

**A STUDY OF THE GIFTED AND CREATIVE  
COLLEGE STUDENTS IN MIZORAM IN  
RELATION TO THEIR PERSONALITY AND  
PROBLEM SOLVING ABILITY**

**ABSTRACT**

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**Thesis  
Submitted in Fulfilment For the Degree  
of Doctor of Philosophy in Education**

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## ABSTRACT

### INTRODUCTION

In the past, people have always been interested in men and women who have superior ability. However, one finds that in many societies because of socio-cultural conditions, talents have remained anonymous in spite of interest in such people. Now, of course, one finds practically all societies greatly concerned with identifying talent and providing opportunities for its upward mobility. The national planners in India, have also emphasized the development of human resources through the cultivation of talents through special educational programmes (National Education Policy, 1986). It has rightly pointed that the talent needs to be assessed, nursed and nurtured through effective educational endeavours. The education Commission (1964-66) has also observed that the talent has to be identified early and allowed to grow in the best atmosphere and under the best teachers. However, not much attention seems to have been paid to the education of the gifted and creatives in India.

The exceptionals, with superior intellectual and creative abilities are badly neglected. The contribution of the gifted and creative is highly significant to the growth of the society. They create new horizons and set new standards in science, technology, literature, fine arts, industry, social

leadership, and in other walks of life. No sooner does society become devoid of nature's gift of talents it would start to stagnate and ultimately perish (Mohsin, 1963). They can make original contributions in their area of work and contribute to the society's most precious resources.

Arnold Toyanbee (1964) considered the creative and gifted as society's great asset and stated that they have the type of talent which can make history, through reshaping man's world. It has been estimated that approximately 200 out of every 1000 children are gifted and can contribute significantly to the welfare of the society. But, as the gifted children are neglected in schools and colleges, held on par with the average child, their talents are lost, often irrevocably, both to themselves and to society. Therefore, their talent should be identified in time, cultivated and utilized for the good of society.

#### **NEED FOR AND SIGNIFICANCE OF THE STUDY**

Understanding the personality of the pupil is extremely indispensable for any teacher entrusted with the education of any type of children whatsoever. Such an understanding is particularly indispensable for a teacher of exceptional children obviously because their individual differences are all the more sharply drawn in certain significant respects. With a complete

understanding of the individual personality of the talented child his education becomes a relatively smooth, progressive and even pleasant process.

Until the late nineteenth century, very few systematic studies have been done on the gifted and creative students. In India, not much work seems to have been done in the area of giftedness and creativity. In a tribal and remote area like Mizoram, there is only one investigation undertaken in the field of special education. The study by Varparhi Khiangte in 1987 is mainly meant to develop a creativity test. This indicates the necessity of undertaking research in this field. Also the education of the exceptional children has not been paid much attention. Therefore, the present study has been designed to identify the gifted and the creative college students in Mizoram. The personality characteristics and the problem solving ability of the gifted and the creative has been studied. Personality and problem solving ability differences with regard to gender, course of study and differences in socio-economic status of the gifted and creative are also analyzed.

#### **STATEMENT OF THE PROBLEM**

"A Study of the Gifted and Creative College Students in Mizoram in Relation to their Personality and Problem Solving Ability".

## OBJECTIVES OF THE STUDY

The major objectives of the present study are :

1. To identify the intellectually gifted students from the colleges of Mizoram.
2. To identify highly creative college students.
3. To study the personality characteristics of the gifted and creative college students.
4. To study the problem solving ability of the gifted and creative college students.
5. To find out the existing provisions for the education of the gifted and make suggestions for special education schemes in the state of Mizoram.

## HYPOTHESES

1. There is no significant difference between the gifted and creative college students with respect to 16 personality factors.

2. There is no significant difference between the gifted and creative college students in their problem solving ability.
3. There is no significant difference in personality, problem solving ability of students grouped on the basis of gender, course of study and socio-economic status (SES).
4. There is a constellation of personality characteristics and problem solving ability of the students belonging to groups such as gifted and creative.

#### **DEFINITION OF TERMS USED**

##### **Giftedness**

Paul Witty (1958) defines giftedness as remarkable performance in any potentially valuable human endeavour. For the present research, the term gifted is taken to mean the students with potentially high intellectual ability and is measured by the standard Progressive matrices by Raven (1992).

##### **Creativity**

Creativity is taken as a divergent thinking process enabling the pupils for creative outputs (novel and useful) and measured through verbal and non-verbal creativity tests on four

primary traits - fluency, flexibility, originality and elaboration.

### Personality

Personality is more or less stable and enduring organization of person's character, temperament, intellect and physique which determine his unique adjustment to the environment (Eysenck, 1970). It is that which permits a prediction of what a person will do in a given situation (Cattell, 1972). For the present research, the personality characteristics are defined in terms of the sixteen personality traits and measured by the 16 PF questionnaire (Cattell and Cattell, 1979). The 16 personality factors are :

1. Factor A Reserved-outgoing
2. Factor B Dull-bright
3. Factor C Affected by feelings-emotionally stable
4. Factor E Humble-assertive
5. Factor F Sober-happy go lucky
6. Factor G Expedient-conscientious
7. Factor H Shy-venturesome
8. Factor I Tough minded-tender minded
9. Factor L Trusting-suspicious
10. Factor M Practical-imaginative
11. Factor N Forthright-astute

12. Factor O Self assured-apprehensive
13. Factor Q<sub>1</sub> Conservative-experimenting
14. Factor Q<sub>2</sub> Group dependent-self sufficient
15. Factor Q<sub>3</sub> Undisciplined self conflict-controlled
16. Factor Q<sub>4</sub> Relaxed-tense.

### **Problem Solving Ability**

The skill of the students in understanding and analyzing a problem and applying the scientific knowledge and method to solve them is designated as problem solving ability in the present study, and is measured by a Problem Solving Ability Test (PSAT).

### **SAMPLE**

The sample for the study consisted of 600 students (286 males and 314 females) selected at random from Pre-university classes of seven colleges in Mizoram.

### **TOOLS**

1. Standard Progressive Matrices (J.C. Raven, 1992).
2. 16 PF Questionnaire (Cattell and Cattell, 1979).

3. Creativity Test (Khiangte, 1987).
4. Problem Solving Ability Test (Darchhingpuii, 1988).
5. Socio-economic Status Index (Lalrinkimi, 1988).
6. Biographical Inventory devised by the investigator for the study. The inventory contains items to elicit information on personal and social characteristics such as students age, sex, course of study, locale, parents education, parents occupation and income, birth order, the students social and cultural participation and their creative talents.

#### COLLECTION OF DATA

For the present study the investigator collected the data from students of seven colleges of Mizoram during October-December, 1995. The investigator personally visited the colleges selected for the study. The tests were administered to the pre-university students after obtaining permission from the college authority. After establishing rapport with the students, the investigator obtained the responses in general data sheet. After that the 16 PF test was administered followed by Problem Solving Ability Test (PSAT). The students were given some rest and refreshments were provided. Then the creativity test was

administered followed by the Standard Progressive Matrices (SPM) Test. The time taken to complete all the tests was about five hours. In all, these tests were administered to 600 P.U. students from the seven colleges from the three districts of Mizoram.

#### **ANALYSIS OF DATA**

The data collected from the 600 students were tabulated after scoring the responses on intelligence, creativity, personality and problem solving ability tests using the standard scoring procedures. Each student was assigned a serial number and their details regarding sex, age, parental education, parental occupation etc. were entered in the tabulation sheet. The socio-economic status of the students was found out following the socio-economic status index (Lalrinkimi, 1988).

The identification of the gifted and creative students were done following a standard criterion. The students who have the score above the 75th percentile in the ascending order in the intelligence and creativity tests were classified as the gifted and the creative. A 't' test was employed to compare the mean scores of the groups based on intelligence, creativity, sex, SES and locale. Pearson Product Moment method was applied to compute intercorrelations between the test scores of students in various

groups. The coefficients of correlation were tested for significance by comparing the value with the table values for corresponding degrees of freedom and were interpreted following the scheme suggested by Garrett (1981).

## RESULTS

The following are the main findings of the study.

1. From 600 students, 81 students were identified as gifted (G), 93 students were identified as creatives (C). It was also found that there are 48 students who were gifted-creative (GC). This type of overlapping has also been observed by other researchers (Gakhar and Kaura, 1976; Getzels and Jackson, 1966). There are 45 gifted males and 36 gifted females, 53 creative males and 40 creative females and 29 gifted-creative males and 19 gifted-creative females. There were 12 science, 28 commerce and 41 arts gifted students, 18 science, 36 commerce and 39 arts creative students, and 20 science, 24 commerce and 4 arts gifted-creative students. There were also 44 low and 37 high socio-economic status (SES) gifted students, 71 low and 22 high SES creative students and 26 low and 22 high SES gifted-creative students.

2. The personality and the problem solving ability scores of the gifted and the creative students were compared applying the 't' test. The results (Table 1) revealed that the creatives had significantly higher mean scores than the gifted groups on personality factors F, H, and M at .05 level, and on factor Q<sub>1</sub>; at .01 level of significance. However, on factor B, the mean personality score of the gifted is higher than the mean scores of the creative group, and were found significant at .05 level. Also, the gifted had significantly higher mean score than the creative group in the Problem Solving Ability Test (PSAT) at .05 level.

**Table 5.19**  
**Comarison of gifted (G) and creative (C) on the scores of**  
**16 Personality Factors and Problem Solving Ability Test**

Personality Factor	Mean/SD	G N=81	C N=93	MD	SE	t	Inference
1	2	3	4	5	6	7	8
A	Mean	9.93	10.12	0.190	0.406	0.467	NS
	SD	2.67	2.68				
B	Mean	6.85	6.16	0.690	0.281	2.459	P<.05
	SD	1.76	1.94				
C	Mean	12.05	12.47	0.420	0.538	0.781	NS
	SD	3.58	3.49				
E	Mean	10.01	10.24	0.230	0.571	0.403	NS
	SD	3.74	3.78				

contd...

