• **WORK PLAN AND METHODOLOGY**

• **I STAGE: SURVEY:**

In this stage researcher will find the total number of the schools of SSC Board affiliated English Medium & Marathi Medium Schools and CBSE Board affiliated Schools located in Panvel taluka of Raigad District in Maharashtra. This survey is to get the information from the target school teacher, who teaches the geography subject at secondary level. Therefore, he will use the questionnaire prepared by researcher to obtain the facts from the specified school teacher. The main objective of this survey is to get the present knowledge/awareness about GIS techniques and their uses in teaching of geography subject.

• **II STAGE: TRAINING PROGRAM FOR TEACHERS:**

At this stage researcher will select the three qualified teachers from outside of the schools for teaching selected geography topics to the experimental group with the help of GIS techniques. Researcher will conduct two weeks special training program for these teachers to provide training about GIS techniques awareness/know ledge and their uses in teaching of geography subject. Training also includes the selection of GIS techniques according to the topics and focuses on techniques like Google Map, Google Earth, Satellite Images, Remote Sensing Map Reading, GPS Reading, GIS software for overlapping of maps, Layered map etc. Then researcher will select the topics according to the school curriculum year plan for teaching the geography subject. The main purpose of providing training to the outside teacher is to control the experimental validity of the research and avoid biasness by the researcher while applying treatment.

• **III STAGE: EXPERIMENT:**

1. **Research Design for Experiment:**

The present study is experimental in nature and ‘Randomized Pretest-Posttest Control Group Design’ will be use from “True Experimental Designs”. The experimenter will select the two class of ninth standard in each selected schools for the experiment and will assign randomly as a control group and experimental group. The researcher will take care of that the groups are selected randomly. The pretests are administered before the application of the experimental and control treatments and posttest at the end of the treatment period.
Researcher will use the selected three qualified and trained outsider teacher (other than the selected schools) to teach selected topics to the experimental group by using GIS technique. Other control group will treat normally by their regular teacher as usual. In this type of design the gain scores will compare which is obtained from pretest and posttest. The relative effects of two treatments are compared on the basis of their result of post test for test significance of difference between means. Results are also compared between different school groups. On the basis of obtained facts interpretations will made with the help of obtained information from teachers about GIS techniques. The design of the study will be as follows:

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**Experiment Design**
(Randomized Pretest-Posttest Control Group Design)
Randomly Selection of two groups

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Pretest</td>
</tr>
<tr>
<td>Treatment</td>
<td>Treatment</td>
</tr>
<tr>
<td>GIS Technique</td>
<td>Traditional Method</td>
</tr>
<tr>
<td>(Trained Teacher)</td>
<td>(Regular Teacher)</td>
</tr>
<tr>
<td>Posttest</td>
<td>Posttest</td>
</tr>
</tbody>
</table>

Comparison between two groups

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2. **Sampling:**

All schools lies in Panvel area of SSC Board affiliated English and Marathi Medium Schools and CBSE board affiliated schools will be used for survey to obtain the information from the geography teacher. The Purposive Sampling technique will be use for the selection of SSC Board affiliated English & Marathi Medium Schools and CBSE Board affiliated Schools for the experimental study. The purpose behind using purposive sampling technique in choosing specific school is the co-operation from the Head-Master of the school. Students studding in the ninth standard of all schools is the population of
the present research. In order to do this study researcher will select the two division of ninth standard from each selected school and will be assign randomly as an experimental and control group by using random sampling technique. The total number of students available in the class of selected schools will be the sample size for the present research. A selected sample may have consists of Boys & Girls and all these schools are selected from the co-education schools only.

3. **Tools and Techniques of Data Collection:**

The questionnaire will prepared for examine the awareness about GIS techniques among the teachers by the researcher. The respondents have been told the appropriate instructions before questionnaire given and respondents are expected to answer in ‘YES’ or ‘NO’ to certain questions and check an item from the list of suggested responses in case of others. Each questions and options will assign a score that could be scored by scoring key. In the present research two parallel achievement tests will also developed by the investigator, will be used to test the achievement of the students that is before
teaching pretest and after teaching posttest. For teaching topics will be select from the ninth geography textbook of respective board to the experimental group. Various techniques of GIS would be used for teaching the same. The GIS techniques may use is Google Earth, Satellite Images, GPS System and GIS Software etc.

- **IV STAGE: ANALYSIS:**

  The collected data will be tabulated for the further analysis and inference. Qualitative and Quantitative analysis of the data will be done as the needs. The following statistical techniques will be use for further analysis of the data, as descriptive analysis for quantitative analysis and inferential analysis for drawn findings & conclusion.

1. **Descriptive Analysis:** The following statistical measures were computed for the analysis of collected data:
   
   a. Measures of Central tendency: Includes explaining of the data in terms of Mean, Median, Mode, Skewness and Kurtosis.
   
   b. Graphical representation of data: It includes the graphical representation of facts and figures in the form of graphs, charts and diagrams it can be add element of clarity to the work, as it enables visualization of the facts and figures represented therein.
   
   c. Measure of variability: Commonly computed Range, Standard Deviation and Variance.

2. **Inferential Statistics:** In the present study parametric tests have been used in order to make comparisons between the observations of students, various secondary schools and teachers.

   The ‘t’ test is the basic purpose of which is to compare two sample means and the significance of the difference. In the present study, the ‘t’ test has been used to make comparison of the mean achievement scores of experimental and controlled group in the various secondary schools. ‘t’ test will also employ for study of pretest and posttest significance of experimental group and control group of standard ninth.

   Analysis of variance test [ANOVA] test would be employ to study the significance of difference between mean achievement scores of experimental groups of various selected schools.
Pearson’s co-relation coefficient will be use for finding the co-relationship between teachers’ awareness about GIS techniques, school type and achievement in geography of the students.