CHAPTER - III

RESEARCH METHODOLOGY

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3.0.0 INTRODUCTION

Before conduction of this study, many reviews were done to find the most appropriate method in conduction of the research. Though there was a clear lack of studies in the local context (in Odisha), references were taken from international and national level studies. In this study an experimental method (pre-test & post-test) of two groups of learners from two different Kendriya Vidyalayas of Angul district of Odisha, who both follow CBSE curriculum were selected. The groups would be matched with attitudes and achievements scores. One of the equivalent groups will serve as a control group and another experimental group. The experimental factors are applied to the experimental group for a specific period of time. The difference is observed at the end of the period between the control and experimental group.

3.1.0 RESEARCH METHODOLOGY

To achieve the objectives of this research, quantitative data was used. However, qualitative data on some aspects will also be assessed (like opinions on the e-contents and suggestions for changes in design from learners and teachers) before undertaking quantitative analysis.

- Primary data was collected through an online survey, wherein a structured questionnaire was created through Google Forms. The questionnaire was divided into two sections. The first section captures questions relating to the personal data of the respondents. In the second section, respondents would be asked to rate factors on the basis of their importance to their e-content based online learning experience and how satisfied they were with those factors. Rating of factors was recorded by using a 3-point itemized rating scale for gauging their importance and satisfaction (Agree - Indefinite - Disagree). The questionnaire was prepared after deliberation with academicians and after extensive review of literature, retaining only those variables which are relevant to the framework of the study.
- E-contents were made according to the chapters in biological science being taught in school exactly during the day of the targeted e-content delivery. The e-contents constitute descriptive researcher made pdfs and ppts, relevant youtube videos and links to critical scientific-informative websites.
- Prior to the main survey, pilot-testing (comparison of attitudes towards science education between secondary and higher degree learners of KVs, Govt Jr College, Angul & Govt (Auto) College Angul) was done to assess the feasibility of the parameters and instruments. Accordingly, inputs resulting from the pilot survey were taken into consideration for preparing the final pre and post test questionnaires. The main survey's links were distributed to the target population through principals, class teachers, biology teachers and class representatives of the institutions. The target population includes class IX students from two Kendriya Vidyalayas of Angul district of Odisha (KV No1 & KV No2), who had transitioned to online and blended learning platforms and e-content mediated learning post Covid-19 lockdown.

3.2.0 VARIABLES IN THE STUDY

Experimental group is the dependent variable on attitude and achievement surveys because of the intervention provided, whereas the control group serves as the independent variable which stays devoid of interventions.

3.3.0 POPULATION

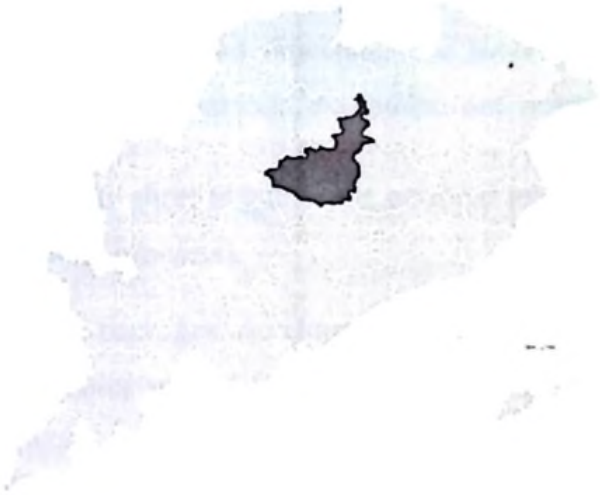

Fig 1. Angul, Odisha, India

Quantitative analysis here deals with 200 respondents of Angul district of Odisha, who are studying at secondary level in their school education, learning science as a subject in their CBSE curriculum.

3.4.0 SAMPLE

For this experimental study 160 (80+80) respondents studying in class IX, belonging to 2 KVs in Angul district of Odisha are selected to serve as the control and the experimental group with 80 respondents in each group respectively.

3.5.0 SAMPLE SELECTION

Since non probability sampling is relevant to my field of study (Class IX learners are needed from two KVs of Angul district of Odisha following CBSE curriculum) the technique of purposive sampling would be

considered appropriate for this study (questionnaire may be sent to class teachers or biology teachers of the two KVs to ensure students fill them up, they would send the link to google classroom/ WhatsApp groups & CRs who would ensure proper distribution).

