CHAPTER II

METHODS AND PROCEDURE

The purpose of this chapter is to examine and define the method and procedure adopted in the present study.

The sequence of presentation will be-(1) Design of the study,(2) Sample, (3) Tools used, (4) Test administration and data collection and (5) Statistical techniques used.

2.1 Design of the Study:

The method of investigation used to conduct the present study entitled "A Comparison of Kinetic Family Drawings (K.F.D.) in relation to creativity, emotional indications and self-concept of gifted and average elementary school children" can be described as descriptive exploratory survey. The study is 'exploratory' in the sense that no previous literature and research of this type is available and it is descriptive because it explains the nature of the phenomena.

2.2 Sample:

The subjects for this study were chosen from the
elementary schools of Thailand representing all the five zones, namely Bangkok, Central, South, North and Southeast. In each zone there are three schools. The subjects were selected in the age range of 9-12 years representing grade III through grade V including roughly three classes in each school. In each class there are two to four sections. In each class only one section was picked up randomly. In each section there are about 30 children. For sampling the design at this stage was multi-stage random cluster technique of sampling involving $5 \times 3 \times 3 \times 30$ design in which 1350 children were included at the first stage. The study was carried out in two phases.

**First Phase: Procedure to select gifted children**

In the first phase, an initial sample of 1288 children (682 boys, 606 girls) chosen from five zones and 15 schools were given the test of intelligence to identify gifted children. After the intelligence test was given those children falling in the range of "Intellectually superior" according to the manual or top 5% of the population were selected as gifted children.

**Criterion to Select Gifted Children:**

The criterion of selecting gifted children was
in accordance with the criteria followed in literature to describe giftedness. Haring (1974) is of the view that assessment of giftedness can be viewed as a two part process: (a) screening and (b) final selection. During screening the use of teacher observation and groups tests and the recognition of demonstrated accomplishment may be employed. For final selection, individualized intelligence tests and tests of creativity should be used.

Martinson (1973) recommended the use of additional screening instruments to reduce errors in selection of the gifted "such tests as the Harris - Goodenough Draw-a-Person, the Peabody Picture Vocabulary Test, The Raven Coloured Progressive Matrices and the Slosson Intelligence Test.

Marland (1972) listed six procedures for assessing and identifying the gifted. The order currently used in the United States is: (1) teacher observation, (2) and (3) group achievement tests and group intelligence tests, (4) previous demonstrated accomplishments, (5) individual intelligence test and (6) scores on tests of creativity.

Keeping these suggestions in view it was deemed fit that gifted children be selected with the help of
intelligence test. "The very superior" scores on intelligence served the criterion to screen gifted children. In the present investigation Raven's coloured matrices - a non-verbal test of intelligence was administered to an initial sample of 1288 children. Thus on the basis of the test scores, the top 5% population who were in 95th percentile, grade I with "very superior intelligence" were screened as gifted children.

Criterion followed to select average group children:

After selecting the gifted children (N=127), the remaining sample (1161) was treated further to select approximately the same number of average children. The means and SD were worked out on the intelligence test scores taken from the initial sample (1288, now 1161 after gifted group was separated). In order to select an equal number of average children, out of 1161, those children who fell within the range of Mean + 1 SD were selected as average group. This criterion fitted very well to have approximately the same number in both the groups viz. gifted and average groups. Thus in gifted group, there were 127 children and in average group there were 130 children.
The break-up of the sample at initial and final stage is presented vide Table 2.1 and 2.2.