	1	2	3	4	5	6	7	8
F	Mean	10.70	12.28		1.580	0.627	2.521	P<.05
	SD	4.23	4.00					
G	Mean	13.40	12.92		0.480	0.468	1.026	NS
	SD	3.12	3.03					
H	Mean	8.63	9.98		1.350	0.678	1.992	P<.05
	SD	4.45	4.47					
I	Mean	10.22	10.68		0.460	0.497	0.926	NS
	SD	3.18	3.37					
L	Mean	9.62	10.03		0.410	0.468	0.877	NS
	SD	3.03	3.13					
M	Mean	8.95	10.01		1.060	0.503	2.107	P<.05
	SD	3.42	3.18					
N	Mean	11.30	10.47		0.830	0.459	1.808	NS
	SD	2.96	3.09					
O	Mean	14.90	14.72		0.180	0.595	0.303	NS
	SD	3.88	3.95					
Q <sub>1</sub>	Mean	9.07	10.46		1.390	0.459	3.028	P<.01
	SD	3.20	2.80					
Q <sub>2</sub>	Mean	10.07	9.58		0.490	0.458	1.069	NS
	SD	3.01	3.03					
Q <sub>3</sub>	Mean	10.96	10.68		0.280	0.436	0.642	NS
	SD	2.73	3.02					
Q <sub>4</sub>	Mean	14.63	13.73		0.900	0.614	1.466	NS
	SD	4.14	3.92					
PSAT	Mean	26.47	25.10		1.370	0.640	2.140	P<.05
	SD	4.18	4.25					

On the basis of the above findings, it may be concluded that the above five personality factors differentiated between the gifted and the creative students with regard to their personality characteristics. The creative students were found to be cheerful, active, talkative, frank, expressive, happy go lucky, and impulsive. They were also found to be socially bold, ready to try new things, spontaneous, uninhibited and venturesome. They were also unconcerned over everyday matters, self motivated, imaginatively creative and careless of practical matters. They are also skeptical and inquiring regarding ideas, either old or new and are inclined to experiment in life generally and more tolerant of inconvenience and change. The gifted students on the other hand, were found to be more intelligent, quick to grasp ideas, abstract in thinking and bright. The analysis of data on the problem solving ability test revealed that the gifted students were also superior in problem solving ability as compared to the creative students.

3. Personality scores and problem solving ability scores of the gifted and gifted-creative (GC) were compared and it was found that the gifted-creative (GC) group differed significantly from the gifted group on personality factors H, and M and on the problem solving ability test at .01 level indicating the gifted-creative to be venturesome, and imaginative than the gifted (G) group. They were also found to be better problem solvers than the gifted group.

4. Personality scores and problem solving ability scores of the creative (C) and gifted-creative (GC) were compared. It was found that the two groups differed significantly on personality factors B and F and also on the problem solving ability test at .01 level, indicating that the gifted-creative (GC) students to be more intelligent, while the creative (C) groups are more serious as compared to their counterparts. It also reveals that the gifted-creative (GC) students have better problem solving ability than the creative (C) groups.
  
5. Sex differences in personality, problem solving ability, intelligence and creativity of the total sample were compared. It was found that the male students differed significantly from the females on personality factors A, C, E, F, H, I, M, N, O, Q<sub>1</sub> and Q<sub>4</sub> at .01 level. The male possessed higher mean score on factors C, E, F, H, M, and Q<sub>1</sub>, while the females scored higher than the males on factors A, I, N, O, and Q<sub>4</sub>. It was also found that the two sexes differed significantly in problem solving ability test at .05 level and in creativity test at .01 level. However, there was no significant difference in the mean score of the standard progressive matrices between the two sexes. The results revealed that the males are more emotionally stable, assertive, happy go lucky, venturesome, imaginative and experimenting while the females are more outgoing, tender-

minded, shrewd, apprehensive and controlled. The males are better problem solvers and are more creative than the females. However, there is no significant difference in the intelligence score of both the sexes.

6. Scores on personality, problem solving ability test (PSAT), standard progressive matrices (SPM) and creativity test of the science and commerce students were compared and it was found that there was significant difference in the personality factor B and I at .05 and .01 level respectively. There was also a significant difference in the mean score of the problem solving ability test, and creativity test at .05 level and in the standard progressive matrices score at .05 level indicating that the science students are more intelligent and tender-minded in their personality as compared to the commerce students. They were also found to possess better problem solving ability, higher intelligence and are more creative as compared to their counterparts (the commerce students).
  
7. The science and arts students were compared in their scores in personality, problem solving ability test (PSAT), standard progressive matrices (SPM) and creativity test. It was found that there was significant difference between the two groups in the personality factors A and N at .05 level and in the factors B, C, E, G, H, M, O, Q<sub>2</sub> and Q<sub>4</sub> at .01

level. There was also a significant difference between the two groups at .01 level in the problem solving ability test, standard progressive matrices and creativity scores. The findings indicate that the science students are more intelligent, emotionally mature, assertive, venturesome, imaginative, apprehensive and self-sufficient than the arts students, while the arts students are more outgoing, conscientious, shrewd, and tense as compared to the science students. The findings also reveal that the science students have better problem solving ability, and are more intelligent and more creative as compared to the arts students.

8. Commerce and arts students were compared in their scores in personality, problem solving ability test (PSAT), standard progressive matrices (SPM) and creativity test. It was found that there was significant difference in personality factors C, E, G, H, I, M, N, O, Q<sub>2</sub> and Q<sub>4</sub> at .01 level and in the factor Q<sub>1</sub> at .05 level between the two groups. It was also found that there was significant differences at .01 level between the two groups in the problem solving ability test, standard progressive matrices and creativity test scores. The findings reveal that the commerce students are emotionally stable, assertive, venturesome, imaginative, apprehensive, experimenting, self-sufficient, while the arts students are conscientious, tender-minded, shrewd and tense.

The findings also reveal that the commerce students are superior in problem solving ability, intelligence and creativity than the arts students.

9. The high socio-economic status (SES) group and the low socio-economic status (SES) group of the gifted students were compared in their personality and problem solving ability test (PSAT) scores. It was found that there was significant difference in the personality factor G and I at .01 level indicating that the low socio-economic status (SES) group were more conscientious and that the high socio-economic status (SES) group were more tender-minded as compared to their counterparts. The difference in the mean score of the problem solving ability test (PSAT) was not significant indicating there was no difference in the problem solving ability between these two groups.
10. Personality score and problem solving ability scores of students belonging to low and high socio-economic status groups among the creative students were compared. It was found that they differed significantly in personality factor A and I at .05 level. Also, they differed significantly in their mean score of problem solving ability test (PSAT) at .05 level. This indicates that the high socio-economic status (SES) group were more outgoing and tender-minded as compared to the low socio-economic status (SES) group. They

were also found to have better problem solving ability as compared to their counterparts (the low SES group).

11. The high and the low socio-economic status (SES) group of the gifted-creative (GC) were compared in their scores on personality and problem solving ability test (PSAT). It was found that there is no significant difference in the personality factors between these two groups. But the mean difference in the problem solving ability test (PSAT) scores were found to be significant at .01 level. This indicates the high socio-economic status (SES) group were better problem solvers as compared to the low socio-economic status (SES) group among the gifted-creative (GC) students.
12. The intercorrelation of the scores of the gifted students on variables intelligence, creativity, problem solving ability and 16 personality factors were worked out and it was found that there was low but positive correlation on variable intelligence and creativity, intelligence and problem solving ability, intelligence and personality factors A, E, H, L, M, Q<sub>2</sub> and Q<sub>4</sub>. However, the correlations were low but negative for intelligence and personality factor B, C, F, G, I, N, O, Q<sub>1</sub> and Q<sub>3</sub>.
13. The intercorrelation of the scores on variable intelligence, creativity, problem solving ability and the 16 personality

factors of the creative students were calculated. It was found that there was low but positive correlation between creativity and intelligence, creativity and problem solving ability, and creativity and personality factors such as B, C, E, F, H, O, and Q<sub>1</sub>, while other personality factors such as A, G, I, L, M, N, Q<sub>2</sub>, Q<sub>3</sub> and Q<sub>4</sub> were found to have low but negative correlation with creativity.

14. The scores of gifted-creative (GC) group of students on variable intelligence, creativity, problem solving ability and the 16 personality factors were intercorrelated and it was found that the group showed low positive correlation between intelligence and creativity. Problem solving ability was found positively and substantially correlated to both intelligence and creativity. There was low positive correlation between intelligence and personality factors B, C, E, I, M, N, Q<sub>1</sub> and Q<sub>2</sub>, whereas it was negative for factors A, G, H, L, O, Q<sub>3</sub> and Q<sub>4</sub>. There was positive but low correlation between creativity and personality factors B, E, G, H, I, L, M, N, O, Q<sub>1</sub> and Q<sub>3</sub> and correlations were negative for factors A, C, F, Q<sub>2</sub> and Q<sub>4</sub>. Positive correlations were observed between problem solving ability and personality factors B, E, G, H, I, L, N, O, Q<sub>1</sub> and Q<sub>3</sub>. However, it was negative for factors A, C, F, M, Q<sub>2</sub> and Q<sub>4</sub>.

15. The scores of 600 students on variable intelligence, creativity, problem solving ability and 16 personality factor were correlated. It was found that there was low positive correlation between intelligence and creativity. Problem solving ability was found positively and substantially correlated with intelligence and creativity. Intelligence was found positively correlated with personality factors B, C, E, H, L, Q<sub>2</sub> and negatively correlated with personality factors A, F, G, I, M, N, O, Q<sub>1</sub>, Q<sub>3</sub> and Q<sub>4</sub>.

