



CHAPTER – 3

METHODOLOGY

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Methodology

3.1 Introduction

This chapter deals with the methodology employed to achieve the objectives of the study mentioned in chapter one. Keeping in view the nature and objectives of the study appropriate sample was selected and tools were developed. This chapter deals with the research design, sample, tools used, data collected and statistics used.

3.2 Research Design

The research design is the detailed plan of an investigation. In fact Experimental Design is the blue-print of the procedures that enable the researcher to test hypothesis by reaching valid conclusions about relationships between independent and dependent variables and analyzing the obtained data. The research design may be defined as a sequence of those steps taken ahead of the time to ensure that the relevant data permits objective analysis of the different hypothesis formulated with respect to the research problems. Research design refers to the systematic scheduling of the time at which treatment is administered to subjects and at which observations are made on the performance of the subjects. This careful scheduling of the treatment and observations can be very helpful in reducing the threats to the internal validity of the research.

3.2.1 Design of the study

The design followed for the study is experimental two group design. The input given to both groups were the two approaches of teaching

education psychology . Two groups of students were equated on the basis of intelligence test .

so it is,

The Post test only, Equivalent-Groups Design

R X O1

R C O2

According to Campbell and Stanley's symbol system

R = random assignment of subjects to groups

X = exposure of a group to an experimental (treatment) variable

C = exposure of a group to the control or place to condition

O = observation or test observed.

One of the groups, called experimental group, was exposed to Multimedia approach of teaching Piaget theory and other one the control group was taught through traditional approach i.e. through simple lecture method taught by researcher himself. The post test is taken to see the achievement.

3.3 Sample

Data collection is an important part of the research . Data is collected from a selected sample and that sample is the representation of the population . According to Borg and Gall . “ The larger group we wish to learn is called population whereas the smaller group we actually study is called the Sample” The sample is a portion of population which represents the population. A good sample must be nearly the representative of the entire population as possible and ideally it must provide the whole of the information about the population as from which the sample has been drawn.

For conducting, the present study keeping in view the limitation and resources available with the researcher the researcher has used two equivalent groups by adopting random sampling technique.

Sample of this study is B.Sc B.Ed. II year students. Of Regional college Bhopal .Size of the sample is 25 students in each Experimental and control group. Their age (chronological) is between 19-21 years and their socioeconomic status is middle class. There are total 50 students ,only 2 students are boys rest all are girls. They all have passed B.Sc. B.Ed. Ist year exam and much difference in their I.Q. level is not expected.

3.4 Data Gathering Tools

To select or construct appropriate tools for the study is an important aspect of any research study. Sometimes the researcher uses tools which have been constructed by others , which are standardized; sometimes the researcher has to construct tools to fulfill his/ her purpose .In the present study the researcher has used two standardized tools and herself has constructed two tools keeping in view the objectives of the study .

3.4.1 Intelligence Test

Standard Progressive Matrices, revised edition(2000) by J.Raven, JC.Raven and JH.Court

Design and use

It was constructed to measure the Educative component of g as defined in Spearman's theory of Cognitive ability. Educative ability is the ability to forge new insights , the ability to discern meaning in confusion , the ability to perceive , and the ability to identify relationships ,the essential feature of educative ability is the ability to generate new , largely nonverbal , concepts which make it possible

to think clearly. The test has been described as one of the purest and best measures of g or General Intellect functioning available.

The test is made up of five sets, or series, of diagrammatic puzzles exhibiting Serial change in two dimensions simultaneously. Each puzzle has a part missing, which the person taking the test has to find among the options provided. The standard test consists of 60 problems divided into five sets (A, B, C, D and E) each is made of 12 problems. In each set the first problem is as nearly as possible self-evident. The problems which follow build on the argument of those that have gone before and become progressively more difficult. The order of the items provides the standard training in the method of working. The five sets provide five opportunities to grasp the method of thought required to solve the problems and five progressive assessments of a person's capacity for intellectual activity. To ensure sustained interest and freedom from fatigue, each problem is boldly presented, accurately drawn, and, as far as pleasing to look at. The test is designed to provide a reliable estimate of a person's capacity to think clearly when allowed to work steadily and undisturbed at his or her own speed. It covers the whole range of intellectual development from the time a child is able to grasp the idea of finding a missing piece to complete a pattern to the levels of ability required to form comparisons and reason by analogy. The SPM was designed to cover the widest possible range of mental ability and to be equally useful with persons of all ages, whatever their education, nationality or physical condition.

