CHAPTER – III

METHODS

AND

PROCEDURE
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Design of the study: Design of the study has been defined by different social scientists in different terms. All these definitions emphasis systematic methodology in collecting accurate information for interpretation with economy in procedure. To mention a free definitions. Miller has defined “Designed research” as “The planned sequence of the entire process involved in conducting a research study.” According to Selliz and others, “Research design is a catalogue of the various phases and facts relating to the formulation of a research effort. It is an arrangement of the essential conditions for collection and analyses of data in a form that aims to combine relevance to research purpose with economy in the procedure.

In the design of the study is need for a systematic method. The investigator have been studies different design of study and he found that testing method is method is appropriate method for this study. Testing methods psychological testing. Psychological testing method is used every aspect in human life. Group study or individual differences study it is use full in all fields. By psychological testing we can study the maximum population with in minimum time. There should be not only collect reliable & valid data but also we can found reliable pure results.

This method has been employed in the present investigation for the purpose of surveying of characteristics of the population understand. It is concerned not with the characteristics of individual but with generalized statistics of the whole population or a sample of data that are abstracted from a number of individual cases.

The present study is designed to get informative data and to find out the concept formation, creativity and personality of hearing impaired students.

SAMPLING PROCEDURE

Nearly all researches experimental and non experimental in the behavioral sciences particularly in the field of psychology. Sociology and education draw some inferences regarding a well specified and identifiable group on the basis of some selected measures. The well specified and
identifiable groups known as population or universe and the selected number of persons or object is known as sample. A sample is any number of persons selected to represent the population according to some rule or plan. These a sample is a smaller representation of the population. A measure based on a sample is known as a sampling. In the social sciences it is not possible to collect data from every respondent relevant to our study but only from some fractional part of the respondent. The process of selecting the fractional part is called sampling. Sampling principle is based on induction logic in which we reach to total from sample.

The investigator wants to assess the concept formation creativity and personality of the hearing impaired students. For this it will be convenient for the investigator to have the information of hearing impaired students institutions in his surrounding area as block Tahshil & Districts. In institutions the students live in a cluster the sampling method is cluster sampling.

TESTS OF THE STUDY

Test of Concept Formation

The test of concept formation originally prepared by S.K. Pal and K. S. Mishra and revised by the Kajal Deb by including five items in the second set and changing the situation in the third set.

This test consist of three tests which have been designed to measure class inclusion, grouping, and hierarchical classification abilities. First test presents sixteen figures and has ten questions while answering these questions students try to find out figures that can be included in one or two groups. The questions provide the basic for classifying figure. First seven questions provide only one basis for classification. While the last three provide opportunity for considering about intersection of classes. These questions are–

1. How many figure are circular?
2. How many figures are triangular?
3. How many figures are quadrangular?
4. How many figures are black in the middle?
5. How many figures are white in the middle?
6. How many figures have lines?
7. How many figures have outer cover?
8. Circular figures are more or figures which are black in the middle are more?
9. Figures which are white in the middle are more or triangular figures are more?
10. Quadrangular figures are more or figures with lines are more?

The second test has been designed to measure grouping or classification ability. It also has a practice item. It has ten items. Each item present four figures students are told that three of these figures are similar and one is different from others. The subjects are asked to identify the figure which is different from others.

The third test has been designed to measure hierarchical classification ability. It has a practice item that illustrates a two level hierarchy in the test item the alphabets have been presented in four different categories. Some are circled some are not some are thin and some are thick. The students are asked to classify two types of English and Hindi alphabets at two levels. Then students are asked to think and write two groups labels at the next level for each super ordinate category. They are also asked to give the serial numbers of the alphabets which belong to each groups.

Test retest reliability of this test was calculated by finding out product. Moment coefficient of correlation between test and retest scores. The value was 8511 (N=30).

Administration of the Test, Concept Formation

This test is designed and developed for below 18 yrs. This test involves more thinking for abstraction. Though concrete objects are used in the test they need to be abstracted. The same response should be applied to different types of objects presented. This test is used as an individual test under the control of the experimenter. There fore the experimenter should make the participant to
sit comfortably in a well illuminated room where there is no visual or auditory distractions. The investigator should prepare a table in he/she should enter the report of the person by using the letter ‘R’ for right and ‘W’ for wrong for each set. Since every set is considered as a trial all the three sets should be performed as three trials. Each picture should be exposed for ten seconds. There can be 20 seconds in between sets.

