CHAPTER - III

METHODOLOGY
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It has been discussed earlier that the motivation of the researcher is to bring out a bird's eye view of a literature on SES and the dependent variables viz., creativity, intelligence and academic achievement. Studies conducted in the west as well as in the east and variations occur in the studies. In this regard, the researcher intends to find out the influence of SES on dependent variables. Further it is aimed to find out the variations existing among the boys and girls.

STATEMENT OF THE PROBLEMS

The problem is to study the creativity, intelligence and academic achievement of primary school children in relation to different socio-economic background. Besides, all the other demographic factors except SEX kept constant.

OBJECTIVES

The purpose of this study is: To find out the difference of creativity (fluency, flexibility, originality and elaboration), intelligence, and academic achievement of the groups belonging to different socio-economic status.
It is also aimed to study the incidence of creative thinking abilities, intelligence and academic achievement and compare these factors among the male and female children belonging to different SES groups.

HYPOTHESIS

The important questions to which answers are sought in the present study are; for the purpose the Null Hypothesis set were:

1. Socio-economic Status has no significant impact on creativity (fluency, flexibility, originality and elaboration), intelligence and academic achievement.
2. There is no significant difference between boys and girls in creativity, intelligence and academic achievement belonging to different SES groups.

RELEVANCE OF THE RESEARCH DESIGN

The selection of proper sample and suitable tests or the development of appropriate test, administration and scoring and consolidation and analysis of data are the most important aspects to be considered in any research programme in social sciences. Since it is possible to have a variety of research programmes incorporating these and related factors, the details of the procedure as used in the present study are given here. It may be noted that a research design, in general is the arrangement of conditions for the collection, and analysis of data in a manner that aims to combine under relevance to the research purpose with the economy in
procedure. It is planning which goes before the actual execution of the investigation (Sellitz et. al. 1967)

SECTION: I

SETTING:
This study was conducted in the later part of 1985 in the Dharwad-Hubli corporation. This city of Dharwad-Hubli is selected because it is fairly representative of the 15 cities of Karnataka State. This is an educational centre with the University and many other colleges. It has also the administrative headquarters of the district. It has all the urban setting which is necessary for the study.

The city of Dharwar is situated in the north Western part of Karnataka State. It is well connected by transportation and communication. The Poona-Bangalore National Highway runs through the city. It is about 450 Kms. away from Bangalore and 700 Kms. from Bombay.

Due to its situations and range of hills and salacious climate the city is known as a hill station. The city on the Western Ghats at the height of 2580 ft above the sea level. It comes under the Malnad region having an average rainfall of 32" inches.

The origin and history of Dharwar is not clearly known but the epigraphic records reveal that several dynasties like Banavasi, Kadambas, Chalukyas, Rashtrakutas, Yadavas and Vijayanagara kings have ruled this town, and
fell. Later on it was ruled by Bijapur Adilshah, Marathas and also by Mysore Kings- Hyder Ali and Tipu Sultan.

In the year 1817 Dharwar with the surrounding region was passed on to the British by the Peshwa Kings of Poona. Since then Dharwar assumed a new importance and continued to be a British Garrison. The temperate climate of Dharwar tempted the British to select it as district headquarters of the civil administration and the city began to increase in both population and area. In its structure Dharwar at present reflects the traits of its stormy past. (Chekki 1966)

Dharwar-Hubli corporation came into existence in the year 1962. The area between the two cities is developed into an industrial estate along the National Highway No.4 and now it is the second largest city of the Karnataka State. The formation of corporation led to the development of industry and urbanization has made its mark on the life of the people. Inspite of all these changes it has retained its originality as an educational, cultural and administrative centre.

The population of Dharwar-Hubli as per 1981 census is about 4 Lakhs. The literacy rate is high in the city. At present there are 40 Primary schools, 20 secondary schools, 5 Junior Colleges and 13 Degree Colleges, besides, 2 Engineering and one Medical, one Dental 2 educational, 3 Law Colleges and one Agricultural University. The total number of students in the degree colleges during the academic year 1983-84 was 50502
(4351-Boys, 1151-Girls). Thus students and teachers form the recognizable population of Dharwar. The growth of the city can be attributed partly to the development of educational institutions with the establishment of University. This city is known for the cultural heritage and contribution to the field of literature.