Creativity was found to be positively correlated with personality factors B, C, E, F, H, L, M, Q<sub>1</sub> and Q<sub>2</sub>, but it was found very low. Low negative correlations were found for creativity and personality factors A, G, I, N, O, Q<sub>3</sub> and Q<sub>4</sub>. Problem solving ability of the students were found to be low but positively correlated in the case of personality factors B, C, E, H, I, L, N, Q<sub>1</sub>, Q<sub>2</sub> and Q<sub>3</sub>. However, it was low and negatively correlated in the case of personality variables A, F, G, M, O and Q<sub>4</sub>.

#### **EXISTING PROVISION IN MIZORAM FOR THE EDUCATION OF THE GIFTED AND SOME SUGGESTIONS**

In spite of the high literacy rate, Mizoram has failed to offer special education for the gifted. The state offers merit scholarship to students who perform well in primary, middle and

high school leaving certificate examinations. The State Council of Educational Research and Training (SCERT) awards prize money and certificates to those outstanding students who do well in science and mathematics subjects in primary, middle and high school leaving certificate examinations.

A small amount of prize money is also granted to students of classes VIII and IX who has scored high marks in science and mathematics in their promotion examinations in the high schools in the state.

The Mizoram scholarship Board, under the Higher and technical Education Department also awards post matric merit scholarships to meritorious students in arts, commerce, science and technical streams for the pre-university, degree and post-graduate levels. Post matric merit science scholarship and book grants are awarded by the Mizoram Planning Department to selected B.Sc. and M.Sc. students.

Inspite of the fact that there are gifted students in the schools and colleges of Mizoram (the investigator has identified a number of gifted college students). No special education for the gifted has been undertaken by the state of Mizoram. The gifted are not provided the opportunities for the realisation of their potentialities, as a result, their education remain neglected. This may be one of the main drawbacks of the

educational system in Mizoram. Proper education arrangements for such students will have to be made. Few suggestions are offered by the investigator for special education schemes of the gifted in Mizoram.

1. A programme can be launch where the gifted students will be identified from the different schools/colleges of Mizoram so that suitable curriculum, method of teaching and evaluation techniques can be evolved for them under the common system of education.
2. Teachers should be oriented to know about the personality characteristic and problem solving ability of the gifted to help them in fostering the growth of their abstract thinking, intellectual potentiality and problem solving abilities.
3. The gifted child should be provided with all the necessary freedom and opportunities to develop their talents to the maximum.
4. The gifted can be provided with supplementary work and enriched curriculum which is superior and richer in content and practice than that for the average student.

5. Since the intellectually gifted tend to be more advanced in mental development and all round learning capacity, the gifted can be given double promotion or acceleration in their respective schools.
6. The gifted can be grouped together and put in one section or in a separate institution with special teachers and enriched curriculum.
7. The education of the gifted should guard against the development of cynicism, conceit, snobbery, defiance, introversion and other unhealthy and wasteful social habits in them.
8. The scholarship provided to meritorious students are too meagre to give them stimulation for advancement. Hence, they may be provided with substantial scholarship so that they can pursue on to higher learning of their interest.
9. The state should take initiatives in a number of activities for the college students such as competitions in literary, creative and scientific activities.
10. It is also proposed to establish higher educational institutions at the tertiary level on the lines of Navodaya Vidhyalaya at the secondary stage.

11. A special night known as "merit nite" can be arranged to honour the gifted students who have secured the top position in different board exams.

### **Suggestions for Further Research**

Beyond the problem of incorporating the findings of the present research into policies and programmes for the gifted and creative college students in the state of Mizoram, certain other related issues seem to be significant and as such are recommended for further investigation.

1. Development of intelligence test for the students of higher secondary stage among tribals in North Eastern Regions.
2. Curriculum innovation and enrichment for fostering creative potential at the higher secondary stage.
3. Home environment as related to the development of giftedness and creativity among the tribal students.
4. Socio-cultural correlates of creativity and giftedness with special reference to tribal pupils.
5. Parental perception and child rearing practices as related to the development of creativity and giftedness among the tribal students.

6. A comparative study of the personality factor patterns and problem solving ability among the gifted and backward children.
  
7. A study of the personality patterns of the creative and non-creative college students in North Eastern Region.

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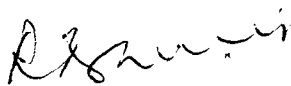
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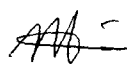
I Mrs. H. Malsawmi, hereby declare that the subject matter of the thesis entitled A Study of the Gifted and Creative College Students in Mizoram in Relation to their Personality and Problem Solving Ability is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.

This is being submitted to the North-Eastern Hill University for the award of the degree of Doctor of Philosophy in Education.

  
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(H. Malsawmi)

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## CHAPTER I

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## CHAPTER I

### INTRODUCTION

Individuals differ significantly from one another in many aspects. Slight variations and deviations in various traits and abilities are commonly observed among the human beings. An exceptional individual, however, is a person in whom these variations reach the extreme. The exceptional children have been described as those who deviate from what is supposed to be average in physical, mental, emotional or social characteristics to such an extent that they require educational services in order to develop their maximum capacity.<sup>1</sup> According to Kirk (1970)<sup>2</sup> "An exceptional child is he who deviates from the normal or average child in mental, physical and social characteristics to such an extent that he requires a modification of school practices or special educational services in order to develop to his maximum capacity, or supplementary instruction. The exceptional may vary in their abilities and those with superior mental abilities form a distinct group. Crow and Crow (1979)<sup>3</sup> acknowledged two types of superior persons (1) those whose intelligence quotients are above 130 as measured by reliable standardized intelligence tests - "the intellectually gifted" and (2) those who have special talents in one or more limited fields, such as art, dramatics, music, or mathematics - "the talented".

## **SIGNIFICANCE OF SPECIAL EDUCATION**

To place all types of exceptional children in schools meant for normal children is not a sound educational policy, because this may harm the educational progress of both the normal and the exceptional children. If the teacher attends to the exceptional child, the majority of normal children will suffer, and to ignore a superior or the bright child is a sin. It is clear that the teacher cannot pay equal attention to all of them for the obvious reason of their extreme mental differences. Therefore, special education has been emerged as a field to cater the educational needs of the exceptional child. It is specifically planned and designed for various categories of exceptional children. The needs and the requirements of exceptional children vary and useful researches and experiments are being conducted to work out adequate types of special education programmes suited to the special physical, psychological and intellectual requirements of various categories of exceptional children.

## **SPECIAL EDUCATION FOR THE GIFTED**

The special education of the gifted envisages selection and organisation of educational experiences that will enable optimum level of development of various faculties among the gifted children. This involves total education planning,

including curriculum, administration, resources, teacher training, student guidance and community relationship. The educational programme for the bright must promote higher cognitive processes through a differential curriculum. The curriculum should plan and prepare instructional strategies that accommodate both the enriched content and learning style of the bright and make all possible arrangements for their education. The quality of education shall be further enhanced by the motivation, better teacher preparation and enriching the school environment. Vastness of these areas evidently requires quite differential and diverse programmes and services for the education of the bright. The type of education to be provided to them in any educational system shall, of course, depend upon the philosophy of education, political will, financial resources, location of the school, availability of facilities in the school and attitude of the parents, community and the society. Failure to provide suitable education may lead to frustration, under achievement or intellectual delinquency of the bright and loss of vital resource to the society.

The education of the bright should enable the bright for development of the self and self esteem. The special education system of the bright needs altogether different planning, but the system cannot avoid its responsibility of identifying the bright and developing their talent. Special

education programmes and strategies for the gifted can be classified and described as follows :

## I. ACCELERATION

Acceleration as a special education strategy provides an instructional or administrative arrangement which enables the bright to progress comfortably at the speed suitable to their ability. The procedure that involves "speeding up" the educational programmes whereby the bright child moves more rapidly at any point in his educational career and accomplishes an academic programme in less time or at an early age than the normal may be termed as acceleration. Since the intellectually gifted tend to be more advanced in mental development and are generally ahead in mental age and have better cognitive ability and all round learning capacity, this strategy can place the rapidly maturing children at a pace that is entirely normal for them. Acceleration however has three aspects such as early entry, grade skipping and sequential but rapidly paced learning.

### (a) Early Entry

The system of acceleration due to early entrance involves early admission of the bright child as compared to the entry of an average child. The system has been sometimes opposed on grounds of emotional maturity but studies have generally yielded favourable results and have not indicated any detrimental

effect on the child's academic progress or on his social and emotional development. Early entry of the bright is advantageous as they keep up with a higher age group with their higher cognitive skills. However, there should always be provision for later acceleration for those who could not be initially identified for early entrance.

#### (b) Grade Skipping

Grade skipping is the practice of omitting one or more grades or classes while ascending the educational ladder. This involves jumping from one class to another skipping the task of a grade or class in between. It is based on the assumption that the child who is sufficiently bright can forego the learning experiences of a given class and accept the challenge of the next higher one. The bright child by virtue of his advanced mental ability and cognitive skills is capable of filling in the gap with additional effort and through proper guidance.

The skipping child has the advantage of associating with classmates who are nearly his equal in mental age and can provide keener intellectual competition. On the other hand, it may not be academically sound as it may aggravate problems by placing the child in a group superior in physical, social and emotional maturity. The older students may exclude him from games and other activities and his impatience to improve may cause frustration. Inability to compete with them may make him return

to books and deprive him of all-round development. Grade skipping should be attempted with utmost care and it is to be seen that students who skip remain well adjusted in all spheres. Then the danger of skipping can be far less than that of doing nothing. Because of this, educationists consider skipping a dangerous practice to be rarely followed and are generally recommended for pre-primary or primary school levels, although this can be attempted both in isolated and special cases at the secondary stage.