The following instruction should be given to the respondent. 2 will show you a series of pictures of different categories. There are going to be three sets of pictures in each sets. The question provides the basics for classifying the figures.

The test of concept formation was administer by investigator with the help of their class teacher. Researcher distributed the test and give the instruction in symbolic, lip reading and facial impression communication with carefully in decided duration. After completed the time duration investigator indicate that the time is over and pen down please.

Administration of Verbal Test of Creativity

Prepared by Prof. K. S. Misra

The verbal test of Creativity in clued four tests namely:-

(i) Consequences test.
(ii) Unusual uses tests.
(iii) Persistency Improvement tests.
(iv) If you be to test.

This test is related to verbal creative thinking above Mentioned tests are included two problematic items. (circumstances). Mean this test have 8 problems. During solving these problem you will be found different ways chances of solving. Any question have no any appropriate answer. Tests have two question item each item have only, three minutes. And each test have six minutes only. Means you will take six minute for solving each test and totally. Twenty four minute are allotted to solve the verbal test of General creativity.

The creativity test can be administered individually and in Group.
Personality Test
H.S.P.Q.(Jr-Sr)

Administration of HSPQ(Jr-Sr)

Simple and clear instructions are printed for the examinee on the cover page of the test booklet. Although the test can be virtually self-administering it is always important to establish good “report” with the examinees, whether tested individually or in groups. Further, it is good to reinforce the instruction by orally reiterating that the examinees will in the long run be doing themselves most good by being frank and honest in describing themselves.

To the trained psychologist the importance of this brief intimate talk with the client can not be easily exaggerated, for the creation of a favorable test. Taking attitude is worth as much as or possibly more in the production of accurate data than any number of “lie” or “correction” scales. If there is serious doubt of the client’s correctness of response it may be well to respond it may be well to reconsider the program in terms of introducing objective tests as in the Q-A Battery, some demonstration of the degree in a potentially uncooperative group by appropriate instruction has been demonstrated by some significant lowering of average scores of a large client group on the Motivational distortion scale of the 14 PF after good rapport was obtained.

The test is administered without a time limit but can be completed by all but the slowest readers in about 40-50 minutes perform. In addition to form A, which requires this time, there are also three other forms. B.C and D equivalent in every way and intended for more extended testing or for respecting. Where there is only a short interval. The author strongly advise using at least the A and B forms and whenever time permits. All four forms for maximally reliable evidence on any single personality dimension and the entire personality on expressed in all fourteen dimensions of the test, for such comprehensive coverage, 160 – 200 minutes of testing time are surely well invested.

In all ordinary cases are passes out the test booklets and answer sheets and proceeds verbatim follows.
This is called the booklet and contains the questions you are to answer. The separate sheet is called the answer sheet. All your answers are to be placed only on the answer sheet, in a way I shall explain.

“Put your answer sheet besides the booklet, like this, and write your name (and what ever other particulars the examiner may want) on it. Do it now (pause until done) Now, follow the ‘what to do, section on the cover of the booklet, while I read to it aloud.

Examiner reads this aloud, pausing to remind the examinees to answer the examples. After the instructions are read and the examples are completed, he says.

“Don’t open the booklet until I tell you. First tell me. Do you have any questions about these instructions? Raise your hand if you do”.

The examiner deals fully with any questions, for this is not an ability test but requires that even the least intelligent shall understand clearly how responses are to be made. Then the examiner says.

Now you have marked the answers for the examples that were on number the cover? Are there any more questions (if not) fine, we are ready open the booklet and station number 1 (one) we are you mark your answer for question 1 in another books besides 1 (one) on answer sheet continue with one question to another marking your answer to each question on the answer sheet, be sure the number of the books on the answer sheet always matches the number of the question you are answering in the booklet. Give one answer to every question. Don’t skip any question.