SAMPLE FOR THE INVESTIGATION

A sample is any sub-aggregate drawn from the population. When a population is drawn at random, it is known as random sampling in which every member in the population has an equal probability of being included in it. Several types of sampling procedures are available, and each one has its merits and demerits (C. G. Ackoff, 1955; Kothari, 1986) over the remaining ones. However, depending on the research design the investigator makes use of the appropriate technique of sampling.

For the present investigation stratified random sampling technique has been made use of. In stratified sampling the sample is first divided into number of strata or groups. Then from each group certain items are taken randomly. Purposive selection method is used in the selection of strata and actual units are selected from each strata by random sampling.

The process of stratifying involves many steps viz.,

1. The different variables involved in the study are to be noted down.
2. The size of each stratum in the universe should be large enough to provide selection of items on random basis.

3. There should be perfect homogeneity in the different units of strata, which is known as proportional stratified sampling.

4. The strata should be clear cut and free from overlapping so that, every unit must find a place in some stratum or the other, and no unit should be placed in more than one stratum (Bajpi, 1980).

Stratified random sampling procedure requires prior knowledge perhaps obtained from census data, about the number of proportions of numbers in the population of various strata. Thus, one may know the number of males and females, the number in various age groups and the like.

As Young and Sahmid (1975) observed, the main objective in stratification is to secure a more reliable sample, sometime gains in stratification may be very high, and at other time very average. If the various strata are so chosen that the variable under consideration is relatively homogeneous within the strata, and heterogeneous between the strata, variance will be randomly distributed throughout all the strata, like no improvement will take place through stratification. Sampling variance can also be reduced by increasing the number of cases.
(a) Factors considered for the selection of sampling

As stated in the introductory chapter the several children who are found to be bright and dull do not come to the notice of the people. The reason is that the parents and relatives of the children do not observe these factors except a few. It would therefore be rather difficult to take a representative sample including those who do not possess the factors at study.

In the light of the above it was decided to limit and focus the study on the children selected by administering the various tests used by the present investigator. The children could be considered as a representative sample of the Karnataka State.

The children with regard to the age of the sample it is homogeneous i.e. the mean age range from 11-13 years and only those who could understand the instructions and items in the test and the general information schedule are selected and hence the lower limit of age has been fixed at 11 and upper limit at 13 years. The sample was categorized into three major groups mainly high, middle and low. The initial sample from whom data was collected for the present investigation consists of 450 boys and girls.

The sample was drawn from the different educational institutions situated in Hubli-Dharwar corporation area.
MATCHING OF THE SAMPLE

There are different methods for matching subjects. In matching of the pairs each person of the group has a match in the second group. When it is impossible to set up groups in which subjects have been matched, person to person investigator often resorts to matching in terms of means. Sometimes matching of group is done equating the strata of certain relevant variables in different groups by taking simply the frequency count (Garret, 1969). For the present investigation, the group matching is done on the basis of the socio-economic status. As regards the age it was fixed 11-13 years as explained earlier. Utmost care has been taken to see that there are almost equal number of subjects in each group.

Both boys and girls are included in the study. Number of boys - 240, number of girls tested in the study - 210.

**Location** :- In the earlier context the majority of the subjects were from the urban while a few were from rural areas living in Hubli-Dharwad.

**SES** :- Of the parents of the sample, it is observed that, some are not having any good educational background but the socio-economic status were found to be sound.
Socio-economic status has been taken as the main independent variable. SES is the combination of parental caste, education, occupation and income. The higher SES group compared to the lower SES group should have higher parental caste, education, occupation and income.

**TESTS**

The investigation made use of standardized tests for measuring the different variables under study. The tools used are described with a view to give the trait interpretation of the variables measured by them and to present the adequate picture of the statistical properties.

