
- Story telling
- Art & drawing
- Song & recitation
- Puzzles / games
- Model preparation
- Critical discussion
- Developing riddle / quiz
- Dance / music activities
- Role playing, sports and games etc.

Activities vary from topic to topic according to the demands of the situations.

Plan / procedure of teaching
1. Planning for teaching
2. Carrying out teaching
3. Assessing the learning difficulties
4. Remedies for learning difficulties
5. Diagnose the learning difficulties
6. In an integrated fashion

The teacher can integrate one or more than one activity at a time for teaching of particular topic / unit according to the demand of the situation.
B. TRADITIONAL METHOD OF TEACHING APPROACH.

In the present study, traditional method of teaching approach refers to the conventional method of teaching strategy. The nature of this conventional teaching method is generally teacher dominated and passive in nature. This method was used by the researcher in order to teach the control group.

3.5.2 TESTING / MEASURING TOOLS

Two types of measuring tools were used in the present study. They are:

A. Cognitive ability test in social studies, and
B. Creative ability test in social studies.

However, it is to note that, the same cognitive ability test was used as both pre-test as well as post-test in the present study. Similarly, the same creative ability test was used as both pre-test as well as post-test in the present study.

The cognitive ability test in social studies used in the present study was named as "Cognitive ability Test in Social Studies (CTS)", and creative ability test in social studies used in the present study was named as "Basantia's Test of Creative ability in Social Studies (BTCS)". The detail descriptions of such test are given below.

A COGNITIVE ABILITY TEST IN SOCIAL STUDIES (CTS)

a. Background nature of the test

One of the major objectives of the present study was to assess the effectiveness of MAI approach in terms of developing cognitive ability of the students. For this purpose, the researcher had used a cognitive ability test in social studies. This test was developed by the researcher himself with the help of experts. This same cognitive ability test was used both as pre-test and post-test in the present study. That means, before the treatment, the same test of cognitive ability was administered to the subjects in order to collect the entry level / base line data and after the treatment the subjects were administered the same cognitive ability test as the post-test for knowing the cognitive changes of the learners due to the effects of the treatment.

This cognitive ability test was based on six chapters of social studies book of class–VI. Such six chapters were taken for research purposes. The most important characteristic of this cognitive ability test was that, the items used in this test were generally convergent in nature. That means, the questions / items used in this test generally
yield fixed answers / fixed responses / convergent answers. Such questions require the divergent answers in a very lesser scale or the divergent thinking had a very little role relating to such test items. The researcher had taken all types of decisions regarding the present test with the help of a panel of experts.

b. Competency areas to be measured through present CTS

As the test was meant for class–VI students, so, the lower order cognitive competencies were selected for the test. Such competencies were knowledge, understanding, skill and application. As the higher order cognitive competencies like analysis, synthesis, evaluation etc. are meant for the grown of students / higher class students, so, such competencies were not chosen for the present test. The brief description of the cognitive competencies, chosen for the present test are given below –

**Knowledge**- Relating to the factual information of the content.

**Understanding**- Relating to the meaningful comprehension of the learning materials of the content.

**Skill**- Relating to the performance abilities of the learners concerning the content.

**Application**- Relating to the appropriate use of the learned materials in other situations.

c. Types of test items given in the present CTS

In accordance with the views of the experts, the researcher had taken three types of test items for the present test. Such types of test items are:

(i) Long question type test items.

(ii) Short question type test items.

(iii) Objective question type test items.

d. Weightage of marks given to such types of test items

According to the opinion of the experts the researcher had given the following weightage of marks to the test items.

(i) L.Q. (Long Question type) items = 4 marks.

(ii) S.Q. (Short Question type) items = 2 marks.

(iii) O.Q (Objective Question type) items = 1 mark.
e. Preliminary draft of the test

The present test was consisted of 100 marks. At the preliminary stage of the preparation of test, there were totally 42 items. Out of those 42 items, L.Q. items were 9, S.Q. items were 19, and O.Q. items were 14. Among them, 7 items of L.Q., 14 items of S.Q. and 10 items of O.Q. were retained for finalization after item analysis. Item analysis was made with the following three stages:

(i) Item selection,
(ii) Item difficulty level, and
(iii) Item discrimination.

*Item Selection* – Item selection was made on the basis of experts’ judgement. Judgement was made taking into consideration the objectives and purposes of test.

*Item difficulty level* – Only such items were taken / selected for final stage which were approaching to the middle difficulty level.

*Item discrimination* – Only such items were retained for the preparation of final test, which were approaching towards highly positive discrimination values.

f. Final draft of the test

In the final draft of the test, the weightage to the different aspects of the test were given in the following manner in accordance with the experts’ judgement.

(i) Percentage of weightage in marks given to the different content areas of social studies in relation to their competencies are given in Table- 3.4.