**(c) Rapid Progress**

Rapid progress is the practice of pupils proceeding through the school programme faster than the normal without skipping any part of curriculum. The process involves quicker promotions by shortening the time for the completion of curriculum in a class. Rapid progress has the advantage of giving the pupil an opportunity to become acquainted with the entire content of the curriculum and simultaneously allowing him to proceed at an accelerated pace which avoids the disadvantages of grade skipping. The adjustment problems resulting due to chronological displacement cannot be avoided in this method also. Rapid progress imposes additional academic task for teachers as it requires to devote extra time on the bright for the completion of curriculum at his own pace. These administrative difficulties, however, tend to decrease as the child ascends the educational ladder since self-education becomes easier at later stages.

## II. ENRICHMENT

Enrichment involves a special curriculum for the bright children which is superior and richer than that for the average students in content and practice. Basically, it involves the selection and organisation of learning experiences and activities appropriate to the child's adequate development. The aim is not to replace the curriculum but to provide, develop and enhance learning experiences in order to add both breadth and depth of meaning beyond what is acquired by the average in the normal classroom. Enrichment can also include learning experiences in kind and degree and need not be only limited to greater depth and breadth of study.

Repetitions and extra drills that simply keep the bright busy and are boring can be omitted for the bright. The bright are able to complete the normal work usually in half the time and may then be given supplementary work involving reading, knowledge, skills, creative projects, experimentation, independent study in areas of interest and other fields. Enrichment may be attempted for the bright as follows :

### (i) Individual or Group Basis

Individual enrichment programmes do not need any readjustment of the class, but do require adequate academic and administrative planning. On group basis, it provides opportu-

nities for more intimate association and greater competition among the students which is denied in an individual enrichment programme. Enrichment, on individual or group basis, is certainly more meaningful and effective when coordinated with regular curriculum and provided in addition to the normal classroom teaching.

(ii) **Enrichment in Classroom or Outside Classroom**

Enrichment programme for the bright may be organised inside the same class or outside. The bright child remains with others of less ability but is given special attention, either individually or in small groups. The disadvantages is that diversities in mental abilities make the task of the teacher extremely difficult in providing enrichment to the bright according to their abilities in a normal class or even outside it. In a large class, it is really difficult for a teacher to prepare genuine enrichment material for a few bright and not doing justice to the other students in the class. Even though administratively less expensive, whether it is academically viable or not is the greatest consideration. Also enrichment need to be attempted carefully as the students find it difficult if introduced prematurely to a subject which may require some background mastery of fundamentals.

### (iii) In or Outside the School

Enrichment for the bright can be organised both within or outside the same school. In the same school, it may be within or outside the normal school time. It is easier to organise it within the school and within the normal working hours of the school as it becomes very difficult both administratively and financially to organise it outside the normal working hours.

### (iv) Special Teachers

The teacher must be skilled in creative teaching, in individualising instruction and in the effective planning of their educational programmes. Enrichment programme in a school may be organised through the same classroom teacher or through a specially qualified teacher. Classroom teacher may make modifications in his instructional programme by providing necessary learning experiences or opportunities to explore the subject more deeply. A special teacher can develop plans for individual enrichment in co-operation with the regular classroom teacher. The special teacher can act as a consultant and will be able to provide opportunity for the exchange of ideas and effectively correlate the enrichment experiences of the bright with regular curriculum to make it more meaningful not only to the bright but to all students. A combination of the system of regular and special teacher will certainly offer a more effective enrichment programme.

#### (v) Part-Time or Full-Time Basis

Special classes for enrichment may be provided on full time or part time basis. Enrichment classes can also be organised as workshops, groups and seminars. Such a system, even though less effective at times, retains the social values of a heterogeneous class and also provides enrichment to the bright through special teachers who may be more conveniently available for shorter duration. It can also serve as a good beginning for initiating enrichment programme in a school.

### III. GROUPING

Grouping is the process of classification and bringing together students of similar ability for all or a portion of their educational experience. It is also sometimes called ability grouping, homogenous grouping, streaming, tracking, segregation or organisation of multi-level or multi-grade curriculum. The aim is to narrow the range of ability and provide adequate learning experiences to a group of students of similar intellectual capacities for the development of their abilities which cannot be normally provided in the regular classroom. Grouping does not automatically take care of ability. The learning experiences must be adopted to the individual needs of the bright in order to provide in-depth intellectual stimulation in every field of education and thus challenge them to continued progress. In these groups, the bright can have a better perspective of their own

ability and achievement and can work at their own pace. They can explore their own ideas which may spur them and their peers to further learning. Organisation of special ability groups creates an academic environment in which the bright can be provided more challenging activities and can be guided in their achievement more effectively than in a regular classroom. These special ability groups may be formed in the following four different ways-

**(i) In the Same Heterogeneous Class**

In this method, the bright are grouped together and retained in the same class along with other students of lower ability and achievement. Philosophically, it is democratic to keep the high and low achievers together but this democratic value itself is questionable. Grouping in the same class is a step towards individual instruction for the whole class, but the danger lies in the bright receiving minimum help and not achieving to full capacity and the slow learners receiving disproportionate time and attention and getting frustrated. The system requires ingenuity for curriculum adjustments for the teachers and makes his task extremely difficult.

**(ii) Within the Same School**

Grouping of the bright children in the form of a special ability section within the same school has been consciously or unconsciously followed in the past and also

practised at present in the institutions. These groups may be formed on the basis of ability or achievement and may be further divided into sub-groups to narrow the range of abilities and achievements and thus facilitate more intensive, extensive or accelerated learning.

(iii) **Outside the School**

The bright may pursue their normal studies in their own class and may then meet for enrichment programmes outside the normal working hours of the school. Seminars and tutorials are forms of such programmes which may be organised after school hours or on holidays. They provide an opportunity to the bright for independent study, the plan of the study and monitoring being done by the regular teacher. The programme can be followed in a school of any size or by combining students from nearby schools. The system certainly places extra burden on the teacher and also requires seriousness of purpose on the part of the bright student.

It is also apprehensive that such a programme may leave very little time for the bright for participation in other activities and may have a deleterious effect on their development.

#### (iv) Special Schools for the Bright

Another method of grouping the bright is to place them in a separate school. In such a school, all the students of all the classes are bright and the teachers are also trained to provide them education according to their ability. Such a system represents the ultimate in group enrichment. The bright read widely, learn all basic skills, use research methods, conduct investigations individually and in groups, pursue their interests and evaluate their own work. They of course, require talented teachers, well equipped library and adequate learning resources to carryout their programmes. Actual curriculum in such a school is very much like the one in a special class for the bright and is more meaningful, richer and challenging than the normal one.

Schools such as these, it is argued, are likely to develop elitist tendencies and a false sense of superiority among the bright. Their isolation from the normal students for a considerable period of their school life can also lead to the possibility of creating an intellectual aristocracy and a tendency of looking down upon their brothers in normal schools, thus causing a serious social and mental division in the minds of the children at a very impressionable age. Separate special schools may be attempted in separate geographical area and can group academically talented students from several schools. Part time special education in special centres of learning can be provided to the intellectually gifted children.

## DEVELOPING CREATIVITY AMONG STUDENTS

Creativity, as a natural endowment and cognitive ability needs stimulation and nourishment. Creative talent cannot flourish unless it is given proper training, education and opportunities for expression. Creative thinking ability though not equal is universal. It is not the monopoly of a few geniuses. Everyone of us possess the creative ability to a certain extent and it is not only the geniuses who are needed to create, manifest and produce.

The need of creating an environment conducive to full growth and development of the creative potential among children is a must. Certain strategies for promoting creativity are cited below -

### (i) Do Not Over Value the Customary

The first step toward encouraging creativity is to respect and value the creative talents. This is not easy to do as creative children are not always the easiest to work with. The teacher must somehow get across that conventional, predictable, routine, structured behavior is good in a general sense but that the gems of unusual, unique, imaginative and unpredictable behaviour are highly valued.

**(ii) Be Willing to Lose Time**

Slavish attention to the clock works directly against creativity, even though there are many times in a teacher's day when attention to the clock is important. By deliberately setting aside time schedules and by being willing to drop time constrictions and toying with them, the teachers and parents can foster creative ideas in students.

The very nature of the teachers job seems to be that it encourages obsessive compulsive behaviour. Perhaps a teacher could never meet all the requirements of the job without being somewhat compulsive. But rigidity, compulsiveness and fear of such sins as 'wasting time' work directly against the development of creativity in students. Conscious efforts on the part of the teachers and parents to overrule the time schedule and save time to the individual needs of children shall pay rich dividends.

**(iii) Encourage Unusual Question**

Generally the unique questions which are off on tangents, draw laughter, are puzzling or require a shift of gears seem to irritate teachers.

Unusual questions are considered as a waste of time and are often difficult even to fit into the discussion. But such questions may stem creative imagination. such questions are to be

valued and the opportunity should be used to generate creative idea. The class even might discover something creative in a question that was meant to annoy the teacher and will end up respecting the teacher more because of his or her response.

In addition to valuing and pursuing unusual questions by students, encouraging follow up questions and explanations, and rewarding such questions, the teacher should try to come up with unusual questions to ask the class as a model of this type of behavior. Unusual questions can result in a most creative discussion. Encouraging, formulating and responding to such questions enhance creativity.

#### (iv) Demonstrate Testing of Ideas

One of the most damaging ideas that students have is the image of school being the pursuit of correct answers to specific questions. Such views have been reinforced in students over a period of many years. But somehow the teacher must get across the tentativeness of ideas, the possibility that some questions have many answers and that other questions have no known answers. An idea that comes up in class discussion, that is planted deliberately by the teacher, that does not have one 'correct' answer is valuable material to explore if creativity is desired. Often, the pursuit of an idea leads nowhere, but this is not important.