1. **SES SCALE**

   This scale was developed by late Dr. B. Kuppuswamy, Professor of Psychology, Mysore and the scale was developed in 1962. In the present investigation the 1981 revised form of the scale was used.

   The scale has two forms. Form A is an adult form and meant for using on earning members or others who are out of employment. Scale B is meant for only students. Hence form B is used in the present investigation. The inventory is self explanatory. The various items are related to education, occupation and income. The scale contains seven items on each of the three variables. The scale on the basis of the total score is as follows:

   - 26 - 29 : I Upper class
   - 16 - 25 : II Upper middle
   - 11 - 15 : III Lower middle
In the present study the II and III were combined to represent the middle class. The mean scores for class II and III were combined to represent the middle class. Similarly the mean scores for IV and V were combined to represent the lower class. The original scale was slightly modified with respect to income level of parents. The modification in the scale was necessary, because of the decreasing rupee value from 1966 to 1981. The value of rupee, according to economists, is determined by the consumers price index while the All India Consumers Price Index in 1966 was 132. During the year 1981 it went up to 270 - an increase of little lower than 100 per cent (Report on Currency and Finance, Volume 2).

Consequently the value of rupee reduced by 50 per cent, i.e. Rs. 50 in 1966 is almost equal to Rs. 100 in 1981. On this basis, the income level part of the scale was modified by Dr. Parashivamurthy 1977.

As proportional modification of the income level was prepared by the investigator to suit the income level for the present study:
The weightage given to educational and professional level of parents were the same as found in the original scale.

The test was found to be valid for the investigation. It was also found that when all the three variables used, the multiple biserial reliability is .885, while it is .733 when income is eliminated, .274 when education is eliminated and .667 when occupation is eliminated.

*Scoring:* The scoring was done as per the weightage given in the table. So it was found that the scale is suitable for the present investigation and hence was selected.
The tests used on different SES groups for measuring the dependent variables were:

1. Creativity
2. Intelligence
3. Academic achievement

**CREATIVITY**:- To measure creativity, Baquer Mehdi's (verbal and non-verbal) test was used. Originally this test was developed by Mehdi in Hindi Language, later on this test was adopted to different languages. The Kannada version of this test was developed by Smt. Nayana Tara (1980), at the Department of Education, University of Bangalore, Bangalore.

Verbal and non-verbal tests of creativity are parts of the total battery. This consists of both verbal and non-verbal items. This tool is based on Guilford's theory of creative thinking of the six primary traits elaborated by Guilford. Mehdi has taken only four, mainly Fluency, Flexibility, Originality and Elaboration, and the left out items being redefinition and sensitivity to problems. This battery is mainly to identify creative talent at all stages of education up to X Standard. Baquer Mehdi has developed norms for the VII Standard which is considered as the higher primary stage. So this battery can be used to measure creative talents of the sample selected in the present study. The types of tasks included in the test have been chosen so that they could be easily and economically
administered over a wide range of sample, starting from VII Std. to the graduate level.

The verbal tests consists of four sub-tests, namely consequence test, unusual user test, similarity test and productive improvement test.

I. **Consequence test**: Three hypothetical situations are given in this test:

a. What would happen if man could fly like birds?

b. What would happen if our schools had wheels?

c. What would happen if man does not have any need for food?

For these situations the subject is required to think as many consequences as he can in the given time and he should write them under each situation in the space provided. There will be minimum effect of experience, as the situations are hypothetical by providing ample opportunity to make responses. According to the manual this test encourages free play imagination and originality. The time allowed for three items is four minutes each.

II. **Unusual Uses Test**: This test consists of three common objects;

a. Small pieces of stones
The subject is required to write as many novel, interesting and unusual uses of these things as he can think of. According to the manual, the test measures the subject’s ability to retrieve items of information in storage. Obviously it also measures the subject’s ability to shift frames of reference to use the environment in the original manner. The time allowed to work on this test for each item is five minutes.

III. New Relationship Test :- Here the subject will see three pairs of words.

a. Tree and house  
b. Chair and ladder  
c. Air and water

The subject is required to think of as many novel relationships as he can between the two words of each pair. The test provides an opportunity for the free play imagination and originality. The time allowed for the three items is five minutes only.

