CHAPTER – III

METHOD AND DESIGN OF THE STUDY

3.1.0 INTRODUCTION

The present study aims to find the effectiveness of learning progression of standard seventh students. For this purpose, experimental method was selected. Instructional strategy was "Non-Equivalent Control group design".

This chapter presents population, sampling technique, the description of the experimental design, tools used, instructional procedure, method of data collection and statistical techniques employed for analysis of the data.

3.2.0 ORIGIN OF THE STUDY

Initially researcher had gone for literature review of learning progression and visited e-content of various university libraries as well as libraries of education departments; Internet resources also provide wide range of the subject. For the study of effectiveness of learning progression, researcher advised to work with constructivist approach which rely on learning progression development. Researcher had studied constructivist approach in his Master's in Education as a part of curriculum with practical experienced in internship programme. When working on constructivist approach researcher find it interesting. Guide of researcher suggested that better to work on topic you are most interested. Researcher had also completed masters in Zoology so it is better to apply Knowledge and understanding of Zoology-content with illumination of Constructivism. "Reproduction in plants" is a very important basic topic at elementary level science. The topic "Reproduction in plants" is included in Central Board Secondary Education (CBSE), National Council of Educational Research and Training (NCERT) and many other state board's Text books. So, the researcher had decided to apply constructivist approach to the teaching of "Reproduction in plants" in science of standard seventh.

Also, researcher interested to study the attitude towards science in grade seventh students.

3.3.0 SELECTION OF RESEARCH METHOD

In the present study, study of learning progression researcher used constructivist approach to the teaching of "Reproduction in plants" in science of standard seventh was required to be checked, so experimental research method was necessary to be used. Therefore, the researcher determined to select two groups. Hence 'Two groups only post-test design' of experimental method was used.

Experimental design of the present study

The experimental-design is most important in experimental research work, in which conclusions can be derived from the observed data through systematic analysis. Thus, the selection of the experimental strategy was planned systematically. The types of experimental design are (i) Pre-Experimental Design, (ii) True Experimental Design (iii) Quasi Experimental Design and (iv) Statistical Design.

In the present study Non-Equivalent Control group design was employed. In the present study effectiveness of independent variable, method of teaching (two levels): (1) Constructivist teaching method (2) traditional teaching method was required to be checked on dependent variable (achievement), thus the researcher decided to use two groups only post-test design.

3.4.0 POPULATION

In any research work, the purpose of the researcher is to find out such conclusion which can be applied universally. The characteristics of the population are to show the marked variations from place to place, and from time to time. Therefore, the researcher has to identify the population, in order to cover the conclusion that is applicable to the population.

Students of standard nine of all secondary schools of Jharsuguda district, Odisha constituted the population for the present study. Other specifications are:

1)   Area: Lakhanpur
2)   Standard: VII
3)   Time period: Academic Year 2020-2021 and
4)   Gender: Boys and Girls.

3.5.0 SAMPLE

Sample means, a selected group of subjects from the population which represent the population. The study was conducted by means of the sample. The generalization applicable to the population, for which the sample was obtained, largely depended upon the technique of sampling.

In the presently study, samples were selected by 'Stratified random Sampling Technique'. As the researcher decided to work at the elementary level of school, he selected the sample from standard seventh. The researcher selected the students of standard seventh from the sample school.

As the present study was experimental one, the researcher had decided to select one school from the population. The researcher selected stratified random sampling technique in the selection of school. One school of Jharsuguda district was selected for the present study: Odisha Adarsha Vidyalaya, Lakhanpur for the experiment. The detail of the selected population and sample is given below.
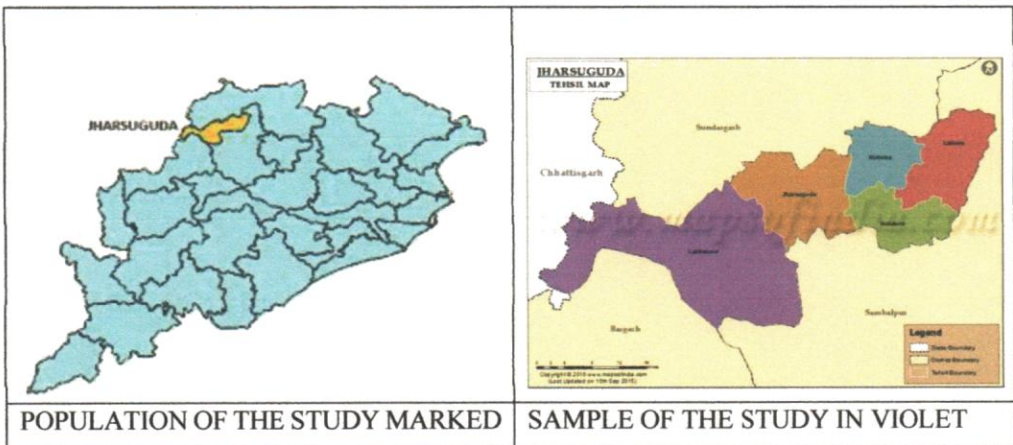

| POPULATION OF THE STUDY MARKED | SAMPLE OF THE STUDY IN VIOLET |

Figure 3.1: Population and Sample of the Study

Table 3.1: Sample Schools of the Study

S.NO	NAME OF THE SCHOOL	NO. OF STUDENTS AS SAMPLE OF THE STUDY
1	ODISHA ADARSHA VIDYALAYA, LAKHANPUR	60 (30 EXPERIMENTAL GROUP+ 30 CONTROL GROUP)

In Table 3.1 sample school and number of students in the sample is presented. In the experiment 30+30 students were selected in experimental and control group of VII class including section A and section B.