“Reminders” as to where one should be by a given time can be made at several points, because this also helps to keep stragglers from proceeding too slowly. The average time needed by high school pupils to finish the test will generally fall with in a class period of 50-60 minutes (except in second school situations where it is in appropriate, these who finish early may reasonably be released or at least allowed to hand in their papers) definitely better performance can be insured in the slower examinee by calling out, at 10, 20, and 30 minutes from the start as follows.
At 10 minutes say

"You should be now have reached at least question 35 if you are not as
for as 35, it means that you should be going faster. Don’t take quite as long
wither each question but give the answer that comes to you when you first read
it. However, do not cave out any of the questions."

Interrupt similarly naming question 70 and 105 at 20 and 30 minutes
respectively. The main point to make toward the end of the test is, “Look back
over your answer sheet and make quit sure before you turn it in that you have
answered every questions”.

It is also good to look around and correct early any improper ways of
indicating answers that might later cause difficulty in scoring make sure that
names, sex, age and form have been filled in before collecting answer sheets,
and especially that one, and only one, answer is given for each question on the
test.

**Used statistical methods**

**Graphical Representation**

1. Graphical Representation is used when we have to represent the data of a
frequency distribution and of a time series. Graphical representation is used for
the following distinct advantages-

1. Graphical representation serve as a pictorial argument appealing to reason
through eye very quickly.

2. The Graphical representation is a means of comparisons and suggest
correlation or connection between two different factors or events.

3. It supplies a basic for finding by interpolation some values of a variable
when others are known.

4. It helps forecasting on the basis of the present data.

5. It helps in finding out the effects of the other factor son the changes of the
main factor under study.

6. It helps in deriving new ideas about the different factors and events which
are helpful in further researches.
In the words of Boddingtons-

"The wondering of a line is more powerful in its effects on the mind than a tabulated statement. It shows what is happening and what is likely to take place “just as quickly as the eye is capable of working”.

**Percentage Cumulative Frequency Curve/Ogive**

In drawing an ogive variety values are represent on the x axis and the cumulative frequency on the y axis commutative percentage curve is difference from cumulative frequency curve, because the cumulative frequency is plotted on x axis in percentage of N.(Total Number) after plotting the percentage of N on X axis in reference to their class interval the points are connect with dotted lines shape is known as curve as curve and the curve which is made by cumulative percentage known as ogive graphical representation of data by using ogive/cumulative percentage curve. We can get following characteristics.

1. Percentile and percentile Rank.
2. We can compare two or more groups data plotted on x and y axis.
3. We can find out direct standard percentile.

**Descriptive and inferential statistics are used to analyze the data.**

3.2. Descriptive statistics

Certain descriptive statistics are computed in order to describe the nature and distribution of the score obtained on the various tests. These are –

3.2.1 Mean

The mean value is computed as measure of control tendency of the distribution of concept formation, creativity and personality of hearing impaired students –

Methods of computation of mean from continuous series (Grouped data)

\[
M = \frac{\Sigma fx}{N}
\]

Where : \( M = \text{Mean (Arithmetic Mean)} \)

\( \Sigma = \text{Sign of Summation} \)
\[ f = \text{Frequency in distributed score} \]
\[ x = \text{mid values of class interval (score in a distribution)} \]
\[ N = \text{Number of scores / Population} \]

**Use of Arithmetic Mean**

1. It is the average which is very common and in wide use it is generally used in the data of every sphere to have a representative value which truly represent the data.
2. It is calculated to compare two or more series with respect to certain character.
3. It is used in calculating the standard deviation of the data.
4. It is calculated for calculating the regression coefficients and correlation coefficient.

**3.2.2 Standard Deviation**

This is computed to study the variation in the scores and to do other various computations. Now a day this measures of variability is greatly used in all the spheres. It calculation is also used on the deviation from the arithmetic mean. In case of mean deviation the difficulty that the sum of the deviations from the arithmetic mean is always zero is solved by taking these deviations irrespective of plus or minus signs. But here that difficulty is solved by squaring them and taking the square root of their average.

\[
\text{Standard Deviation (S.D.)/(\sigma)} = \sqrt{\frac{\sum fx^2}{N}}
\]

Where = \( \Sigma \) = sign of summation

\[ f = \text{frequency} \]
\[ x^2 = \text{square of difference between mid value of class interval} \]
\[ N = \text{Number of population/Scores} \]
Uses of Standard Deviation S.D.