<table>
<thead>
<tr>
<th>Competency Areas</th>
<th>Knowledge</th>
<th>Understanding</th>
<th>Skill</th>
<th>Application</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography</td>
<td>8%</td>
<td>12%</td>
<td>8%</td>
<td>7%</td>
<td>35%</td>
</tr>
<tr>
<td>History</td>
<td>12%</td>
<td>8%</td>
<td>8%</td>
<td>7%</td>
<td>35%</td>
</tr>
<tr>
<td>Civics</td>
<td>8%</td>
<td>10%</td>
<td>6%</td>
<td>6%</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>28%</td>
<td>30%</td>
<td>22%</td>
<td>20%</td>
<td>100%</td>
</tr>
</tbody>
</table>

TABLE – 3.4.

PERCENTAGE OF WEIGHTAGE IN MARKS GIVEN TO DIFFERENT CONTENT AREAS IN SOCIAL STUDIES IN RELATION TO THEIR COMPETENCIES
(ii) Weightage in marks given to different competencies in relation to the content areas of social studies are given in Table 3.5.

TABLE – 3.5.
WEIGHTAGE IN MARKS GIVEN TO DIFFERENT COMPETENCIES IN RELATION TO CONTENT AREAS IN SOCIAL STUDIES

<table>
<thead>
<tr>
<th>Competencies</th>
<th>Knowledge</th>
<th>Understanding</th>
<th>Skill</th>
<th>Application</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography</td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>History</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>Civics</td>
<td>8</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>30</td>
<td>22</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

(iii) The detail blueprint of the present cognitive ability test in social studies developed by the researcher with the help of experts is given in Table – 3.6.

TABLE – 3.6.
BLUEPRINT OF THE COGNITIVE ABILITY TEST IN SOCIAL STUDIES

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Knowledge</th>
<th>Understanding</th>
<th>Skill</th>
<th>Application</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ</td>
<td>LQ SQ OQ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X 2 (4)</td>
<td>4 (4)</td>
<td>2 (8)</td>
<td>2 (4)</td>
<td></td>
</tr>
<tr>
<td>History</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ</td>
<td>LQ SQ OQ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X 2 (4)</td>
<td>8 (8)</td>
<td>1 (4)</td>
<td>2 (4)</td>
<td></td>
</tr>
<tr>
<td>Civics</td>
<td>LQ SQ OQ</td>
<td>LQ SQ OQ</td>
<td>LQ SQ</td>
<td>LQ SQ OQ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X 2 (4)</td>
<td>4 (4)</td>
<td>1 (2)</td>
<td>6 (6)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>22 (28)</td>
<td>10 (30)</td>
<td>20 (22)</td>
<td>11 (20)</td>
<td>63 (100)</td>
</tr>
</tbody>
</table>
• LQ = Long Question type items.
• SQ = Short Question type items.
• OQ = Objective Question type items.
• The number given in the bracket (....) indicates the marks.
• The number given outside the bracket indicates the number of questions.

g. Preparation of the test manual

The present test contains 100 marks. These 100 marks were divided on the basis of content areas (geography, history, and civics) and competency areas (knowledge, understanding, skill and application) according to the experts' judgements. The test contained three types of items, i.e. Long question type items (LQ), Short question type items (SQ), and Objective question type items (OQ). Each LQ question contained 4 marks, SQ question contained 2 marks and OQ contained 1 mark. Scoring was done according to the weightage of marks given to the different types of questions. Though the total number of questions mentioned in the blueprint were 63 but such 63 questions were kept under the heading 31 questions in actual test. It was made / done so because under the heading of one question, many questions of similar category are kept. For example, under the heading of one question three or four objective questions were kept. Similarly, under the heading of one question two or three short answer type questions were kept. The researcher had made so in order to make the test more feasible for administration, scoring and interpretation.

Out of these 31 questions in actual test, the content area of geography contained 10 questions, the content area of history contained 11 questions and the content area of civics contained 10 questions. Similarly, out of these 31 questions, the knowledge competency area contained 10 questions, the understanding
competency area contained 9 questions, skill competency area contained 5 questions and application competency area contained 7 questions. The detail natures of the actual test questions used in cognitive ability test in social studies are given in Table - 3.7. and Table - 3.8.