IV. Product Improvement :- Here the subject is asked to keep in mind a simple model of a toy horse, and he has to suggest as many things as he
can add to make it more interesting and novel for children to play. The time allowed on this test is six minutes.

**ADMINISTRATION**

The instructions printed in the beginning of the booklet were read out loudly to the subjects by the investigator. There are separate instructions for the subjects. The total time required is 48 minutes.

Another extra 5 minutes are given to write any new ideas they get while answering any item of any activity.

**Scoring** :- Scoring has to be done carefully as there are no right or wrong answers for the test. Each item is to be scored for fluency, flexibility and originality. Fluency is the number of relevant number of responses given by the subject.

In Flexibility the investigator should categorize the given responses with the help of the scoring guide.

The Flexibility numbers is the total number of categories the subject has used while responding. The Originality scoring is done on the basis of the statistical uncommonness of the responses. The more uncommon the response, higher is the originality Weight. The originality weights have been stated in the scoring guide for all the original ideas and they should be used as such. To get a composite creativity score it is necessary that
the raw scores should be converted into standard scores, as per the norms given by the author.

RELIABILITY AND VALIDITY OF THE TEST
The reliability coefficients of test-retest methods are highly satisfactory ranging from 0.896 to 0.959. The coefficient of correlation are fluency .945, flexibility .921 originality, .896 and creativity score .959. The manual also reports inter scores reliabilities for the factor scores, found to range from .653 to .981 from a study conducted by the author. The reliability coefficients against the teachers rating for each factor are fluency .40, flexibility .32, originality .36 and total creativity score is .39. All these correlations are significant at .01 level. The adopted Kannada version test is also a highly reliable test giving a high reliability coefficients. The test retest reliability coefficient obtained was .92. The inter judge correlation was .96 indicates the validity of the test.

NON-VERBAL TEST OF CREATIVITY:
The non-verbal test is the part of total battery which consists of both verbal & non-verbal tests. It can be administered to stages of higher primary to graduate level to know the creative talents of the individual. The non-verbal test is intended to measure the individual's ability to deal with figural content in a creative manner. Three types of activities are used for this purpose viz., Picture construction, Picture completion, Triangles and ellipses.
i) **Picture construction** : This activity presents the subject with two simple geometrical figures, a semi-circle and a rhombus. He is asked to construct an elaborate picture using each figure as an integral part. The subject is allowed to turn the page to use the figures in any way he likes for making the picture. The subject should try to make a novel picture as far as possible so that no one else will be able to produce. This gives originality factor. He must also add as many details as he thinks necessary in order to make the picture as complete and interesting like a story. This gives importance to elaboration factor. The subject also should give an interesting and unusual title to each picture. The time allowed to complete this task is 10 minutes.

ii) **Incomplete Figure** : This activity is used by a number of psychologists to study the personality and thought patterns of children. In terms of Gestalt Psychology, "An incomplete figure sets up in an individual tension to complete it in the simplest and easiest way. This activity consists of ten line drawings which could be made into meaningful pictures of different objects. The subject is asked to make a picture which others cannot draw. He is asked to give an interesting and suitable title to each picture he makes. The time given is 15 minutes for ten items.

iii) **Triangles and Ellipses** : In this activity the subject is provided with seven triangles and seven ellipses and he is required to construct
different meaningful pictures based on the two given stimuli. He is also asked to give an interesting and suitable title to each picture. Total time of 10 minutes is allowed for this activity.

The three activities together provide ample opportunity to the subject to use his imagination with different types of figures tasks and come out with novel ideas. The general instructions were read out to the subjects which were given in the beginning of the test. These are separate for each subtest. The total time required is 35 minutes. An extra 5 minutes are given to any new ideas if they get during that time about any item of any activity.

The scoring has to be done carefully as there are no right or wrong answers. Each items is to be scored for elaboration and originality. Only the items in third sub-tests may be scored for flexibility if the researcher desires.