3.6.0 RESEARCH TOOLS USED

The following tools were used by the investigator for the experimental study; these are valid, reliable, and objective. The tools were constructed after thorough examinations, plannings, executions, and repetitive testing stages.

3.6.1 Personal data sheet to gather the personal information from students (linked with pre-tests).

3.6.2 E-content packages developed by the investigator on biological science topics studied by learners in their respective classes during the experimental tenure.

3.6.3 Pre-test & Post-test achievement questionnaires for both control and experimental groups, which were based on the selected topics of IXth standard science textbook which were being taught during the conduction of surveys; constructed and validated by the investigator, supervisor, class teachers, heads and principals.

3.6.4 Pre-test & Post-test attitude questionnaires for both control and experimental groups which were based on a standardized scale of Scientific Attitude (Manual) by Dr. N. N. Shrivastava.

3.7.0 DEVELOPMENT OF E CONTENTS

The development of e-content includes the following different steps:

- Planning of e-content modules.
- Frame the objectives for different class on different topics
- Considerations of respondents and their preferences
- Preparing the specifications

- Preparation of clear concise script in biological topics
- Making a document (Editing the pictures & merging of text)
- Designing the e-content (Multisensory, appealing and short)
- Planning a sequence and script for e-content in consultation with subject experts/teachers/ heads of the concerned subject. Editing the script with the help of technical experts.
- Validation of E-Content - The e-content material in Biological Science was screened to a group, consisting of experts in the subject, to ascertain subject matter, modify, improve the content and validate the material.

3.8.0 QUESTIONNAIRE

The pre and post questionnaires were of two types, one scored respondents with respect to their attitude towards science and one scored their achievement in science. Equal number of questions were designed for both control and experimental groups.

- Attitude questionnaire contained 26 statements (13 positive +13 negative questions) with 3 point response selection (Agree-Indefinite-Disagree) and scoring (2 for positive attitude, 1 for indefinite and 0 for negative attitude). The attitudes of students towards Biological Sciences measured in this study are represented by six major components and three indicators adopted from the Scientific Attitude Scale (Manual) by Dr. N. N. Shrivastava. Components: Rationality, Curiosity, Open Mindedness, Aversion to superstitions, Objectivity-Intellectual honesty, Suspended Judgements & Indicators namely: attitudes towards investigations in science, adoption of scientific attitudes, and interests in a career in science.

- The Achievement questionnaire includes 10 questions from the biological science course of study, containing multiple choices of answers out of which only one answer is correct, and awards a score of 10 points.

3.9.0 PROCEDURE OF DATA COLLECTION

Primary, secondary and pilot data for both attitude and achievement tests will be collected through online surveys with the help of structured questionnaires through Google Forms. The survey's links would be distributed to the target population (90+90 control & experimental group class IX students from two Kendriya Vidyalayas of Angul district of Odisha) through biology teachers of the institutions. Respondents were checked on the following parameters.

3.9.1.0 PRE-LECTURE PARAMETERS

3.9.1.1 Availability of a personal device of learner's choice

3.9.1.2 Access to high-speed uninterrupted internet connection

3.9.1.3 Conducive environment with limited/no distractions

3.9.1.4 Reading material shared by instructor to prepare for the upcoming session

3.9.1.5 Access to digital library resources

3.9.2.0 PARAMETERS DURING THE LECTURE

3.9.2.1 Interaction with the instructor during the session

3.9.2.2 Interaction with other students related to coursework

3.9.2.3 Use of innovative and engaging content delivery mechanisms by the instructor

3.9.2.4 Feeling included as a member of the class

3.9.3.0 POST-LECTURE PARAMETERS

3.9.3.1 Access to instructor's lectures post session (timely e-content delivery to experimental group learners)

3.9.3.2 Periodic monitoring of progress at the end of every course module

3.9.3.3 Timely feedback from the instructor on assessment (google forms)

3.10.0 DESCRIPTIVE AND INFERENTIAL STATISTICS

The quantitative analysis takes the form of eight questionnaires, divided into four questionnaires for each control and experimental group. Of the four questionnaires two symbolize pre & post attitude; and two pre & post achievement questionnaires. Statistical analysis would start from range, maximum and minimum values, summations, means, medians, modes, standard deviations, variances, skewness, kurtosis & t-tests (two-tailed) respectively.