**TABLE - 3.7**  
THE DETAIL NATURE OF TEST QUESTIONS OF DIFFERENT CONTENT AREAS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content areas</th>
<th>Types of questions</th>
<th>Question Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Studies</td>
<td>Geography</td>
<td>LQ</td>
<td>No. - 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No. - 5</td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No. - 1</td>
<td>No. - 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. - 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No. - 3</td>
<td>No. - 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. - 7</td>
<td>No. - 10</td>
</tr>
<tr>
<td></td>
<td>History</td>
<td>LQ</td>
<td>No. - 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. - 11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No. - 1</td>
<td>No. - 6; No. - 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. - 2</td>
<td>No. - 7</td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No. - 3</td>
<td>No. - 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. - 4</td>
<td>No. - 10</td>
</tr>
<tr>
<td></td>
<td>Civics</td>
<td>LQ</td>
<td>No. - 4</td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No. - 1, No. - 5, No. - 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. - 2, No. - 8, No. - 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No. - 3</td>
<td>No. - 7</td>
</tr>
</tbody>
</table>
### TABLE – 3.8
DETAIL NATURE OF THE TEST QUESTIONS IN DIFFERENT CONTENT AREAS IN RELATION TO THE COMPETENCIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content areas</th>
<th>Competency areas</th>
<th>Types of questions</th>
<th>Question numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography</td>
<td>Knowledge</td>
<td>LQ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No.1, No.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Understanding</td>
<td>LQ</td>
<td>No.4, No.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skill</td>
<td>LQ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No.7, No.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application</td>
<td>LQ</td>
<td>No.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History</td>
<td>Knowledge</td>
<td>LQ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No.1, No.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No.3, No.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Understanding</td>
<td>LQ</td>
<td>No.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No.6, No.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skill</td>
<td>LQ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application</td>
<td>LQ</td>
<td>No.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civics</td>
<td>Knowledge</td>
<td>LQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No.1, No.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Understanding</td>
<td>LQ</td>
<td>No.4, No.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skill</td>
<td>LQ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>No.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application</td>
<td>LQ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ</td>
<td>No.8, No.9, No.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OQ</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The details of the actual test items, marks etc. are given in Appendix – D.

250622
h. **Reliability and validity of the test.**

A sample of 30 students of Sec.-B of Kendriya Vidyalaya (K.V.) No.-1, Bhubaneswar were taken to estimate the reliability and validity of the present cognitive ability test.

Any psychological test is a device for giving a quantitative measure for given characteristics. Therefore, it is essential to determine the efficiency of any such tool before it is put to use. Validity and reliability are the most important aspects of efficiency of a psychological test.

**Reliability** - The reliability of the present cognitive ability test was estimated through test retest method. At first, the test was administered upon the sampling group. After the test had been administered, a gap of one week was given to the subjects. Then, the same test was re-administered upon the group. The test re-test reliability co-efficient of co-relation was found to be 0.78.

**Validity** - Validity is the basic characteristic of a measuring tool. It is the most important quality of a good measuring instrument. A host of methods are generally followed in order to calculate the validity of a measuring tool. The validity of the present test was determined through the following ways / methods.

**Content Validity** – The theoretical validity of the test was established through content validity procedure. The content validity of the test was established on the basis experts' judgement. Items were selected as well as analysed on the basis of objectives and the nature of the test.

**Item Validity** – The statistical validity of the items were calculated by applying the principles of items difficulty and item discrimination. The following formulae were followed for calculating item difficulty and item discrimination.
Item Difficulty = \(\frac{R}{N} \times 100\)

\(R\) = number testees answered correctly.
\(N\) = Total number of testees.

Item Discrimination \(\frac{Ru - Rl}{\sqrt{2} N}\)

\(Ru\) = Number of testees in the upper group who answered the item correctly.
\(Rl\) = Number of testees in the lower group who answered the item correctly.

\(N\) = Total number of testees.

As discussed earlier, the items which were approaching the middle difficulty values, and the items which were approaching the highly positive discrimination values, were selected for finalization.

*Concurrent validity of the test* - Not so much good and standardized external criterion was found to validate the present test. However, the present test result was co-related with the test result of a general classroom achievement test in social studies of the same group of 30 students of Sec.-B, KV-1, Bhubaneswar. Here, the present test scores (which was developed by the researcher) was known as ‘test score’ and the test scores of classroom achievement test in social studies developed / administered by the teacher(s) of the school was regarded as the ‘criterion score’. When the test score was co-related with the criterion score, the validity co-efficient was found to be 0.75. From these validity coefficient of correlation and reliability coefficient of correlation, the researcher concluded that the cognitive ability test developed by himself is highly valid as well as reliable.
B. BASANTIA’S TEST OF CREATIVE ABILITY IN SOCIAL STUDIES (BTCS)

a. Background nature of the test

One of the significant objectives of the present study was that – the study aimed at studying the effectiveness of MAI approach over TMT approach in terms of development of creative abilities in social studies of the elementary stage students. For this purpose, the researcher had developed a creative ability test in social studies. This self developed creative ability test in social studies was named by the researcher as “Basantia’s Test of Creative ability in Social studies (BTCS). This, same creative ability test was used both as pre-test as well as the post-test in the present study. That means, before the treatment, the same test of creative ability was administered on the subjects as the pre-test in order to collect the base line data, and after the treatment the same test of creative ability was administered as the post-test on the subjects in order to assess the extent of change of creative abilities of the subjects due to effect of treatment.