**Elaboration**: It is the person’s ability to add more ideas to the minimum and primary response to the stimulus figure. For scoring the minimum responses, it is recommended as a general rule that only those parts will be considered most essential if the figure cannot be identified.

**Example**: A human head, eyes, indication of nose and mouth will be enough to identify head and so all other parts like hair and ear are considered as elaboration.
Scoring of titles :- In scoring the title for elaboration care has to be taken to identify primary and minimum response and all additions should be taken for elaboration. For example : If a picture of an aeroplane and the title reads "Pilot returning from bombarding the enemy" the elaboration score for this title will be the number of idea included in the title - 1 for pilot, 1 for returning, 1 for bombardment, 1 for enemy. Total score will be 4. A word aeroplane is not mentioned verbally, so no score is given but, it is conveying a novel idea and a primary responses. So it is scored.

Originality is represented by uncommonness of a given response. Originality scoring from the title will be considered as verbal rather than non-verbal. The titles are evaluated for originality on the following scheme. 1. A zero score will be given if it is just a name of the object, e.g. cat, dog etc., these are obvious things. 2. A score of 1 will be given if it attempts to describe the object in elaborate terms such as a tall man, beautiful object etc. 3. A score of 2 will be given to a title which is imaginative and goes beyond physical description of the object. Example: a "King from Mars", "A cat that never mewed". 4. A score of 3 will be given for a title which is appropriate and says something which goes beyond that is observed. Example : A pilot returning after bombing enemy.
After scoring the originality factor as mentioned in the guide to get the composite creativity scores the raw scores should be converted into standard scores.

The reliability scores of r. co-efficients obtained by test retest method are considerably high ranging from .932 to .947. The coefficients for elaboration .932, originality .946 and total creativity score is .946. The inter score reliability for elaboration, originality and creativity scores were .981, .98 and .947 respectively as given in the manual.

The validity coefficients against the teacher ratings for each factor are:

1. Elaboration .346
2. Originality .329
3. Total creativity .385

These correlations are significant beyond .01 level so that the adapted Kannada version of the creativity test is also reliable and valid test. Hence it is used in the present study as a sound tool.

INTELLIGENCE: RAVEN'S PROGRESSIVE MATRICES

To assess the intellectual capacity of the sample selected for the study the RPM sets of ABCDE is used. It is culture fair, perceptual, non-lingual, non-verbal, non-performance test which is not influenced by factors of
experience, verbal ability, spatial ability, manual dexterity and so on. These matrices are based upon Spearman’s theory of intelligence.

As stated by Raven himself this is a test "of a person's capacity at the time of test to apprehend meaningless figures presented for his observation to see the relationship between them, conceive the nature of figure completing each system of relations presented, and by so doing develop a systematic method of reasoning".

There are five sets in the test ABCDE. In each set there are 12 problems making a total of 60. The problems are arranged on the basis of level of difficulty encountered in solving them. The difficulty is in the ascending level. On each page of the booklet the pattern is given and in that a bit is missing. Below this pattern six to eight alternatives are given. The subject is required to select only one pattern which fits to complete the pattern. The subject should carefully observe and find the correct answer in the answer sheet given by the experimentalist. There is no time limit but the maximum time provided is 30 to 45 minutes.

The scoring is done by taking the correct answers. The number of correct responses given by the individual forms the raw score of the test.

This test can be administered to both children and adults. It can be used as an individual and a group test. The test is found to be highly valid and
the reliability coefficients using split-half method ranged from .70 to .90. So this test was selected for the present investigation.

ACADEMIC ACHIEVEMENT

The knowledge, which people get in course of instruction in various academic subjects is estimated by means of tests or examinations. The performance of pupils in these examinations is taken as the academic achievement of the sample in the respective subjects. The percentage of marks obtained by the students at 5th, 6th and 7th examinations were taken to represent the academic achievement of the selected sample for the purpose of the study.

These tests were selected since they were adopted versions found to be suitable for the sample studied. Besides they are also group tests which can be administered at one time to a group and save time.

THE DATA COLLECTION

The procedure for the collection of the data is explained in this section under various heads.