Administration of SPM

The test is extremely easy to administer, It can be given as an individual, a self-administered, or a group test. The key requirements are, first, to make sure that those taking the test understand what they are to do

and the method of thought required to solve the problems. Second to ensure that the tests are administered in the same way to all who are to be tested. Test may be conducted in groups of any size, but there should be an assistant supervisor for every 10-15 people to be tested. The test administrator needs: instructions to be given, a copy of the appropriate test booklet(s), the SPM answer sheet.

Scoring

The answers in the answer sheets are matched with the standard answer key having all the right answers. One point is scored for each correct answer. A person's score on the test is the total number of problems solved correctly when allowed to work quietly through the series from the beginning to the end. A person's total score provides an index of intellectual capacity.

Reliability

Test-retest Reliability-Different data is available which differ widely in their methodology and the intervals between week to three years. Laroche reported a correlation after one week of .85 with sixth grade schoolboys. Retest correlations after one year ranged from .55 to .84. At a four-year interval, reliability was .61 dropping to .46 after 11 years. In the original work with the SPM, reliabilities ranged from .83 to .93 with the higher values being associated with younger respondents. Well-conducted studies therefore indicate a satisfactory retest reliability for the SPM for periods up to one year.

Validity

Content validity –The content validity of SPM, measured by the internal consistency of the test, varies markedly when different test items are considered. Banks and Sinha with children found an average biserial

correlation between SPM items and the combined results of three IQ tests of .45 ;for different test items , correlations ranged from .20 to .80 . For a large sample of adults ,Sheppard et al report a mean biserial correlation of .52 and good to excellent discriminative power for most items. Their result support the overall structure of SPM.

3.4.2 Rotter's Locus of control scale

Design and use

It's a standardized test which consists of 29 items. Each item consists of two statements one in favour of External locus of control other in favour of Internal locus of control. Subject can pick up a statement he/she believes in. Individuals with a high **Internal locus of control** believe that events result primarily from their own behavior and actions. Those with a high **External locus of control** believe that powerful others, fate or chance primarily determine events. The respondent will choose the answer in which he believes and accordingly the total score will determine whether he has high/ low locus of control

Scoring.

He can score one point for each of the following

2. a, 3. b , 4 .b, 5 .b, 6 a, 9 a ,10 b, 11 b, 12 b , 13 b , 15 b , 16 .a a
17. a , 18 a 20 a. 21. a ,22 .b ,23 .a, 25 .a, 26.b ,28. b , 29 a.

A High score i.e. , above or equal to 10 = external locus of control

A low score i.e ., below 10 = internal locus of control

The total score will determine the locus of control of the subject.

3.4.3 Attitude Test

The purpose of this scale would be to know whether or not the students have developed favorable Attitudes towards Educational Psychology as a discipline. The underlying assumption being that one

of the outcomes of teaching educational psychology is the development of positive attitude towards the subject. As there is a lack of standardized attitude scale researcher has herself developed an attitude scale .

Technique used

Among the different techniques available for the construction of the scale described by Edwards(1957) ,the method of summated ratings also known as Likert technique has been used in the construction of the scale

Item writing ,editing and selection

Before preparing the scale, the Investigator reviewed the relevant literature. Students studying Education Psychology were also asked to give reasons for and against its stud .While preparing the items of this scale, the criteria mentioned by Edward(1975) have been followed. Precautions were taken to keep the reading level of the scale well within the reach of the normative pupils. With a view to know the nature of the statements , the edited items were submitted to the experts. Based on their review the initial draft was revised and the final form was written and again submitted to the judges. The judges were specifically instructed to classify the statements into two piles on the strength of the nature of the statement , positive and negative. Classifying any one of these items into neutral category was discouraged. They were then requested to read the statements with a view to find out , if any ,flaws, omissions and commissions in the grammatical structure of the statements. Suggestions offered by judges were incorporated in the statements and they were further refined and improved. Having known the nature these items were edited into five point scale after Likert and weightages were assigned.

Try out and final form

Finally there were 18 statements. The reliability of the Tool was found using the Test Retest method. It was administered on 50 students and then after a period of one week again it was administered. The Test Retest correlation was found out to be 0.61. This was done with a view to determine the reliability of the scale.

Scoring

The students were asked to indicate their responses to each statement by putting a tick mark in the box given against one of the five responses namely strongly agree, agree, undecided, disagree and strongly disagree.