This creative ability test was based on the six topics of Social Studies book of Class-VI, which (those six chapters) were taken for the research work. The names of such topics are mentioned in the earlier part of this chapter. The most important characteristic of this creative ability test was that, the items included in this test were generally divergent in nature. In more clear-cut words, one can say that the items / questions included in this test generally yielded the answers which are divergent / not fixed. In this creative ability test, each and every question / item required the answers / responses which are not fixed. Each examinee of this test was free to give / provide as many as responses that s/he can give for the same item / question. While the researcher had taken the decision regarding this creative ability test, he was assisted by a panel of experts in the area of psychology and creativity.

b. The topics on which BTCS was based

This BTCS was a subject related creative ability test. While the test items for this BTCS were prepared, the items were prepared on the basis of six chapters of Class-VI social studies book. These six chapters were taken from three content areas of social studies book, namely, Geography, Civics and History. The topic on which BTCS was based is given below.
### TABLE – 3.9
THE DETAILS OF THE TOPICS ON WHICH BTCS WAS BASED

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content Areas</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Studies</td>
<td>Geography</td>
<td>India our country.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Our climate, natural vegetation, and wild life.</td>
</tr>
<tr>
<td></td>
<td>History</td>
<td>India’s cultural contact with outside world.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Major religions</td>
</tr>
<tr>
<td></td>
<td>Civics</td>
<td>How people in the cities meet their needs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Caring for things belonging to us all.</td>
</tr>
</tbody>
</table>

c. Competencies to be measured through the present BTCS

The present BTCS aimed at measuring three competency areas of creativity. Such competency areas were fluency, flexibility and originality.

*Fluency*— Fluency refers to the ability to produce many numbers of unrepeated ideas for a given task.

*Flexibility*— Flexibility refers to the ability of the individual to produce different categories or varieties of ideas.

*Originality*— Originality refers to the ability to produce new or unusual ideas.

d. Nature of the test items included in BTCS

Each test item of BTCS required the answer, which is divergent in nature. That means, the items included in BTCS didn't have fixed answer. The participants / examinees of the BTCS were free to answer so many answers for the same question / item according to their ability.

Another important characteristic of the items of present BTCS was that, from the same item three types of competencies (i.e., fluency, flexibility and originality) were scored. Fluency was scored on the basis of number of answers / responses given by the respondent, flexibility was scored on the basis of categories of responses given by the respondent, and originality was scored on the basis of the unusual responses given by the respondent to the same item. In this test no separate items were needed to measure the fluency, flexibility and originality competencies separately, rather from the same item all these competencies were measured.
**e. Preliminary draft of the test**

The present BTCS had been developed to measure the creative ability in the area of social studies. While preparing the test items the following considerations were taken into account.

- The items were prepared in such a way that those items would help in measuring the creativity in the area of social studies / social sciences.
- The items were divergent and having no single right answer.
- The items were challenging and which could draw the best creative ability of the students.
- The contents of the items were familiar to the students, and related more or less to the specific areas / topics of social studies.
- Some of the items were hypothetical in nature whereas the others were memory based, understanding based, critical thinking based and so on.

Some of the limitations of the items included in the BTCS are:

(i) The test was only concerned with the verbal items, no non-verbal items were included in the test.

(ii) The test was designed to measure only three types of creative competencies i.e., fluency, flexibility and originality whereas the other creative competencies like elaboration, imagination, curiosity etc., were not taken care of.

(iii) A fixed time limit was followed for all the items of the test. Though many of the creativity tests do not follow the fixed time limit, but for the betterment of administration, scoring and interpretations such time limit was followed for the present test.

This BTCS was a test which was not just like the general achievement test or I.Q. test or aptitude test. Neither large quantity of questions were available relating to present test, nor such items were selected from the content areas in ready-made way. So, while preparing the items for BTCS, the researcher had tried his best to make such
items open ended as well as content based. For this purpose the researcher has faced a lot of challenges. The researcher had also taken the challenge to re-design the course pattern / topics he taught and accordingly he formulated the items. While preparing the preliminary draft as well as the final draft of the test, the researcher had taken the help of a panel of experts and resource persons.

At the preliminary stage, 21 items in all were taken by the researcher. Out of these 21 items, 7 items were from the content area of geography, 7 items were from the content area of history and 7 items were from the content area of civics. But, out of these 21 items, 13 items were chosen to the final draft. Out of these 13 items, 5 were from the content area of geography, 4 were from the content area of history and 4 were from the content area of civics.

f. Descriptions of the test items

When such test items were prepared by the researcher, the formats used by Guilford, Torrance, Mehdi etc. were taken care of / followed. Those test items were based on the action related tasks / words / sentences like ask as many as questions, write down all the causes, what would happen etc. The brief descriptions of such test items are given below and the test itself is given in Appendix-E.