**(v) Treat All Ideas with Respect**

The dangers of hurting a student by failing to respect a well-intended idea more than offset anything that may be best when a teacher respects a poorly intended idea. It is unlikely that a teacher can automatically distinguish between a strange but creative question and a joke. There is probably little to be gained by such a skill anyhow. However, disrespect for a student idea has a stifling effect on creative thinking not only for the student involved, but for any other students listening or observing.

It is best, then to treat all ideas with respect, no matter how offbeat, bizarre, or obtuse they might appear at first. If a suggestion turns out to be unworkable, the student will figure that out in time, and nothing is lost. Some ideas that sound ridiculous at first, became valuable ideas. The crucial lesson for students is that any ideas they might have, regardless of how strange, will be treated with respect by the teacher.

**(vi) Avoid Perfect Examples**

Being in awe of masterpieces, worshipping great creators from the past, admiring heroic examples are not prescriptions for encouraging creative behaviour. The problem is that, in looking at a perfect example, students consciously or

unconsciously compare it with their own work, find their own wanting, and became discouraged.

Instead of perfectness in outcomes (the perfect poem, play, novel, picture, sculpture) the teacher should stress the creator's efforts, the problems encountered along the way and the shortcomings and flaws that are almost always a part of any creative outcome. The disappointments and dissatisfactions that some artist, writer, or musician has faced served as encouragement to creative students, as they see that they are normal and that their work is not supposed to be perfect. Being in awe, overwhelmed, incredulous at the work of others is of very limited use in developing one's own creative abilities.

(vii) **Informality and Flexibility**

Somehow, having a healthy flexibility and informality in the classroom does not come easily for many teachers. Perhaps this goes against the natural desire for structure, control and order. Or perhaps it is only a function of teachers unconsciously wanting to teach in the same way that they were taught themselves.

One way to approach this is to escape from the all or none dilemma by starting with just a portion of each day that is especially informal and flexible.

The classroom that is more informal and flexible in general tends to bring out creative and imaginative behaviour. Teachers should be able to find ways of providing enough informality and flexibility in the classroom. Teachers can even experiment to find what works in relation to their own particular classroom personality.

**(viii) Tolerance of Ambiguity**

This is the ability to accept uncertainty, to live with tentativeness, to overcome the need for absolutes, and to live with possibilities and a certain degree of vagueness. This is one personality characteristic of creative persons. It may be due partly to genetic endowment, but it is certainly affected by learning. It is essential that it be part of a classroom environment that intends to promote creativity.

If the students are to develop a tolerance of ambiguity, the teacher must model this characteristic. It is not a whole-scale change so that the classroom becomes vague, confused, ambiguous, and tentative to the point of constant uncertainty. The teacher must be careful not to over structure, not to eliminate all food for thought and decisions, and leave some room for the type of tentativeness and uncertainty that encourages creative problem solving.

#### (ix) Positive Criticism

Contrary to popular opinion, creativity does not abound automatically in situations devoid of criticism. If all criticism squelched creativity and all encouragement caused it to blossom, the answer would be simple - don't criticize, give only positive feedback, reward, encouragement, and watch creativity grow.

A closer look at the research yields the commonsense fact that there are different types of criticism and that it is only certain types that squelch creativity.

Although not yet understood fully, it seems fairly clear that children achieve confidence in the value of their ideas beginning in early childhood. Parents obviously play a large role, but teachers are also important in this process. Two keys to helping students learn to value their ideas are (i) to encourage all efforts at creative achievement regardless of the outcome and (ii) to encourage internalized self-criticism rather than dependence on an external judge.

Objective criticism, focusing on outcomes while strongly encouraging efforts, always leading to internal standards and self-criticism, seem to be the basic guidelines in criticism as it relates to creativity. Criticism that is negative, too personal, discourages effort, devalues one's own

ideas, and implies "goodness" and "badness" seems to be the formula for squelching creative efforts.

**(x) Resist Peer Pressures**

Peer influence can also enhance creativity but peer pressures negates it. From about seventh class on through high school, the peer group is number one for determining thoughts, tastes and standards of its members. But a teacher can encourage students to resist peer pressures when it comes to creativity, to value their own ideas. One way is for the teacher to model internal standards and resistance to outside pressures, thus demonstrating the self-confidence and self-evaluation required. The teacher must also take care not to unwillingly reward peer conformity. Independent behaviour should not be neglected in the quest to maintain order and sanity in the classroom. It is to be encouraged that resistance to peer standards and conformity lead to respect and peer approval in the long run. The student who shows individuality and pursue creative ability can receive not only the approval of teachers, but the support and approval of peers. Open-ended assignments, individual projects, thought provoking questions, just suppose games are all ways of developing resistance to immediate peer conformity enhancing creativity in the long run.

**(xi) Encourage Self-Initiated Learning**

Studies of highly creative persons indicate that freedom to engage in self-directed activities and learning are essential to creative achievement. Sometimes it appears that our society's emphasis on the well-rounded person works against such self-initiated and self-motivated learning. When a curriculum forces students to take exactly the same program as everyone else, when standards are set so rigidly that sameness is implied, when the bulk of time is spent on developing deficient areas rather than advancing in an outstanding area, creative individualism is hardly the likely result.

Instead, teachers must constantly look for ways to individualize assignments, to encourage students to develop areas in which they are already above average, to focus on unique skills and ideas that are not the norm, to reward non-conformity as well as conformity. A searching, enquiring attitude on the part of the teacher, accompanied by freedom, courage, independent thinking, and discipline on the part of the students, implies a high valuing and rewarding of self-initiated learning.

**(xii) Using the Creative Resources of the Community**

Children should be made to visit the centres of art, scientific, and industrial creative work. This may stimulate and inspire them for creative work. Creative artists, scientists and creative persons from different fields may also be occasionally

invited to the educational institution to interact with the student in an effort to enhance the scope of knowledge of our children and kindle the spark of creativity in them.

**(xiii) Avoidance of Blocks to Creative thinking**

Factors like conservatism, faulty methods of teaching, unsympathetic treatment, fixed and rigid habits of work, anxiety and frustration, excessively high standards of achievement for low levels of work, over emphasis on school marks, authoritarian attitude of teachers and parents etc. are known to be detrimental to the growth of creativity among children. As far as possible, parents and teachers should, therefore, try to avoid such factors in upbringing and educating the children.

**(xiv) Proper Organisation of the Curriculum**

Learning experiences in the form of curricula should be so designed as to foster creativity among children. For this purpose, the school curriculum should be organised primarily on the basis of concepts rather than facts. Individual needs of each student should be catered to rather than to the generalized needs of all students. The general philosophy should be that truth is something to be sought after rather than something to be revealed. Curriculum should be quite flexible and make provision for studying and working without the threat of evaluation. In a nutshell, the curriculum should reflect the creative dimensions

of fluency, flexibility, originality, divergent thinking, inventiveness and elaboration etc.

**(xv) Reform in the Evaluation System**

The education system is totally examination oriented and appropriate reform must, therefore, be made in the evaluation system if creativity is to be nurtured. The emphasis on memorization by rote, fixed and rigid single responses, and convergent thinking etc. which kills creativity of the children should be abandoned and a proper evaluation system adopted for encouraging complete and balanced experiences in developing their creative behaviour.

**(xvi) Use of Special Techniques for Fostering Creativity**

Researches in the field of creativity have suggested special techniques and methods for fostering creativity among children.

(a) *Brainstorming* - Brainstorming is a technique to explore ideas without judgment or censure. In practice, the children may be asked to sit in a group for solving a problem and attacking it without any inhibition from many angles. In fact, literally storming it with a number of possible ideas and solutions. To start with, the students may be provided with a focus, e.g., a particular problem like 'student unrest', or the

growing unemployment problem in India. The students are then asked to suggest ideas as rapidly as possible.

(b) *Use of Teaching Models* - Some of the teaching models developed by educationists may prove quite beneficial in developing creativity among children. For example, Bruner's concept attainment model helps in developing creativity in children for the attainment of various concepts. Similarly, Suchman's inquiry training model is very helpful in developing creativity among children in addition to imparting training in the acquisition of scientific inquiry skills.

(c) *Use of Gaming Technique* - Gaming techniques, in a playful spirit, help the children in the development of creative traits. These techniques provide valuable learning experiences in a relaxed, spontaneous and evaluative situation. Both verbal and non-verbal stimulus material is used in such techniques. For instance, in verbal transaction of ideas, children may be asked to name all the round things they can think of, tell all the different ways a knife may be used, or all the ways in which a cat and a dog are alike. In non-verbal transactions the children may be asked to build a cube, construct or complete a picture, draw and

build patterns, interpret the patterns of drawings and sketches and build or construct something or anything out of the raw material given to them.

(xvii) **Teaching by Example**

There is truth in the saying that example is better than precept. The teachers and parents, who themselves follow the beaten track and do not show any originality for fear of being wrong or never experiences the excitement of creating or doing something new, fail to stimulate creativity among the children in their charge. The teachers and parents must, therefore, themselves develop the habit of creative thinking. They should learn to believe in change, novelty and originality, and themselves experience the creative process. The behaviour and style of teaching must reflect their love of creativity which can give students inspiration for change and innovation.

**MIZORAM : THE LAND AND PEOPLE**

Mizoram comprises the erstwhile districts of North and South Lushai Hills which were under Assam since 1898, and were known as the Lushai Hills District. It became a union territory in 1972 consequent to the North-Eastern Reorganisation Act of 1971. Mizoram attained statehood in February, 1987, the twenty - fourth state of India. This strategically located state has an area of 21,081 sq. km. and its boundaries touch the neighbouring

countries of Bangladesh in the West and Myanmar on the east and South and has international boundary of approximately 1,014 km.

The state of Mizoram has three districts, namely Aizawl with 4 sub - divisions, Lunglei with 3 sub-divisions and the Chhimituipui district with 2 sub-divisions.