**Table 2.1**

Break-up of the total sample

<table>
<thead>
<tr>
<th>Zone</th>
<th>Name of School</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok</td>
<td>Wat Amarin Vidyakom School</td>
<td>62</td>
<td>51</td>
<td>113</td>
</tr>
<tr>
<td></td>
<td>Wat Bangkok Yai School</td>
<td>49</td>
<td>43</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>Wat Thapra School</td>
<td>47</td>
<td>48</td>
<td>95</td>
</tr>
<tr>
<td>Central</td>
<td>Wat Prapathomchedi School</td>
<td>45</td>
<td>41</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Wat Prap Yom School</td>
<td>42</td>
<td>38</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Wat Sanaiha School</td>
<td>39</td>
<td>33</td>
<td>72</td>
</tr>
<tr>
<td>North</td>
<td>Wat Lag Muang School</td>
<td>44</td>
<td>32</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Wat Song School</td>
<td>38</td>
<td>41</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Promilas Vidya School</td>
<td>33</td>
<td>35</td>
<td>68</td>
</tr>
<tr>
<td>South</td>
<td>Nabon Vidhayalai School</td>
<td>51</td>
<td>38</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>Wat Saiburi School</td>
<td>46</td>
<td>42</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>Wat Sarpanom School</td>
<td>37</td>
<td>47</td>
<td>84</td>
</tr>
<tr>
<td>Southeast</td>
<td>Wat Wangchan School</td>
<td>64</td>
<td>54</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Wat Kao Saming School</td>
<td>46</td>
<td>38</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Wat Klong Yai School</td>
<td>39</td>
<td>25</td>
<td>64</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>682</td>
<td>606</td>
<td>1288</td>
</tr>
</tbody>
</table>
From this, the gifted and average children were selected according to the criterion mentioned above. The break-up of the final sample is shown vide Table 2.2.

Table 2.2
Final Sample

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>G</th>
<th>Total</th>
<th>Gifted</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok</td>
<td>158</td>
<td>142</td>
<td>300</td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>Central</td>
<td>126</td>
<td>112</td>
<td>238</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>North</td>
<td>115</td>
<td>108</td>
<td>223</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>South</td>
<td>134</td>
<td>127</td>
<td>261</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Southeast</td>
<td>149</td>
<td>117</td>
<td>266</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>682</td>
<td>606</td>
<td>1288</td>
<td>77</td>
<td>50</td>
</tr>
</tbody>
</table>

In the second phase the major investigation was done on a sample of 127 gifted and 130 average children.

2.3. Tools Used to collect data for this study

Six tests were used for the collection of the data in accordance with the design and purpose of the study.

A brief description of each tool is also given below:
2.3.1 Raven's Coloured Progressive Matrices (1954)

The coloured Matrices are designed for young children and old people, for anthropological studies, and for clinical work. They can be used satisfactorily with people who, for any reason, cannot understand or speak the English language, with people suffering from physical disabilities, aphasias, cerebral palsy or deafness, as well as with people who are intellectually sub-normal or have deteriorated.

This test is most sensitive to function fluctuations in the output of intellectual activity. It is a booklet consisting of 36 items. Each item has a design made on half of the page. A part of the design is left blank and underneath, six small extracts, similar in shape for the top design are given. Only one of these are exactly the same colour and design as the top block. The children have to look at the top design, and then at the six given below and write the number of the one which they feel would complete the top design.

The three sets of twelve problems constituting the Coloured Matrices are arranged to assess the chief cognitive processes of which children under 11 years of age are usually capable. The three sets together provide three opportunities for a person to develop a consistent theme of thought, and the scale of thirty-six problems as a whole is designed to assess as accurately as possible, mental development up to intellectual maturity.
This test was chosen as one of the tools to assess the level of intelligence of the children and on that basis it was attempted to identify the gifted and average children.

Reliability of the Coloured Progressive Matrices:

Reliability has been interpreted by Raven (1956), 58 children, aged 6½ + one year, and 61 children age 9½ + one year, who had been given the original scale, were subsequently re-tested with the revised scale of 36 problems. The results showed a test-retest correlation of 0.6±0.06, and 0.8±0.03 respectively.

The relatively low-retest reliability at 9½ years of age, compared with the re-test reliability of 0.8 at 9½ years of age, suggested that the scale was sensitive to fluctuations in the output of intellectual activity in early childhood, rather than to any defect in the scale itself.