**Items in geography content area**

1. India is a land of forests. Forest helps us in many ways. For example, (i) it provides wood for fuel, (ii) it provides food for eating.

List out all other types of help we get from forest.

The basic idea for this test has been drawn from Torrance’s ‘tin can uses’, Guilford’s ‘brick uses’ and Wallach Kogan’s ‘alternative uses’ test items. Here, the subject is instructed to state as many as types of help that we get from forest. Also, this test expects from the subject to state the varieties of the ways as well as unique ways of help that we get from the forest.
2. Ask as many as questions you can ask about earth. For example, (i) what is the size of the earth, (ii) what is earth etc.

Curiosity, inquisitiveness, asking and questioning etc, are the basic characteristics of creative persons. This test has similarity with Torrence's test of "ask and guess". Ausubel (1958) discusses the development of curiosity in terms of number and kinds of questions asked by the children. So asking the divergent questions regarding a particular matter / thing / object / stimuli is an important creative ability and the present test measures the same.

3. India is a land of diversities. For example we find diversities in respect of (i) caste, (ii) colour of the people etc.

Write down as many as other such diversities found in India.

This test calls for multiple answers for the same question / item. These multiple answers can be written in terms of diversities found in India. The basis of this test is that, the subject will pull / write / state many answers referring to a single defined task / matter.

4. India is surrounded by seas in its all sides. We are getting different types of benefits from the seas. For example – we are getting salt from the sea. Write all those benefits we are getting from the seas.

This test is mostly similar with item / test No.1. The only difference is in content. In the test No.1 it is told to write / state as many as uses of forest but in this test / item it is told to write as many as benefits we are getting from the seas.

5. Write down all those you think of that would happen if sun stops giving light. For example – the earth will be cold.
This test item is a hypothetical test item. Though it is a hypothetical test item, but the answer required for this test item is fully divergent in nature. This test item requires critical and high level of divergent thinking. This present test can be compared with Guilford's 'consequence test' and Torrance's 'Just suppose test'. This item illicits the divergent responses which are more hidden within the individual.

**Items in history content area**-

1. Today's society is called modern day society. We find a number of facilities in this modern society. For example – (i) the people stay in pucca houses, (ii) the people use computer etc.

   This item requires the subject to generate / say / write a number of answers within the limited time. Here the subject is instructed to write as much as facilities which are found in modern society. The subject has to think over a wide range of objects / situations / activities which would fall under the category of this item.

2. Before thousands of years, the people were leaving in forests and mountains by facing many difficulties. The examples of such difficulties are – (i) the people were eating raw food, (ii) there was no medicine to cure the dangerous diseases etc.

   Write as many as other difficulties that the people might have faced at that time.

   This test items s a replica of test item No.1 of this history content area. The only difference is that in item No.1 the subject is told to state the number of facilities found in modern day society but in this test item the subject is told to state as many as difficulties faced by the people of thousands of years back.

3. What would happen if India would have one religion. The examples of consequences are – (i) the people would live happily, (ii) the people would go to same religious place etc.
It is also a hypothetical test. In this hypothetical test, the subject is required to write the consequences if India would have one religion. This test also can be compared with Guilford's 'consequence test' and Torrance's 'just suppose test'.

4. Name the different luxurious things that the people of our society use. For example – (i) gold, (ii) mobile phone etc. Write as many as you can in the space given below.

This test item is restricted to luxurious things only, which are used by the people of modern day society. The subject would list the name of as many as number of luxurious things that we use. This is a very good test for measuring creativity in social science area because the luxurious things used by the people of the society have social relevance on sociological significance.

**Items in civics content area**-

1. Cities are different from villages in many respects. For example (i) population in cities are more (ii) big big buildings are found in cities. Write down all other differences between cities and villages.

In the present test item, the subject is required to write as many as points in which city is different from village. This is a special type of test item, which requires the subject to write as many as differences between city and village. This item is some what different from other types items in the point that, in this test item the subject is instructed to write as many as differences between two things (difference between urban area and rural area) whereas in many other types of items, the subject is not required to write differences between two but required to give as many as details / points on a single task. XXX For example – name the luxurious things found in society, facilities found in the modern society, write the benefits we are getting from sea etc. xxx
2. Write down as many as causes for which the environment of the cities are polluted. For example – due to overpopulation.

Here, the subject is instructed to write the different causes for which the environment of the cities are polluted. The basis of the present test item is that, the environment of the cities are polluted due to divergent factors / causes like wide use of vehicles, mismanagement of the waste materials etc. The subject has to write as many as causes of pollution of the cities.