According to 1991 census, the population of Mizoram is 6,86,217 (3,56,672 males and 3,29,545 Females) the density of population is 33 per sq.km and 54 per cent of the Mizo population is rural, living in small villages situated on hill slopes. The state capital Aizawl has a population of 4,75,360 and about 94 percent of the population comprises scheduled tribes like the Mizo, Chakma, Lakher, Pawi and Hmar. "Mizo" is the mother tongue of majority of the population. Mizos came under the influence of christian Missionaries in the 19th Century and the majority, now practise Christianity. Mizo society is a close knit one affiliating to kinship, social relations and co-existence. Mizo women enjoy a position of honour and freedom in society now a days although Mizo society is patriarchal and patrilineal.

#### **EDUCATION IN MIZORAM**

The present set-up of Educational system in Mizoram was exclusively the result of the works of Christian Missionaries who

had a deep faith in spreading literacy among the Mizos besides proselytizing them into the Christian religion.

Prior to the arrival of Christian Missionaries, there was no organised educational institution in the area. There was no written language and all the instructions were verbal in nature. Family served as an effective agent of education.

Formal education was introduced in Mizoram by the Christian Missionaries for the first time in 1894. There was no script and no literature whatsoever in the Mizo language. The first alphabet was composed by the Missionaries by adopting the simple Roman script with a phonetic forms of spelling in 1895. The first school in Mizoram was opened on 9.4.1894 and was reopened in 1898 since the first one has been closed down. In the year 1909, the first Middle school was opened in the Lushai Hills District in Aizawl.

The opening of schools in both the towns and village had completely changed the attitude of both man and woman who became more respective to new ideas. The first High school was started in 1944 through public donations and collaboration. It was provincialised in January 1950.

Remarkable educational development has been achieved in the post - independence period partly because of the part played

by the Government in the field of education. The number of schools as well as the enrolment of student have increased and this has an abiding impact on the rate of literacy. The literacy percentage of Mizoram in 1991 census was 81.32 per cent. In 1996 the state has achieved a literacy percentage of 89.94 (Adult Education Wing, Mizoram Government).

The first college was started in Mizo Hills District to cater to the need of the public in 1958. It was provincialized in 1965. Within a very short span of time of its existence, the college was able to produce a number of graduates. After the formation of Union territory in the year (1972) new colleges came up. At present, there are 29 colleges out of which 8 are Government colleges, 10 are Deficit colleges and 11 private colleges. There is one University campus under NEHU with Pro-Vice Chancellor and supporting staff.

The growth of population and the growth of literacy rate from 1901 to 1991 census are clearly shown in Table 1.01.

**Table 1.01**  
**Growth of Literacy in Mizoram**

Year	Population	Literacy percentage.
1901	82,436	0.93
1911	91,204	3.98
1921	98,406	6.28
1931	124,404	10.70
1941	158,768	19.48
1951	196,202	31.13
1961	266,063	44.50
1971	322,360	53.79
1981	493,757	59.88
1991	686,217	81.32

The state follows the national pattern of education 10+2+3. The first ten years of education comprise three stages; the primary stage - classes I to IV; upper primary stage - classes V - VII and the secondary stage with classes VIII- X. The higher secondary stage classes XI and XII are attached to degree colleges with the nomenclature of pre-university course affiliating to North-Eastern Hill University. However, steps have been taken to attach the higher secondary stage to the high schools from 1996 onwards as classes XI and XII, and examination will be conducted by the Mizoram Board of Secondary Education (MBSE).

#### **EDUCATION OF THE GIFTED AND CREATIVE IN MIZORAM**

In spite of the high literacy rate, the state has failed to offer special education for the gifted and the creative. Students considered academically gifted are given double promotions in some schools, otherwise there is no special provisions or special curriculum for the exceptionally gifted students. The state offers Merit scholarship to students who perform well in primary, middle and High school leaving certificate examinations. The state council of educational research and training (SCERT) awards prize money and certificates to those outstanding students who do well in science and mathematics subjects in Primary, middle and high school leaving certificate examinations.

A small amount of Prize money is also granted to students of classes VIII and IX who has scored high marks in science and mathematics in promotion examinations in the high schools in Mizoram.

The Mizoram scholarship Board, under the Higher and Technical education department also awards post matric merit scholarship to meritorious students in Arts, Commerce, science and technical streams for the pre-university, degree and post graduate levels. Post matric merit science scholarship and book grants are awarded by the Mizoram planning Department to selected B.Sc. and M.Sc. students.

The creative and talented children are also not paid much attention. However, a few efforts are made by the government and other bodies for the promotion of the talent. The art and culture department provides facilities for training in traditional dances and modern music to talented individuals for a period of three months. Open competitions are conducted in story writing, spot painting, art exhibition, solo and beat contest, cultural dances, wood curving and sculptor, craft exhibition, book exhibition and drama competition etc. by the Art and Culture Department with a view to spot and award the creative and talented ones. There is no effort to identify the creative or talented and there is no special training to promote their

creativity. This can be considered as the main drawback of the present system of education.

#### **NEED AND SIGNIFICANCE OF THE STUDY**

Harold Lyon (1976)<sup>4</sup> erstwhile U.S. Federal Director of the gifted and talented observed that the planets survival depends on how successfully the potential of the gifted and talented children is realised.

The report of the Education Commission (1964-66)<sup>5</sup> accorded that there was dearth of competent manpower in every branch of national life. It quoted whiteheads warning. In the modern world the rule is absolute any race which does not value trained intelligence is doomed.

A nation's wealth of superior talent is the most precious of its resources according to renowned philosophers like Plato, Aristotle down to the present day scientists. The development of a nation depends upon the vision and insight of a relatively few exceptionally able people. The vision necessary for the promotion of human welfare must come from the gifted and they should be educated for worth while leadership and productivity in a democracy. Democracy will be realised in its richest sense by recognizing the full range of ability in our total population and also by giving full recognition and adequate

opportunities for the maximum development of the gifted and talented". This indicates the necessity for identifying the intellectually superior and the creative individuals and foster their talent to the fullest possible extent.

Not much work seems to have been done in identifying the gifted and the creative in India. The studies conducted are mostly among the urban and more advanced regions. Mizoram, one of the youngest states in India is situated in the remote part of the North East Region. Although Mizoram is having a high rate of literacy and education, special education for the gifted and the creative has not been given much attention.

Consequently, there is a tremendous amount of wastage of talent especially among the Mizo youth. This is due to the neglect and failure to identify and promote the potential to develop in conducive conditions. The pioneering work in this field has been done by Varparhi Khiangte. Khiangte (1987)<sup>6</sup> has constructed a creativity test and has identified the high and low creative secondary school students. The personality characteristics of the high and low creative students were compared on 14 personality factors.

Concerning the limited studies done in this area, and considering the benefit the state of Mizoram is going to harvest from the research in this area, the investigator was inclined to

undertake the present research. The study is intended to compare the intellectually gifted and the creative college students with regard to their personality and problem solving ability.

#### **STATEMENT OF THE PROBLEM**

The study is entitled "A Study of the Gifted and Creative College Students in Mizoram in Relation to their Personality and Problem Solving Ability".

#### **OBJECTIVES OF THE STUDY**

1. To identify the intellectually gifted college students.
2. To identify highly creative college students.
3. To study the personality characteristics of the intellectually gifted and highly creative college students.
4. To study the problem solving ability of the gifted and creative college students.
5. To find out the existing provisions for the education of the gifted and make suggestions for special education schemes in the state of Mizoram.

## HYPOTHESES

1. There is no significant difference between the gifted and creative students with regard to personality characteristic: reserved - outgoing.
2. There is no significant difference between the gifted and creative students with regard to personality characteristic: less intelligent more intelligent.
3. There is no significant difference between the gifted and creative student with regard to personality characteristic : affected by feelings - emotionally stable.
4. There is no significant difference between the gifted and creative student with regard to personality characteristic : humble - assertive.
5. There is no significant difference between the gifted and creative student with regard to personality characteristic : sober-happy go lucky.
6. There is no significant difference between the gifted and creative student with regard to personality characteristic : expedient-conscientious.

7. There is no significant difference between the gifted and creative student with regard to personality characteristic : shy - venturesome.
8. There is no significant difference between the gifted and creative student with regard to personality characteristic : tough minded - tender-minded.
9. There is no significant difference between the gifted and creative student with regard to personality characteristic: trusting-suspicious.
10. There is no significant difference between the gifted and creative student with regard to personality characteristic : practical - imaginative.
11. There is no significant difference between the gifted and creative student with regard to personality characteristic : forthright - shrewd.
12. There is no significant difference between the gifted and creative student with regard to personality characteristic : placid - apprehensive.

13. There is no significant difference between the gifted and creative student with regard to personality characteristic : conservative - experimenting.
14. There is no significant difference between the gifted and creative student with regard to personality characteristic : group dependent - self sufficient.
15. There is no significant difference between the gifted and creative student with regard to personality characteristic : undiscipline self-conflict - controlled.
16. There is no significant difference between the gifted and creative student with regard to personality characteristic : relaxed - tense.
17. There is no significant difference in the problem solving ability of the gifted and creative college student.
18. There is no significant difference in personality and problem solving ability of students grouped on the basis of gender, course of studies and socio-economic status (SES).
19. There is a constellation of personality characteristics and problem solving ability of the students belonging to groups such as gifted and creative.

## DEFINITION OF TERMS USED

### Giftedness

Paul Witty (1958)<sup>7</sup> defines giftedness as remarkable performance in any potentially valuable human endeavour.

For the present research, the term gifted is taken to mean the students identified as possessing, demonstrated or potentially high intellectual powers or ability and is measured by the Standard Progressive Matrices - Raven (1992).