Comparisons between the Matrices, Terman-Merrill and Crichton Vocabulary Test Correlations for Normal School Children (9 years): The Matrices and Vocabulary scales show a high inter-test correlation rising to 0.90 for the third test, for the emotional disturbed children the inter-correlation between their capacity for intellectual activity as assessed by the Matrices Scale, and their acquired information and powers of verbal communication as assessed by the Crichton Vocabulary Scale, in no case
The Torrance Tests of Creative Thinking are among the most widely used batteries of tests to assess "creativity" or "creative thinking". It is a booklet consisting of 7 items. But the investigator chose only 3 items. These are:

(i) Product Improvement
(ii) Unusual uses of cardboard boxes
(iii) Just suppose

(i) Product Improvement:

The product improvement activity has always been one of the most dependable measures. It is a complex task with a high degree of face validity. The activity is attractive from the standpoint of administration and scoring. To most subjects at all age levels, it is an interesting task. It permits them to "regress in the service of the ego" and enables them to play with ideas that they would not dare express in a more serious task. A toy elephant is shown to the subjects and they are asked to suggest the cleverest, most interesting and unusual ways. They can think of for changing this toy elephant so that children will have more fun playing with it.
The fluency score for this activity is the number of relevant responses produced. The flexibility score is the number of different approaches used in producing ideas for improvement. The originality score is based on the statistical infrequency and appropriateness of the ideas produced. The sum of fluency, flexibility and originality is total creativity.

(ii) Unusual uses of cardboard boxes

This activity was adopted from a technique devised by Robert C Burkhart (1961). Burkhart had developed this activity as a measure of what he terms 'Divergent power'. He maintains that a factor that he has labelled 'Productive Spontaneity' is not sufficient for the prediction of a high degree of creative achievement. What he terms 'Divergent power' is essential for such achievement and is considered to be of critical importance for creativity in the classroom.

The subjects are required to answer as many uses as they can do about cardboard boxes. This test assesses four areas of creative thinking: fluency, flexibility, originality and total creativity. Fluency is the number of relevant responses to an item. Flexibility is the number of different categories into which the responses fall. Originality is a sum of scores assigned to responses based on rarity of the response. And total creativity, the last
being the additive sum of frequency, flexibility and originality.

(iii) Just Suppose Activity

The Just Suppose Test presents improbable situations accompanied by drawings and requires imaginative solutions to get the most information from a minimum of testing times. The measures have been constructed to allow responses to be scored for more than one dimension of creativity (Vernon, 1970).

The 'Just Suppose Activity' is an adaptation of the consequence type test in Guilford's battery and is a variation of the 'Guess Consequences Activity' of the Ask-and Guess series. This variation was designed in an attempt to elicit a higher degree of spontaneity and to be more effective with children. As in the consequences test, the subject is confronted with an improbable situation and is asked to predict the possible outcome from the introduction of a new or unknown variable. The subjects are asked to think of all of the other things that would happen if the given improbable situation were to come true.

An example of the improbable situation is - Just suppose a great fog were to fall over the earth and all we could see of people would be their feet. How would this change life on earth?
Scoring — There are four criteria for evaluating the responses of the subjects - fluency, flexibility, originality and total creativity. The number of responses produced by a subject yields one measure of ideational fluency. The number of shifts in thinking or number of different categories gives one measure of flexibility. The statistical infrequency or the extent to which the response represents a mental leap or departure from the obvious and common place gives one measure of originality. Total creativity is the sum of frequency, flexibility and originality.

Reliability in Torrance Tests of Creative Thinking:

Studies of scorer reliability have shown that individuals specially trained and experienced in the scoring of the Torrance Tests of Creative Thinking are capable of scoring with a very high degree of reliability. To answer the question about the reliability of results derived by untrained scores, an experiment was conducted in which regular classroom teachers and educational secretaries scored tests without benefit of any training other than the study of the scoring manual. Results available for six teachers and one educational secretary indicate that when the scoring guide is carefully studied and accepted, scores of acceptable reliability are obtained. The mean
Pearson product moment coefficients between the scoring of trained scores and untrained teachers for the figural tests are: fluency, .96; flexibility, .94; originality, .86; and elaboration, .91. The mean reliability coefficients for the verbal tests are: fluency, .99; flexibility, .95; and originality, .91. The results for the one educational secretary are: fluency, .99; flexibility, .98; originality, .76; and elaboration, .87. The lower reliability for originality seems to occur when the scorer rejects the scoring guide and substitutes his own concept of what is original.