3. Suggest different welfare activities that a municipal council should do for the people of the city. For example – it should establish drainage system in the city.

In this test, the subject is required to enlist sufficient number of welfare activities which municipal council should do for the people of the city. A subject who is more aware of the different problems of the city can give more answers for this item. The individual / subject may give different suggestions, like creating drainage system, opening more schools and colleges, opening recreation centres etc. A subject who is sensitive to the existing problems and more aware about the needs and deficiencies about the city can give more, varied and new responses for the present test item.

4. Write the names of as many as personal properties found in your surrounding. For example – (i) pen, (ii) computer etc.

This item is restricted but its answers / responses are open. The item is restricted in the sense that, the item states about only personal property. But it's answer is open in the sense that, this item calls for multiple answers. One can write pen, pencil, box, cap etc. many answers for this test. Another important characteristic of present test is that, this test calls for responses which are
more information related / type but not more logical and provocative. For this test the subject is required to enlist the divergent kind of personal properties.

**g. Preparation of the test manual**

The manual of the BTCS included the followings.

(i) Target group,
(ii) Selection of test items to the final test,
(iii) Procedure of Administration, and
(iv) Procedure of scoring.

**Target Group**— The present test was meant for Class-VI students of elementary school. This test was meant for measuring the creative abilities of the students in the area of social studies, so, this was a creativity test in a specific area. Generally, the average age of Class – VI student are 11 +.

**Selection of test items to the final test**— After a rigorous analysis, the test items were selected to the final test. As stated earlier, during the preliminary draft stage all total there were 21 items, and out of these 21 items, 7 were from the content area of geography, 7 were from the content area of history and 7 were from the content area of civics. But, out of these 21 items, 13 items were selected to the final test. Out of these 13 items, 5 were from the content area of geography, 4 were from the content area of history and 4 were from the content area of civics.

**Item Selection**— Items were selected / prepared on the basis of the expert’ judgements. While selection of the items were made, due care had been taken regarding the objectives of the test, nature of the group, area / sub-area of the test etc. While items were selected proper content analysis and factor analysis were done.

**Item Analysis**— Item analysis is an essential requirement for constructing a good test. Item analysis can be done for any test for selection, substitution and revision of the items. Item analysis can be done both quantitatively as well as qualitatively. Qualitative item analysis is done in term of contents and forms of a test whereas quantitative item analysis is done in terms of its statistical properties.
Item analysis is basically done in order to find out the validity of the test items. For item analysis of the present test qualitative method was followed.

**Validity of the present test**—For the present test, only the qualitative method was followed to find out the validity. No such rigorous statistical method / quantitative method was followed to calculate the validity. It is also true that, it is very difficult to establish the quantitative validity of a creativity test, due to lack of a well-defined and well-established criterion. Yama moto (1965) in a substantive review of the some validation studies in the area of creative thinking found that:— (a) investigators have not come to an agreement as to the most of the meaningful, practical and immediate criteria of creative thinking. (b) every one of the easily obtained measures like school grades, supervisor and teacher rating, peer nomination, production records and psychiatric diagnosis have serious short comings as a suitable criterion; and (c) more validation studies are urgently needed to establish both empirical and conceptual validities of the current instruments. Torrance (1962) also stated "perhaps one of the major reasons, why research related to the measurement and development of creative thinking did not catch the imagination of the educators of past years, lies in the failure of researcher to deal adequately with difficult problems of criteria and validity.

Both the content and construct validity methods were followed to establish the validity of the present test. That means, when the items were chosen / selected for the test, a group of experts analysed properly how far such items confirm to the principles of creativity and the nature of the content materials / topics specified. Therefore, the present creativity test items supported these two points: -

(i) The test items are based on the specified contents / topics of social studies, and

(ii) Each of the test items is seeking divergent answers.
h. Procedure of administration

The nature of creativity test is somewhat different from the nature of intelligence test, nature of achievement test etc. Because, most of such tests (intelligent test, achievement test etc.) generally require convergent answers. But, all the creativity related tests require the subject to think very deeply and answer a test item with multiple answers. It is only the game like, playful and enjoying situation in which the creative ability of a subject / individual can be elicited. Also in this context, Wallach & Kogan (1965) in connection of one of their studies say “every effort was made to generate permissive, game like context in working with the children on most of the instruments comprising the study”. The present test also followed the same principle / condition. For the administration of the present test, a well conducive game like, enjoying and playful situation was created.