### Creativity

Creativity is taken as a divergent thinking process enabling the pupils for creative outputs (novel and useful) and measured through verbal and non-verbal tests on four primary traits - fluency, flexibility, originality and elaboration.

### Personality

Personality is more or less stable and enduring organization of a person's character, temperament, intellect and physique which determine his unique adjustment to the environment (Eysenck, 1970). It is that which permits a prediction of what a person will do in a given situation (Cattell, 1972). For the present research, the personality characteristics are defined in terms of the sixteen personality traits and measured by the 16 PF questionnaire (Cattell and Cattell, 1979).

## **Problem Solving Ability**

The skill of the students in understanding and analyzing a problem and applying the scientific knowledge and method to solve them is designated as problem solving ability in the present study, and is measured by a Problem Solving Ability Test (PSAT).

## **DELIMITATION**

The study is delimited to 600 pre-University students chosen from seven colleges in Mizoram. Standardised tests have been used for collecting data on different variables under study.

## **ORGANIZATION OF THE RESEARCH REPORT**

The research report has been presented in six chapters. The introductory chapter presents the significance and strategies for special education for the gifted and the creatives, a brief survey of the educational development in Mizoram, the need and significance of the study, and enunciates the problem, major objectives, hypotheses and delimitations of the study. The second Chapter is devoted to a review of the related research. Studies conducted in India and abroad are reviewed in this Chapter.

The third Chapter deals with the conceptual framework of the study. The method and procedure of the study has been

described in Chapter four. The sample, the tools used, the procedure for data collection, and the statistical techniques used for the analysis of data are presented in detail in this chapter.

Chapter five deals with the analysis of the data which is presented in fifteen sections. Section I deals with the identification of the gifted and the creative college students and explains their characteristics in general. Section II deals with the comparison of the gifted (G) and creative (C) with regard to their personality and problem solving ability. Section III deals with the comparison of Gifted (G) and Gifted-Creative (GC) with regard to their personality and problem solving ability. Section IV deals with the comparison of the Creative (C) and Gifted-Creative (GC) with regard to their personality and problem solving ability. Section V deals with the comparison of male and females with regard to their personality, problem solving ability, intelligence and creativity. Section VI deals with the comparison of science and commerce students with regard to their personality, problem solving ability, intelligence and creativity. Section VII deals with the comparison of science and arts students with regard to their personality, problem solving ability, intelligence and creativity. Section VIII deals with the comparison of commerce and arts students with regard to their personality, problem solving ability, intelligence and creativity. Section IX deals with the comparison of the Low and High socio-economic group of the gifted students with regard to

their personality and problem solving ability. Section X deals with the comparison of the Low and High socio-economic group of the creative students with regard to their personality and problem solving ability. Section XI deals with the comparison of the Low and High socio-economic group of the gifted-creative (GC) students with regard to their personality and problem solving ability. The intercorrelation of the scores of gifted students with different variables under study are given in Section XII. Intercorrelations of the scores of creative students with different variables under study are stated in Section XIII. Section XIV presents the intercorrelation of the scores of gifted-creative (GC) students with different variables. In Section XV the intercorrelations of the scores of total sample with different variables under study are present which is followed by conclusion of the study, discussion and tenability of hypotheses.

Chapter VI deals with the summary and conclusion. The existing provision for the education of the gifted are presented and suggestions for special education programme for the gifted college students for the state of Mizoram are also stated.

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## CHAPTER II

### CONCEPTUAL ANALYSIS

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## CHAPTER II

### CONCEPTUAL ANALYSIS

Individuals differ from one another in many aspects. Modern psychology reveals that individual differences manifest in physical, emotional, intellectual, social and cultural spheres. Variations and deviations in human traits are observed even among the normal children. An exceptional individual, however is one in whom these variation reach the extreme. The deviation may be positive or negative. Such children are so exceptionally inferior or superior to the normal children in terms of physical development, mental ability, social behaviour and emotional reaction and faces difficulties in making a successful adjustment to people and situations. According to Cruickshank (1955)<sup>1</sup> "an exceptional child is he who deviates physically, intellectually, emotionally and socially so markedly from normal growth and development that he cannot be benefited from a regular classroom programme and needs special treatment in school". Kirk (1970)<sup>2</sup> has given a comprehensive definition, "An exceptional child is he who deviates from the normal or average child in mental, physical and social characteristics to such an extent that he requires a modification of school practices or special educational services in order to develop to his maximum capacity". According to Telford and Sawrey (1977)<sup>3</sup> "The term exceptional children refers to those children who deviate from the normal in physical, mental, emotional, or social characteristics to such a degree

that they require special social and educational services to develop their maximum capacity.

#### **GIFTEDNESS DEFINED**

As there are many kinds of talented and gifted children, there is no real agreement as to who is the gifted child. The reason is that the degrees of giftedness or talents are quite different. The terms giftedness and talents are used synonymously. Gifted children have been included in the group of exceptional children needing special attention because they are superior in intelligence and deviate markedly from the normal children. They require special training, education and adjustment. Gifted children come from all strata of society, including the very poor and the minority communities such as the scheduled castes and scheduled tribes, because high intellectual qualities or creative abilities are not confined only to the economically or socially superior groups. They come from all social, ethnic, religious, rural or urban groups, in high or low scales of social and economic positions. Some of these children live in low scales of social and economic positions. Such children living in an unstimulating environment may not be noted. They remain potential rather than actual contributor.

Psychologists have defined giftedness on the basis of I.Q., Terman classified 140 IQ as the lowest mental ability for a

gifted child. Children having an IQ of 140 and above are said to be gifted children. However, philosophers of 17th century like John Stuart Mill described gifted children as having IQ between 190 and 200. Hann and Havighurst have reported 1 per cent of the school children as geniuses with high IQ and 10 per cent of the rest as gifted children on the basis of percentage. This classification is very general and varies depending on the socio-economic status, cultural background and educational status.

According to Marland (1972)<sup>4</sup> the term "gifted and talented children" means children and whenever applicable, youth who are identified at the pre-school, elementary or secondary level as possessing demonstrated or potential abilities that give evidence of high performance capabilities in areas such as intellectual, creative, specific, academic, or leadership ability or in the performing and visual arts, and also who by reason thereof, require services or activities not ordinarily provided by the school. Havighurst (1958)<sup>5</sup> defines "The talented or gifted child is one who shows consistently remarkable performance in any worthwhile line of endeavour. The intellectually gifted can be identified in terms of the test scores or demonstrated performance, or as the upper 1 or 2 per cent of the general population as measured by intelligence and/or achievement test (Telford and Sawrey, 1977)<sup>6</sup>. According to Witty (1940)<sup>7</sup> "the term gifted or talented stands for those whose performance is consistently remarkable in some potentially valuable activities".

Pasricha (1964)<sup>8</sup> considers the gifted child is one who exhibits superiority in general intelligence or the one who is in possession of special abilities of high orders in the fields which are not necessarily associated with high intelligence quotient.

#### CHARACTERISTICS OF THE GIFTED

Gifted children have been found to excel normal children of their age and even adults to an incredible extent. Most of such children later on turned out to be exceptionally reputed poets, musicians, philosophers, scientists, writers, lawyers, administrators, physicians, religious preachers and genius in several other fields and they have been found to differ from each other considerably. Certain features and traits, however, have been commonly observed amongst a majority of them.

According to Galton, Hollingworth and Taylor the mentally superior children excel in physical traits. The gifted, as a group, are slightly better than their average peers in most measures of physical traits (Terman et al, 1925<sup>9</sup>; Hildreth, 1938<sup>10</sup>; Miles, 1954<sup>11</sup>). They tend to be taller, heavier and better looking. Furthermore, they tend to be superior in measures of strength of grip, leg strength, pumping, running and other motor activities involving either the whole body or part of it. Incidence of mortality and insanity are found to be low in case

of gifted children. During infancy, they walk, talk and read earlier than the other normal children.

### **Intellectual Characteristics of the Gifted**

As reported by Kirk (1970)<sup>12</sup> gifted children are more interested in abstract subjects such as literature, debate, ancient history, and less interested in practical subjects such as penmanship and manual training. Gallagher and Lucito (1961)<sup>13</sup> compared the patterns of intellectual strengths and weaknesses on Wechler sub-tests for seven samples - three gifted, three retarded and one average ability. The gifted were strongest on the factor of verbal comprehension while they were poorest on tests relating to a perceptual organization factor. Thompson and Finley (1962)<sup>14</sup> essentially replicated the Gallagher-Lucito study with larger samples of people and confirmed the results.

Case studies of intellectually gifted children have shown that they possess better standards than average children. Their reactions are quick and their progress is conspicuous. At an early age, they enter school and at school, they are much ahead of their class. Their activities in the classrooms are wide and varied. Their interests are also very diverse.

### **Family Background and Social Characteristics of the Gifted**

According to Terman and Oden, the majority of the gifted were offsprings of intellectually superior parents, though

they come from all kinds of homes, ranging from the poorest to the best. Parents of the gifted were found to be better educated and the parents mostly belonged to professional and managerial occupations. Educational and economic conditions of their families were found to be superior. There is considerable evidence to assert that gifted students are more socially accepted than pupils from other intellectual levels. The gifted in regular classrooms are chosen more often than the average by his peers in socio-metric studies (Johnson, 1950<sup>15</sup>; Miller, 1956<sup>16</sup>). Kerstetter (1952)<sup>17</sup> studied the social adjustment of students in special classes, and concluded that the gifted as a group were well adjusted socially. Miller (1957)<sup>18</sup> investigated the question of whether students who had been accelerated (Young for grade placement) suffered social maladjustment. She found them to be socially well adjusted. Gallagher (1958)<sup>19</sup> and Martyn (1957)<sup>20</sup> found that the gifted rated as high as or higher than the average in popularity. They also appeared to be shy and hence keep aloof from the group. Lucito (1959)<sup>21</sup> and Hottel (1960)<sup>22</sup> suggest that the gifted have less need to conform to peer group pressures than average or retarded students.