These findings suggest that it is not necessary to have special training in scoring these tests to assure reliable results. What does appear to be necessary is that the scorer reads and follows the scoring guide as precisely as possible, accepting the standards, of the guide as a basis for judgement.

Test of creative thinking was made by the test constructors of item ability to differentiate children who were imaginative, humorous, playful, relaxed and nonrigid in their viewpoints.

It has been used extensively during the last two decades for variety of purposes. A large number of short
range as well as long-range prediction studies have led to the accumulation of a large variety of content, concurrents, and construct validity data. The available data have proved the suitability, sensitivity and appropriateness of the test for assessing creative potential (Dutt and Lal, 1977).

Since the subjects in this study were in the age group of 9 to 12 years, the complete battery of Torrance's Test of Creative Thinking was not used. Only 3, verbal and non-verbal tests were used. These are: Product improvement; Unusual uses and Just suppose. The main purpose of selecting only 3 tests was to see if score on creativity could be obtained with the help of only 3 tests given to very small children. Secondly this test was also used to validate tests of originality which also yields scores on creativity.

Third purpose of using the two tests was to obtain creativity scores with the help of as many tests. Hence only 3 tests, not the complete set— that were administered in the study.

3.3 Kinetic Family Drawings (K.F.D.)

The Kinetic Family Drawings (K.F.D.) was introduced by Burns and Kaufman (1970) in an attempt to include a dimension of action among family members. The authors of
the K.F.D. felt the addition of action would help produce a more valid and dynamic projective measure and would assist in furthering the understanding of psychopathology of children in a family setting.

The K.F.D. drawing seem to reflect cultural background, creative expression, aesthetic desires and innate ability. Authors indicate that children try to be creative and aesthetic, and in doing so, they use varying art qualities. It is interesting to use K.F.D. in normal elementary school children in order to understand their behaviour more intensively.

The K.F.D. authors examine the styles, actions and symbols of family drawings in their two books. Actions are the activity, the child shows family members doing and are a direct outcome of the directions that ask for the people to be doing something in the picture. Symbols are the content of the pictures such as balls, trees, light etc. Styles are the manner in which a child makes a family drawing. The authors list seven major style categories of drawing. There are compartmentalization, encapsulation, lining at the bottom, underlining individual figures, edging, lining at the top, and folding compartmentalization. KFD was used to measure children's self expression in terms
of styles, actions and symbols used in their drawings. Although KFDs may be used as a projective measure in test intellectual, aesthetic and emotional development, but these drawings are used in this study only to find out the use of styles, actions and symbols on lines of Burns and Kaufman.

Regarding reliability and validity, since the KFDs do not have empirical evidence to report as mentioned in the study of Burns and Kaufman. But the KFD's are used fairly widely as a projective measure in clinical setting. With this confidence the KFD is used on normal group of gifted and average children in this study.

2.3.4 Deo-Mohan Test of Originality (1972)

The originality test was developed by the joint collaboration of Deo and Mohan (1972). These tests were developed to test originality. It consists of four coloured line drawings. These drawings are a configuration of straight and curved lines and geometric shapes which are vague and unstructured. The situation is non-verbal to be seen by the subjects. Each picture is shown to the children and they write down whatever comes to their mind on seeing the picture. It provides enough latitude to the
children for the free expression of imaginative responses in the language best known to them. The dimensions of measures obtained from this originality as well as fluency and flexibility, and a composite of these described as total creativity.