1. Administration of Tools and scoring. The details of administration of the tools used for the study and the scoring procedures are explained along with the description of the test given earlier.

After finalizing the sample and the tools, a programme, for testing has been arranged. The data are collected during the academic year. The
testing was followed by several sessions and usually held soon after the school commenced and always before the lunch break. This caution was taken considering that the students were fresh and have no physical and mental fatigue at the time of taking the test. The report was established with the subjects to get unbiased answers.

The data collected from the following schools from Dharwad-Hubli corporation on the basis of sampling techniques explained earlier. The names of the schools are:

1. Kannada Govt. model school No. 3, Dharwad.
5. Govt. model No. 6 Girls School Hubli.
7. Basel Missions Boys School- Hubli

The Principals and the respective class teachers were contacted earlier to provide necessary infra-structure for test administration.

Besides necessary information of each student was recorded on personal data sheet and also the Socio-economic background of each candidate was obtained by administering Dr. Kuppuswamy scale (1981).
STATISTICAL ANALYSIS, STATISTICAL METHODS USED

If the knowledge has to be empirical and objective it is to be systematically analysed. If the knowledge is not analysed the conclusions drawn may be influenced by likes and dislikes of the individual researcher. As human being is more complex and refined, the knowledge obtained by him through research, specific quantitative measures become increasingly important. In order to evaluate the measures of the event it is expressed in terms of concrete aspects such as how much gain or loss, how much closely related or different, or how much better or worse. It is important to use quantitative measures to determine the differential aspects of the groups and it serves as a foundation for judgement.

If a research has to be considered as a valid one it has to satisfy two main conditions;

1. Unbiased collection of data on an empirical way.

2. The data collected should be subjected to an appropriate statistical analysis.

In the present work the use of computer analysis is found to be more effective and time saving.

The statistical technique used in the present work is a two factor "Analysis of variance". Method of H. Scheffe and Fishers F test was applied as post hoc test.
The comparison of the difference between means is usually done using the t-test as the procedure is simple and meaningful. When three or more groups are involved in the comparison, the standard error of t-test becomes complicated. In such cases another procedure using the F-distribution known as Analysis of variance (ANOVA) is commonly used. It requires the same assumptions as the t-test: Independent and random samples, normal distribution of the dependent variable in each population group and homosudasticity of the variances. The F-ratio is calculated as for the procedure explained by H. Scheffe (1959).

If the calculated values are lesser we accept the null hypothesis. On the other hand, if the calculated values are greater than the table values we reject the null hypothesis sustainable. Karl Pearson Product moment of correlation coefficient is used for estimating the extent of relation existing among the different variables taken in pairs for all the different groups. The product moment of correlation coefficient between any two variables can be described in a general way, as high marked, or substantial and low or negligible. Garret 1965 presents the following classifications for interpreting the various values of r's.

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r= from 0.00 to ± 0.20 denotes negligible or indifferent relationship.
r= from 0.20 to ± 0.40 denotes low correlation but slight.
r= from ± 0.40 to ± 0.70 denotes substantial or marked relationship.
r= from ± 0.70 to ± 1.00 denotes high to very high relationship.
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Guilford (1956) also classified r's in a similar manner. However as Guilford points out what would be a large correlation coefficient for one purpose, would be regarded as a small one for another.

Interpretation is therefore, largely a relative matter related to the area of the investigation. With this in view the strength of relationship various r's are given below for the present study.

As there are three variables in this study the total number of r's obtained for each variable is three. These r's have been tested for significance and verbally described whether significant or insignificant.

In the next chapter the details of analysis and the discussion of the results are presented.

LIMITATIONS OF THE STUDY TO BE INCLUDED
1. The sample is only 450 and it may not give the real picture of the results to be obtained in the study.
2. The subjects might not have given the information necessary for the present investigation.
3. Further the sample being Primary school students, the comprehension of the instructions may not be clear.
4. The test administration being tedious one the subjects might have lost interest in responding
In the following chapter data obtained have been statistically analysed and interpreted so as to give the comparative picture of the relationship of dependent variables on the independent variables.

In the next chapter the results have been analysed and interpreted.