Each of the ten positive statements of the scale are assigned a weight ranging from 4 (strongly agree) to zero (strongly disagree). In the case of eight negative statements the scale scoring is reversed ranging from zero (strongly agree) to 4 (strongly disagree). The attitude score of a subject is the sum total of scores on all the 18 items of the scale. For each student a total score can be obtained by summing his scores for the individual items. Thus a maximum of 72 scores can be obtained by a subject.

Time for Administration

Researcher explained the test and students were given 15 minutes for giving responses to the items of the scale.

3.4.4 Achievement test

The purpose of this scale would be to measure difference of achievement in learning of Piaget theory between control group and experimental group.

Technique used

While planning about the test items in the test Bloom's taxonomy of cognitive domain i.e. Knowledge, Understanding, Application and Skill was kept in mind

Item writing, editing and selection

Before preparing the scale, the investigator reviewed the relevant literature, precautions were taken to keep the level of the Test well within the reach of the normative pupils. The Blue print of the Test was prepared. With a view to know the nature of the statements, the items of the draft were submitted to the experts, they were also requested to read the statements with a view to find out, if any, flaws, omissions and commissions in the grammatical structure of the statements. Suggestions offered by judges were incorporated in the items and they were further refined and improved and the final draft was prepared.

Try out and final form

Finally there were 32 items after the necessary modifications in the light of experts suggestions. The questions in the test were multiple choice questions. The test was administered on 50 students. It was administered on 50 students and then after a period of one week again it was administered. The Test Retest correlation was found out to be 0.51. This was done with a view to determine the reliability of the scale.

Scoring

Each of the 32 questions carried one mark for the correct answer. No marks are there for the wrong answer. The achievement score of a subject is the sum total of scores on all the 32 items of the scale. For each student a total score can be obtained by summing his scores for

the individual items. Thus a maximum of 32 scores can be obtained by a subject.

Time for Administration

Researcher explained the test and students were given 40 minutes for giving responses to the items of the scale.

3.4.5 Retention test

To measure the relative retention in learning through traditional approach and the multimedia approach the researcher has developed an another achievement test of similar level which was administered after 20 days of the treatment. For the construction of the Test similar procedure as for the Achievement Test was adopted.

3.5 Data Gathering Procedure

It was completed in four phases

Phase I - Sampling

The sample B.Sc. B.Ed. II year students was subjected to Intelligence Tests and Test for Locus of Control. After computing the result, the students of High Intelligence and Low Intelligence, External and Internal Locus of control were randomly and equally divided into Control and Experimental groups of 30 students each.

Phase II - Treatment

The Experimental group was allowed to learn Piaget theory through Multimedia based approach using power point presentations, videos (based on Piaget's theory) and related sites on the Internet, in four sessions of one hour each ,in the absence of the teacher , whereas the control group was allowed to learn by the traditional approach i.e. Lecture method by the teacher, in four sessions of one hour each.

Phase III - Results

After the Treatment Experiment and Control group were subjected to post-test to measure their Achievement and Attitude..

Phase IV - Retention Test

After one month of treatment the Experiment and Control group were once again subjected to another Achievement test to compare their relative retention levels.

Table 3.1
Schedule of Data collection

Activity	Date of conduction	Time
Intelligence test	2-2-09	9:30 to 9:50 A.M (20 minutes)
Locus of control test	2-2-09	9:50 to 10:00 A.M (10 minutes)
Treatment	3-2-09 to 6-2-09	9:15 to 10:00 A.M (45 minutes),daily for four days.
Achievement test	9-2-09	9:20 to 10:00 A.M (40 minutes)
Attitude test	9-2-09	10:00 to 10:15 A.M (15 minutes)
Retention test	2-3-09	9:20 to 10:00 A.M. (40 minutes)

Scoring-The tests were evaluated by the researcher herself

3.6 Statistics used

The data collected was subjected to appropriate statistical procedure to test the hypothesis with which this study was initiated.

Statistical techniques are used for organizing, analyzing and interpreting numerical data. If the collective data are systematically arranged and

analyzed through appropriate scientific and statistical technique, the results obtained are scientific and correct.

3.6.1 Statistical Procedure Employed –

To understand the distribution of variables , basic statistic such as mean and standard deviation were calculated for all the variables involved in the study for the total sample, as well as the sub group of the sample .Attitude, and achievement will be compared and t – test is used.