All the responses on the four pictures were analysed in terms of categories obtained from frequencies of responses. The uniqueness of responses as an index of originality was decided on the basis of frequency distribution prepared separately for each of the items. The most unique response was the one that occurred once or at the most twice of total responses, which was defined as original or most uncommon, and creative, provided relevant to the figure. Moreover, because a large number of categories were obtained for each item, it was decided to prepare a 5 point scale to assign numerical weightage to the response categories, depending on its strength of frequency in occurrence. For each item, the categories for the responses along with frequencies were arranged in descending order. The categories with maximum frequencies were assigned a score of zero and the one with one or two responses was given the maximum score of seven, this indicating the strength of originality. The more frequent the responses in category, more common an idea and lesser the score. In this way with slight variation for every item, a separate scale was prepared, depending
on the situation specific to the particular item.

The fluency scores were obtained by counting the number of different responses in all four pictures. The maximum number of responses were assigned the maximum scores of fluency.

The flexibility scores were obtained by counting the responses categories different from each representing a new idea as different from another. The maximum number of new ideas were assigned the maximum scores of flexibility.

The total creative thinking ability scores were found after converting the raw scores of fluency, flexibility and originality into T-scores and by adding all these three as a composite creativity scores.

Reliability and Validity

<table>
<thead>
<tr>
<th>Method of reliability</th>
<th>r_{tt}</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Test-retest reliability coefficient</td>
<td>.74</td>
<td>60</td>
</tr>
<tr>
<td>2. Validity coefficient of correlation with things done</td>
<td>.24</td>
<td>77</td>
</tr>
<tr>
<td>3. Validity coefficient of correlation with test of inquisitiveness</td>
<td>.78</td>
<td>62</td>
</tr>
</tbody>
</table>
In the light of the reliability and validity, it is found that this test is highly reliable and valid. So that the investigator selected this test as a valid test to measure creative thinking ability for the present investigation (Patel, 1979).

2.3.5 Emotional Characteristics Scale (1981)

The Emotional Characteristics Scale constructed locally consists of 50 statements. This scale measures emotional problems with different characteristics. These characteristics have been classified in following categories:

(i) Apathetic Social withdrawal
(ii) Unsocialized Aggressiveness
(iii) Emotional Instability
(iv) Miscellaneous characteristics

There are 12 statements in Apathetic Social withdrawal, 12 statements in Unsocialized Aggressiveness, 16 statements in Emotional Instability and 10 statements in Miscellaneous. This inventory is a 3-point scale, 'Self-rating or rating by others'. It consists of adjectives/statements of everyday use. The three points in the scale are: 'not at all' characteristics, 'somewhat characteristic' and 'very much characteristic'. The ratings on emotional characteristics were obtained from the teachers who taught the children for at least one year. These teachers were also the class
teachers/incharge, who were in close contact with the students most of the time during the day in the school. These teachers are responsible for writing their daily record. Therefore, they were selected as the best raters to give ratings for these children on emotional problem scale. The teacher rated the children on list of emotional behavioural problems and tried to evaluate the emotional characteristic of the child.

2.3.6 Children's self description Scale by Mohan (1972)

The children's self-description scale has been used to measure the self-concept of the subjects. This scale of 45 items devised out of the children's self descriptions given by them. These descriptions were obtained from the age ranges of 10-11 through 13-14 years, studying in 5th, 6th, 7th and 8th classes in the Government Schools of Chandigarh. It contains 45 adjectives of every day use. It is a self rating scale rather than a check list, to be rated by the subject on three points, from 'much like me', 'somewhat like me' and 'not like me'. Out of these 45 adjectives, it has 26 positive and 19 negative both to be scored with two separate stenciled scoring keys.

The children's self-description scale is a self-acceptance measure which provide data for various aspects of
self viz. perceived ideal, social self scores for self-acceptance are obtained by subtracting the tabulated negative scores from positive scores. The score irrespective of positive and negative traits ranges from 3 to 1 along, the scale from 'much like me' to 'not like me'.

Out of various tests the children's self description scale was selected by the investigator for the following reasons, because (i) it is a quick measuring easy to measure and quick scoring, (ii) it can measure several dimension of self. In this study only perceived self is measured with the help of children self-description scale.