Regarding the time limit of creativity test, most of the specialists in creativity tests 'support the view that no fixed / rigid time limit is required for administration of a creativity test'. But this does not means that, the test would continue the whole day long. Also, many of the test specialists support that some sort of time limit is necessary for the purpose of experimentation and the related works. A reasonable time limit is necessary for completion of all the tasks. Mehdi (1973) and many other test constructors have fixed time limits for their tests of creativity. In fact it is true that without any time limit, the test may be meaning less. The present test contained 13 items. The researcher set 10 minutes for administration of each item. Therefore, for 13 items, 130 minutes was the time limit. Therefore, the researchers set a time limit of 130 minutes (two hour ten minutes) for administration of the present test. Another important point that was to be followed by the subjects of present test is that, the subjects were told to complete one item within ten minutes and then shift to the next item. In this way subjects were instructed to complete each item within a given period of time (i.e., ten minutes). However, the subjects were not bound to follow the item wise time limit but they were bound to follow the time limit of the whole test. That means, just after completion of two hours and ten minutes the subjects were bound to submit their sheets to the examiner.
While the test was administered, the following points also were kept in mind:

- the testing environment was well designed, conducive and comfortable.
- the administer maintained proper time for administration of the test.
- the pupils / subjects were properly motivated towards the test. Every effort was made by the administrator to motivate the test takers.
- proper clarity was maintained while instructions were given to the pupils / subjects.

i. Procedure of Scoring

As there was no right or wrong responses of the test and no fixed answer of the test, so the scorer was very careful while scoring. While scoring was done for the present test, the scoring procedure for verbal test of Baqer Mehdi was followed with some sorts of changes / modifications. While fluency and flexibility were scored, Baqer Mehdi procedure was exactly followed, but while originality was scored, some sorts of necessary changes were made to Baqer Mehdi procedure, which is discussed in below.

Scoring of fluency— While scoring of fluency of this test score was done, the exact scoring pattern of Baqer Mehdi was followed. In scoring for fluency, the scorer did go through the responses to the item in question carefully and stroke off those, which were irrelevant and/or had been repeated. Then he counted the remaining number of responses and entered this number as the fluency score for the item.

Scoring of flexibility— For scoring of flexibility, also the exact scoring pattern of Baqer Mehdi was followed. For scoring of flexibility, the scorer at first acquainted himself with the categories of responses for each item. After the scorer had gone through all the responses to a given item, he found out how many different
categories have been used by the testee. The flexibility score was nothing but total number of categories of answers given by the testee to a particular item. For example, for a test item, the testee answered 15 responses. This 15 was his/her fluency score. And, if this fifteen answers were grouped under 4 categories of answers on the basis of their similar qualities / characteristics, then this 4 will be his / her flexibility score.

It is also a fact that, no scorer / test maker can say exactly how many categories of answer should remain under one item. Actually, the categories depend upon nature of the students’ answer. Since all most all the creativity test questions require divergent answers, so, it is very difficult to fix the categories of answers before the test is administered to the specific group. For the present test, while scoring was done for flexibility, the researcher formulated the flexibility categories for a particular item according to his own perception / observation to the answers / responses referring to the test items. The researcher had not used any pre-fixed or pre-determined criteria or standardized criteria for determining the flexibility categories. However, while scoring of the present was done, the pattern of scoring was as similar with Baqer Mehdi’s pattern of scoring flexibility.

Scoring of Originality— In the earlier chapter (i.e. chapter-1) it is discussed that originality scoring is generally done on the basis of statistical un-commonness of the responses. The more uncommon responses, the higher the originality weight.

According to Baqer Mehdi manual, the weight for originality scoring has been determined on the basis of following scheme. If a response is given by .1% to .99% of the testees, then the response will get an originality weight of 5; if a response has been given by 1% to 1.99% of the testees, then the response will get an originality weight of 4; if a response has been given by 2% to 2.99% of the testees, then the response will get an originality weight of 3; if a
response has been given by 3% to 3.99% of the testees, then the response will get an originality weight of 2; and if response has been given by 4% to 4.99% of the testees, then the response will get an originality weight of 1. Responses given by 5% or more of the testees will get an originality weight of zero.

But in the present test, the following scoring procedure was followed which is also very much closer to the procedure of scoring of originality stated by Baqer Mehdi. The procedure followed for scoring of originality of present BTCS is given in Table-3.10.

**TABLE 3.10**

<table>
<thead>
<tr>
<th>A response answered by the number of testees in percentage form</th>
<th>Originality score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A response given by 1% of the testees</td>
<td>5</td>
</tr>
<tr>
<td>A response given by 2% of the testees</td>
<td>4</td>
</tr>
<tr>
<td>A response given by 3% of the testees</td>
<td>3</td>
</tr>
<tr>
<td>A response given by 4% of the testees</td>
<td>2</td>
</tr>
<tr>
<td>A response given by 5% of the testees</td>
<td>1</td>
</tr>
</tbody>
</table>

In the present test the number of sample in both the groups were quite small (52-in control group and 60-in experimental group). So while one would go for calculating the originality score of these groups, s/he would face some difficulty in the process of scoring. For instance, s/he would get a number of fractional originality score under a response group. In order to get rid of such difficulties, the researcher had taken challenges to convert such fractional number of originality scores in to whole number. And, accordingly the researcher had calculated the originality score.