1. Standard deviation is used in computing different statistical quantities like regression coefficient, correlation coefficient and in connection with business cycle analysis.
2. Standard deviation is used in testing the reliability of certain statistical measures.

3.2.3 Correlation / Measures of Relationship

Correlation is the relationship between two or more paired variables or two or more sets of data. The degree of relationship is measured and represented by the coefficient of correlation. This coefficient may be identified by either the letter ‘r’ the Greek letter rho (ρ) or other symbols depending upon the data distributions and the way the coefficient has been calculated.

Students who have high concept formation tends to receive high score in creativity (Problem solving) where as those with low self concepts tends to score in creativity low. When this type of relationship is obtained, the factors of measured concept formation and scores on creativity test are said to be positively correlated.

Some times variables are negatively correlated when a large amount of one variable is associated with a small amount of the other as one increase the other tends to decrease.

A definition of perfect positive correlation specifies that for every unit increase in one variable there is a proportion as unit increase in the other. The perfect negative correlation specifies that for every unit in crease in one variable there is a proportional unit decrease in the other the sign of the coefficient indicates the direction of the relation ship, and the numerical value its strength.
Pearson's product moment coefficient of correlation \( \rho \) with bi-variate frequency distribution.

\[
 r = \frac{N \sum f dx dy - \sum f dx \sum f dy}{\sqrt{\left[ N \sum f dx^2 - (\sum f dx)^2 \right] \left[ N \sum f dy^2 - (\sum f dy)^2 \right]}}
\]

Where \( N \) = Number of population / person/sample size.
\( \Sigma f dx \) = Sum of frequency on x axis multiply with deviation / distance from mean on x axis.
\( \Sigma f dy \) = Sum of frequency on y axis multiply with deviation distance from mean on y axis.
\( \Sigma f dx \Sigma f dy \) = Sum of multiplication of \( f dx \) and \( f dy \).
\( \Sigma f dx^2 \) = Sum of square of distance multiply with frequency on x axis.
\( \Sigma f dy^2 \) = Sum of square of distance multiply with frequency on y axis.

**Partial Correlation Coefficient**

Partial correlation coefficient can be calculated by the following formula if the total correlation coefficients \( r_{13} \), \( r_{13} \) and \( r_{23} \) are calculated first. The correlation coefficient between variable 1&3, 2&3, and 1&3 are have been calculated first so the given formula may be use to computation of partial correlation coefficient.

\[
 r_{123} = \frac{r_{12} - r_{13} r_{23}}{\sqrt{(1-r_{13}^2)(1-r_{23}^2)}}
\]

Where \( r_{12} \) = calculated correlation between variable 1 & 2
\( r_{13} \) = calculated correlation between variable 1 & 3
\( r_{23} \) = calculated correlation between variable 2 & 3
\( r_{123} \) = calculation of correlation between variable 1,2&3 in the case of partial correlation the correlation between two variables dispose the effect of third variables on both variables.
Inferential Statistics

The inferential statistics are used in the present investigation to test the various hypothesis of the study as well as to draw definite conclusions on the basis of the obtained results. A procedure to assess the significance of a statistics that a sample statistics would differ from a given value of the parameter of from another sample value, by more than a certain value, by more than a certain amount, is known as test of significance. From sampling distribution it is possible to find the probability that a sample statistic would differ from a parameter or another sample and accordingly a procedure to assess to know as test we say that –

i) difference between a statistics and the corresponding population parameters or

ii) difference between two independent statistics, is not significant if can be attributed to the fluctuation of sample, others, it is said significant.

3.3.1 Hypothesis testing

\[ H_0 \text{ Null Hypothesis} \]
Null Hypothesis is concerned with all Possible rejections, the hypothesis assists that there is no true difference in the sample and population in the particular matter under consideration difference if found is accidental unimportant arising out of fluctuations of sampling.

\[ H_a \text{ Alternately Hypothesis} \]
Alternate hypothesis specifics those values that the investigator believes to hold true and of course, he hope of that the sample states read to acceptance of this hypothesis as the alternate hypothesis may embrace the whole range of values rather than Simple point \( H_a \).
3.3.2 Parametric Statistics (Students t-test / z-test)

When the investigator wants to test the significance of difference between two means, he uses either the t-test (or t-ratio) or z-test (or z-Ratio) the computation of t or z involves the computation of ratio between the experimental variances. Between t-ratio and z-ratio is a basic difference. When the sample size is less than 30 we use the t test or students test t for testing the significance of the difference between two means. The concept of small sample size test was developed in 1915 by William Seely Gosset, a statistician for Guinness Breweries in Dublins Ireland. Because the service code prohibited publication of this test. Hence this statistics is also known as students t-test.