This scale was validated against the PWL (Revised 1971) and validity coefficient of correlation was .76 \(N=35\). The test-retest reliability coefficient was .88 obtained from 30 boys and 25 girls after an interval of 5 weeks.

2.4. Administration and Data Collection

The data for the present research work were collected by the investigator personally from different elementary public schools of Thailand by employing six research tools. The entire data collection was completed within five months.

2.4.1 Data for Intelligence to select gifted and average children

Raven's Coloured Progressive Matrices were administered
Every class was provided a booklet of test with answer sheet, and 30 minutes time was allowed to complete the whole test. Before starting the test, necessary instructions were given and were shown one or two problems for clear understanding of doing the test. After the time was over the test booklet and answer sheets were collected.

2.4.2 Data of Creative Thinking Ability

For the data of creative thinking ability, "Deo-Mohan Test" (1972) and "Torrance Test of Creative Thinking Ability" were administered to the children. These tests were given to the students after identification of gifted and average children.

Deo-Mohan test of originality contains four coloured line drawings. According to the instructions, in each picture 5 to 7 minutes were given to the children to think and to write, whatever they imagined on seeing the picture. They were asked to write their responses in the answer-sheets of each picture. The time to complete this test was 25 minutes.

Torrance's Test of Creative Thinking ability:

In this test, there are sentences and pictures.
The children were given the copies of test. The instructions were read out aloud and the children were requested to follow the instructions of each test meticulously for giving proper responses. The test took 25 minutes to be finished.

2.4.3 Data for Emotional Characteristics

The Emotional Problem Scale developed by Sethi and Ram (1981) was given to the teachers for rating the emotional characteristics of the children and were asked to check about the emotional characteristics of their students. There was no time limit fixed on it, but requested the return as soon as possible. It was further ensured that these teachers knew their students for at least one year.

2.4.4 Data for Self-Concept

The children's self-description Scale developed by Mohan (1972) was given to the children. It measured and provided data for self-concept. After the subjects read the test, they were asked to take up the rating scale. It took 10 to 15 minutes to complete this test.

2.4.5 Data for Kinetic Family Drawing (K.F.D.)

K.F.Ds are drawings that children make to show their family members. They differ from family drawings in which the children are specifically asked to draw a
picture of family with each person doing something. Students were asked to write their ages, sex and class. At the completion of the drawings, they were asked to write who each person in the drawing was (mother, father, self, brother, sister) and then to tell what each person is doing. The time for administration of K.F.D. is short (5 to 10 minutes), the instrument is appropriate for individuals in kindergarten through high school.

2.5. STATISTICAL TECHNIQUES USED

In the present study several statistical techniques were employed to analyse the data collected for the major study. The entire results were obtained from IBM-1620 Computer Centre of Panjab University, Chandigarh. The entire study was completed in two phases - Phase I and Phase II.

Phase I - Analysis of data for identifying gifted and average children with the help of means and standard deviations.

Phase II - Major Statistical Analysis.

In the second phase the major statistical analysis was done to test various hypotheses. The techniques
employed were:

(i) Descriptive Analysis: Mean, Standard deviations and standard errors of means were worked out to study the nature and distribution of the variables like K.F.D., creative thinking, emotional characteristics and self-concept.

(ii) T-ratios: The t-test was employed for comparison of the different groups of subjects on different variables of the study.

(iii) Bivariate Analysis: Pearson's Product moment co-efficients of correlations were worked out to find the strength and magnitude of relationship between Kinetic Family Drawings (K.F.D.) and the variables of creative thinking ability, emotional characteristics and self-concept.

(iv) Factor Analysis: Principal-Axes method of factoring and varimax rotation of factors was employed to study the underlying factor structure and to locate and identify certain factors of K.F.D. in the light of creative thinking ability, emotional characteristics and self-concept on the total sample on the basis of $16 \times 16$ inter-correlation matrix.

Thus with the help of the above statistical analysis the investigator could draw some conclusions based
on the results according to the various hypotheses. The detailed results and analysis are presented in Chapter III and Chapter IV.