The following tables (Table –3.11 and Table-3.12) provide the guidelines for scoring originality scores for control group as well as experimental group referring to the present BTCS.
TABLE 3.11
PROCEDURE FOR SCORING ORIGINALITY SCORE FOR CONTROL GROUP
(Number of testees – 52)

<table>
<thead>
<tr>
<th>A response answered by number of testees out of 100 testees</th>
<th>Respective originality score</th>
<th>A response answered by number of testees out of present 52 testees</th>
<th>Their respective originality score</th>
<th>The respective originality score converted into whole form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>1</td>
<td>( \frac{5}{100} \times 52 = 2.60 )</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>2</td>
<td>( \frac{4}{100} \times 52 = 2.08 )</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
<td>( \frac{3}{100} \times 52 = 1.56 )</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>4</td>
<td>( \frac{2}{100} \times 52 = 1.04 )</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5</td>
<td>( \frac{1}{100} \times 52 = 0.52 )</td>
<td>1</td>
</tr>
<tr>
<td>More than 5</td>
<td>0</td>
<td>More than 5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

TABLE 3.12
PROCEDURE FOR SCORING ORIGINALITY SCORE FOR EXPERIMENTAL GROUP
(Number of testees – 60)

<table>
<thead>
<tr>
<th>A response answered by number of testees out of 100 testees</th>
<th>Respective originality score</th>
<th>A response answered by number of testees out of present 60 testees</th>
<th>Their respective originality score</th>
<th>The respective originality score converted into whole form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>1</td>
<td>( \frac{5}{100} \times 60 = 3 )</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>2</td>
<td>( \frac{4}{100} \times 60 = 2.4 )</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
<td>( \frac{3}{100} \times 60 = 1.8 )</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>4</td>
<td>( \frac{2}{100} \times 60 = 1.2 )</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5</td>
<td>( \frac{1}{100} \times 60 = 1 )</td>
<td>1</td>
</tr>
<tr>
<td>More than 5</td>
<td>0</td>
<td>More than 5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3.6.0 TECHNIQUES OF DATA ANALYSIS

For the present piece of research work, the researcher has used the descriptive statistics like mean, standard deviation, graphical representation of data etc. and the inferential statistics of ANCOVA for analysis of data. The factorial designs for data analysis regarding the present study are given in Chart No. 3.3; 3.4; 3.5; 3.6.
FACTORIAL DESIGN FOR DATA ANALYSIS REFERRING TO OBJECTIVES OF TEACHING, APPROACHES OF TEACHING AND PERFORMANCE TESTS.

Teaching social studies

- Objectives of teaching
  - Approaches of teaching
    - Performance tests
      - COG = Cognitive ability
      - CRE = Creative ability
      - Geo = Geography
      - His = History
      - Civ = Civics
      - TMT = Traditional method of teaching
      - MAI = Multi-dimensional activity based integrated approach
      - Fy.x = Analysis of co-variance result by adjusting post-test scores with pre-test scores

- PT = Pre-test
- POT = Post-test

Fy.x = Analysis of co-variance result by adjusting post-test scores with pre-test scores
FACTORIAL DESIGN FOR DATA ANALYSIS REFERRING TO OBJECTIVES OF TEACHING, APPROACHES OF TEACHING,
COMPETENCY AREAS OF OBJECTIVES AND PERFORMANCE TESTS.

CHART – 3.4

FACTORIAL DESIGN FOR DATA ANALYSIS REFERRING TO OBJECTIVES OF TEACHING, APPROACHES OF TEACHING,
COMPETENCY AREAS OF OBJECTIVES AND PERFORMANCE TESTS.
FACTORIAL DESIGN FOR DATA ANALYSIS REFERRING TO APPROACHES OF TEACHING, OBJECTIVES OF TEACHING, CONTENT AREA TEACHING AND PERFORMANCE TESTS.

Teaching social studies

Approaches of teaching

Objectives of teaching

Content areas of teaching

Performance tests

Geo  His  Civ

Geo  His  Civ

Geo  His  Civ

Geo  His  Civ

MAI

TMT

Fy.x  Fy.x  Fy.x  Fy.x  Fy.x  Fy.x  Fy.x
FACTORIAL DESIGN FOR DATA ANALYSIS REFERRING TO OBJECTIVES OF TEACHING, APPROACHES OF TEACHING, CONTENT AREAS OF TEACHING AND PERFORMANCE TESTS RELATING TO COMPETENCY AREAS OF OBJECTIVES.

Teaching social studies

Objectives of teaching

Approaches of teaching

Content areas of teaching

Performance tests

Competency areas of objective