When the sample size is more than 30, the ratio of the difference between two sample means to the standard error of this difference is calculated by the z-ratio which is interpreted through the use of normal probability tables.

t-ratio or z-ratio for significance difference between two means z-ratio / t-ratio

\[ T = \frac{M_1 - M_2}{\sigma D} \]

Where \( M_1 \) = Mean of first group/population
\( M_2 \) = Mean of second group / population
\( \sigma D \) = Standard error of two means

\[ \sigma D = \frac{S_1^2}{N_1} + \frac{S_2^2}{N_2} \]

Where \( S_1 \) = Standard deviation of first group/population
\( S_2 \) = Standard deviation of second group/population
\( N_1 \) = Number of cases in first group/sample size
\( N_2 \) = Number of cases in second group/sample size
During using the t-test / z-test or (z-ratio) the concepts of degree of freedom, null hypothesis level of significance and one tailed and two tailed test should be considered.

Degree of freedom:

The degree of freedom mean freedom to vary. It is abbrriated as df. In statistical language. It can be said that the degree of freedom is the number of observation that are independent of each other and that can not be deduced from each other suppose we have five scores and the mean of five scores is ten the fifth score immediately makes adjustment with the remaining four scores in a way which assures that the mean of all five scores must be 10. for examples, suppose we have four scores 12, 18, 5, 16 and than the must be 3 the mean becomes 10. in another distribution if the four scores are 2, 10, 8, 5 the first score must be 25 in order to have a mean of 20. the meaning is that four scores in the distribution are independent or they have any value and they can not be deduced from each other. The size of the fifth score, however, is fixed because the mean in each case is 10 hence $df = N - 1 = 5 - 1 = 4$.

3.3.4 Null Hypothesis – The starting point in all statistical test is the statement of null hypothesis (Ho) which is no difference hypothesis. In other words a null hypothesis states that there is no significance difference between the sample under the study. It makes a judgment about whether the obtained differences between samples are due to some chance errors. The null hypothesis is formulated for the express purpose of being rejected because if it is rejected the alternate hypothesis (Ha) which is an operational statement of the investigators research hypothesis is nothing but predictions or deductions drown from a theory. The test of null hypothesis are generally called test of significance the out come of which is stated in term of probability figures or levels of significance.
3.3.5 Level of Significance –

The rejection or acceptance of the null hypothesis is based upon the level of significance, which is used as a criterion. The levels of significance are also known as alpha level. In educational research there are two level of significance which are commonly used for testing the null hypothesis. One is 0.05 level or 5% level and another is 0.01 level or 1% level of significance. If the null hypothesis is rejected at 0.05 level, it means that 5 times in 100 replications of the experiment, the null hypothesis is true and 95 time this hypothesis would be false. In other words, this suggest that a 95% probability exists that the obtained results are due to the experimental treatment rather than due to some chance factors rejection of the null hypothesis when, in fact, it is true, constitute type I error or alpha error.

This it can be said that at 0.05 level of significance the investigator commits a 5% type one error when he rejects a null hypothesis. Some investigator may want a more stringent test and 0.01 level suggests that 99% probability exists that the obtained results are due to the experimental treatment and hence, once in 100 replications of the experiment. The null hypothesis would be true.

One-tailed and two – tailed test

One tailed test is a directional test, which indicates the direction of the difference between the samples under study. Suppose the experimenter conducts an experiment in which he takes two groups and the scores are obtained one is the control group and another is experimental group.

A two tailed test is one in which the investigator is interested in evaluating the difference between the groups. The direction of difference is of no importance here. The null hypothesis will be that the mean of the experimental group is equal to the mean of the control group. That is there is no significance difference between the means of the experimental group and the control group. The alternative hypothesis would be that the mean of the experimental group is not equal to the mean of the control group.