3.6.0 TOOLS DEVELOPMENT FOR THE STUDY

Tools are nothing but the instruments that help researcher to gather data. Naturally the type of information depends upon the kind of tools used for the purpose. The selection of tools depends upon the objectives and design of the study, and the type of respondents intended to cover. In order to draw any conclusion from the research, tools used for the measurement of variables should be reliable and valid. This requirement is usually met by employing standardised test. The present study required the following tools and measures.

1. Academic Achievement scores of the students.
2. A test of measuring Attitude towards Science.

3.6.1 Development of Constructivist teaching model-

The researcher used Science Learning Cycle in the development of constructivist model. A learning cycle is a method for planning lessons, teaching learning process and curriculum development. The learning cycle is a way of thinking and acting that is consistent with how pupil learns. It provides an excellent approach for planning science instruction effectively. The science learning cycle originally consisted as a 5-E learning cycle: (a) engage (b) exploration, (c) explanation, (d) elaboration and (e) evaluation.

The aim of the program was to prepare a model for teaching of the chapter **"Reproduction in plants"**. To fulfil this aim, an instructional program is developed with special science content which can justify constructivist aspect of teaching and learning. Secondly researcher has to implement Constructivist model teaching for the

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teaching of the chapter "Reproduction in plants". And then to compare the effectiveness of special science content Constructivist model of teaching with traditional teaching model for the study of the learning progression of students.

3.6.2 Implementation of Traditional Teaching Model-

In traditional teaching group students were taught topics of "Reproduction in plants" by traditional teaching method. Traditional teaching program was applied to control group students as per the regular timetable of the school. Traditional teaching program included/ involved Classroom teaching, Practical/Demonstration in the Biology laboratory. The class room teaching was with teacher talk, questioning.

3.6.3 Construction of Achievement Test

An achievement test is a test of developed skills or knowledge in a given grade level. Students are regularly examined to demonstrate their learning and proficiency in the subject. In the present study to study the learning progression through special content in science by Constructivist teaching model, the researcher measured the achievement of learners with the help of achievement test after completion of chapter. In this regard the researcher developed an achievement test on the topic Cell of the science subject. To prepare the test, the researcher followed the points such as:

1) Deciding the objective of the test
2) Content Analysis
3) Preparing blue print
4) Writing of the test items
5) Expert opinions on the test.

The achievement test was comprised of 20 marks. The questions were based on knowledge, understanding, application, analysis and evaluation. The questions were written in English language.

3.6.4 Measure of Attitude towards Science

"Science Attitude Scale" developed by Dr. (Mrs) Avinash Grewal (2012) was selected for the present study to measure Attitude towards Science. The scale was developed on the lines of Likert type summated ratings procedure. The scale was developing for the students of age 15 to 19 years. It consisted of 10 positively items and 10 negatively items. The subjects were to read the statement and select out of five options given against each statement. The five choices were: Strongly Agree (SA), Agree (A),

Undecided (UD), Disagree (D), and strongly disagree (SD). The scoring scheme of the scale is as follows:

The total score on the scale is the Raw Score for it. The minimum and maximum range of possible Raw Score is 0 – 80.

Table.3.2: Scoring Scheme of the Science Attitude Scale

TYPES OF ITEMS	SCORING				
	SA	A	UD	D	SD
Positive Items Sr. no. 2,4,6,8,10,12,14,16,18,20	4	3	2	1	0
Negative Items Sr. No. 1,3,5,7,9,11,13,15,17,19	0	1	2	3	4

3.7.0 PROCEDURE OF DATA COLLECTION

The Researcher personally visited the selected school to collect data. Through the permission from the head of the schools, the Researcher was able to meet with the students. After establishing a rapport with the pupils, the Researcher taken 45 classes and performed the research as per the respective method mentioned above.

The data collection was done basically in three ways, that are as follows-

1. Achievement test was conducted to saw the learning progression in science in both the section of class 7. Section A was control group students and section B was experimental in design where controlled group was taught in traditional teaching while experimental group was taught by special content in science constructivist teaching method. 20 marks questions including MCQs, true-false statements, fill in the blanks questions and match the pair questions. Test was given parallel to both the groups. Tests was corrected by the researcher and marks were given to each answer paper and data was collected.

2. "Science Attitude Scale" developed by Dr. (Mrs) Avinash Grewal (1984) was selected for the present study to measure Attitude towards Science. After the detailed about the paper instructed to students of both the sections of class 9 were

given responses in 15 minutes. Researcher later evaluate the scoring as per the guidelines and data was collected.

3. The annual examination marks of standard six of science subjects of the sample, which were collected from the school before the experiment with the permission of the head of the school. Marks were collected for control group and experimental group students. The said scores were considered as the pre-achievement of the sample.

3.8.0   STATISTICAL TECHNIQUE

Statistic is a body of Mathematical techniques or processes for gathering, organising, analysing and interpreting numerical data. Because most research yields such quantitative data, statistic is a basic tool for measuring evaluating and research. Statistical technique helps the researcher to systematised the observations, description of the characteristics or events for the purpose of discovering the relationships between variables. The various statistical techniques that are employed in the study are:

1. Mean
2. Standard Deviation
3. Percentile
4. Coefficient of Variation
5. 2 x 2 Factorial Design ANCOVA of unequal Cell size

3.9.0   CONCLUSION

In conclusion it can be said that research methods are of utmost importance in a research process. They describe the various steps of the plan of attack to be adopted in solving a research problem. Therefore, it is very much essential to adopt a sound and systematic strategy to carry out any investigation effectively.