### **Academic Achievement of the Gifted**

Examination of the many research studies related to educational achievement indicates that the gifted, as a group, achieve well in most areas, so that versatility rather than one-sidedness is the rule. They also tend to have higher achievement

than the average in all school subjects regardless of the type of measures used. If school grades are used as a measure of achievement, the gifted were found to excel. They receive a larger proportion of A and B grades than the average group. Even youngsters who have been accelerated receive better grades than their older average classmates (Barnette, 1957<sup>23</sup>; Justman, 1956<sup>24</sup>; Shannon, 1957<sup>25</sup>; Worcester, 1956<sup>26</sup>). The gifted has a great deal of common sense and practical knowledge and perform difficult mental tasks and can progress very rapidly in academic field. The gifted are high achievers and found to score higher than their classmates of average intelligence in achievement tests. A gifted child often receives awards and scholarships for his high achievement.

### **Personality and Emotional Characteristics**

Recent researches have reflected a positive and intimate relationship between giftedness and personality. The capacity of social adjustment of gifted children have been found to be much higher than that of the average child. The gifted are found to be outstandingly honest, dependable, original, self-reliant and possessing a number of other social traits which are desirable for leadership. It has also been observed that gifted children are impulsive, and self-confident. They are very much interested in aesthetic expression and reflective thinking, normally sensitive, resourceful, flexible and enthusiastic, and are persistent and confident. Emotional stability and adjustment

are the commonly observed traits of superior children. They are usually cheerful, prefer to face their difficulties and problems independently, make adjustment to persons, places and situations easily and are inclined to develop socially healthy emotional outlooks and attitude. Bonsall and Steffler, (1955)<sup>27</sup> found that the gifted were superior to non-gifted on thoughtfulness, restraint, ascendance, emotional stability, objectivity and masculinity.

Terman and his associates conducted an intensive study of the mental, physical, social and emotional characteristics of over one thousand gifted children whose IQ's were above 140. The results of the study are summarized by Terman and Oden as follows:

1. The average member of our (gifted) group is a slightly better physical specimen than the child of average intelligence.
2. For the field of subject matter covered in our tests, the superiority of the gifted over unselected children was greatest in reading, language usage, arithmetical reasoning, science, literature, and the arts. In arithmetical computation, spelling and factual information about history and civics, the superiority of the gifted was less marked.

3. The interests of gifted children are many sided and spontaneous, they learn to read more easily and read more and better books than the average child.
4. As compared with unselected children they are less inclined to boast or to overstate their knowledge, they are more trustworthy under temptation to cheat, their character preferences and social attitudes are more wholesome, and they score higher on tests of emotional stability.
5. The deviation of the gifted subjects from the generality is in the upward direction in nearly all tests. There is no law of compensation whereby the intellectual superiority of the gifted tends to be offset by inferiorities along non-intellectual lines.

#### IDENTIFICATION OF THE GIFTED

The gifted can be identified on the basis of a number of psychological tests and techniques.

##### 1. Mental Tests

Mental tests are based on individual differences in innate abilities to acquire, arrange and use facts as objectively as possible. An intelligence test score is a numerical appraisal of mental abilities required for performing a task that depends

on the exercise of intelligence. The IQ is conditioned to the test itself, to the cultural limitations, to the person who is administering the test and to the child's attitudes as well as his physical and emotional conditions at the time. At present the reliability of the best current tests of intelligence is between 0.90 and 0.95. While current tests of intelligence will not pick out all the mentally gifted children in a group, they are probably the most effective single instruments available for selecting the gifted.

Both the 'Individual test' and 'group test' of intelligence are used. Some of the popular intelligence tests used for identifying the gifted are :

- (i) Alexander's battery of Performance Tests.
- (ii) Bhatia Battery of Performance Tests.
- (iii) Wechsler Bellevue Intelligence Scale.
- (iv) Chicago Non-Verbal Test.
- (v) Raven's Progressive Matrices Test.

## 2. Aptitude Test

The American Association for gifted children recommended that qualities other than IQ be included in the conception of giftedness and defined the gifted as "A person whose performance in any line of socially useful endeavour is consistently superior". This definition includes those who are

talented in art, music, drama and mathematics as well as those who possess a high level of mechanical and social skills or high abstract verbal intelligence. However, there is a controversy among psychologists about the aptitudes, their exact limits, their nature, and whether they are innate or acquired. The aptitude tests can definitely throw light at least on the nature of the abilities of the gifted. The value of such tests however depends in the accuracy in administration and interpretation of scores. The aptitude tests are significant in the identification of the gifted as the special abilities cannot be discovered readily through the use of the intelligence tests.

### 3. Reports of Parents

Reports by parents have considerable value in identification of the gifted. No one can hope to have as intimate a knowledge of a child's behaviour over as long a period of time as his parents. Terman and Oden have stated that early indications of superior intelligence most often noted by parents are quick understanding, insatiable curiosity, extensive information, retentive memory, large vocabulary and unusual interest in such things as number relations, atlases and encyclopedias. Early walking and talking and acquiring the ability to read without training during the pre-school period have also attracted the attention of parents of these children. Moreover, gifted children are likely to have parents who are themselves gifted or at least who are superior in intelligence, so they are likely to have more

insight into the ability of their children. However, the reports need to be verified as it cannot be denied that some parents are often biased and inaccurate in their observations.

#### **4. Reports of Teachers and Professional Workers**

The American Association for gifted children indicated that teachers fail to identify the gifted. This is because that the teachers often are inclined to evaluate a child in terms of his school achievement. Few gifted are as educationally advanced as their ability warrants. Teachers also tend to overlook the factor of chrono-logical age. A reaction to the personality of different children may influence the teacher's evaluation of ability. In most foreign countries teachers are now being given criteria for recognizing deviations from physical and emotional health in school children. Ability to detect giftedness has become an important part of the teachers training programme in some of the advanced countries. In addition to teachers, physicians, school coun-sellors and psychologists can also help in the identification process. Recreation leaders and religious teachers can also help to recognize the gifted.

#### **5. School Accomplishment and Achievement Tests**

The belief that outstanding ability may invariably be reflected by superior accomplishment in school is wrong. Teacher estimates and school achievement can often be inaccurate. In every school grade there were children whose school achievement

in one or more subjects was rated as average or below for the grade, but whose achievement test scores showed them to be as much as two years above their grade norms in those same subjects. Standardized achievement tests are better than school marks.

#### **CREATIVITY : THE NATURE AND CONCEPT**

Probably the greatest challenge to the existing concepts of intelligence was presented by the emergence of divergent or non-conforming aspect upon the intellectual scene. Guilford (1950<sup>28</sup>, 1959<sup>29</sup>, 1962<sup>30</sup>) holds that these abilities should be perceived as general in nature, as opposed to specific, and that they can be applied to great variety of tasks. They can no longer be viewed as the preserve of a few or be limited to aesthetic pursuits. Rather, they must be recognized as existing in many forms and in many different kinds of men.

Getzels and Jackson (1962)<sup>31</sup> concluded from students' responses that, within four minutes following the presentation of a picture, divergent responses tended to be unrelated to the stimulus whereas convergent responses were stimulus oriented. The convergent thinkers tended to be more inhibited by the stimuli and presented conformity or 'expected' responses to the stimuli. Divergent students constructed less inhibited, more creative stories when presented with the same picture.

Creativity involves not one but many abilities or traits. Some of these abilities are fluency, flexibility, originality, elaboration, sensitivity to problems and openness to experience. Creativity differs from intelligence. The abilities involved in creativity are different in form than those involved in intelligence. Whereas intelligence involves convergent thinking, creativity caters to divergent thinking abilities among children.

In spite of the importance attached to creativity for the individual and the society, not much research has been done in the field of creativity till recently. Also, it is not defined properly. The main reason being the complexity and the multi-dimensionality of the concept.

Stein (1953)<sup>32</sup> stated creativity as a process that results in a novel work that is accepted as tenable or useful or satisfying by a group at some point in time. The capacity of a person to produce compositions, products or ideas which are essentially new or novel and previously unknown to the producer is considered creativity by Drevdahl, (1956)<sup>33</sup>. Torrance (1966)<sup>34</sup> testified it as "the process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies and so on, identifying the difficulty, searching for solutions, making guesses or formulating hypothesis and possibly modifying and retesting them and finally communicating the results".

Wallach and Kogan (1965)<sup>35</sup> defined creativity as "an individuals capacity or ability to general cognitive associations in quality and with uniqueness".

Guilford (1956<sup>36</sup>, 1959<sup>37</sup>, 1960<sup>38</sup>) through his psychometric procedures has conceptualized creativity in terms of the mental abilities involved in creative achievement. According to him "creativity is the ability to go beyond the immediate solution, ability to redefine the problem or some part of it, ability to cope with ideas that are unusual and ability to change or having new approach to the problems". "Creativity is a generalized constellation of intellectual abilities, personality variables and problem solving traits" according to Ausubel (1963)<sup>39</sup>. For Paplia and Old (1987)<sup>40</sup> creativity is the "ability to see things in a new and unusual light, to see problems that no one else may even realize exist, and then to come up with new and unusual and effective solutions". Simpson (1922)<sup>41</sup> defined creativity as the initiative which one manifests by his power to break away from the usual sequence of thought into an altogether different pattern of thought.

#### **CHARACTERISTIC OF CREATIVE INDIVIDUALS**

A great deal of research has been carried out by Guilford and others on the characteristics of creative persons. The intellectual, motivational and personality characteristic of

highly creative people are summarized by Taylor and Barron. Taylor and Barron (1972)<sup>42</sup> listed seven different but related cognitive abilities in creative thinking as

- (1) Sensitivity to problems
- (2) Associative fluency
- (3) Ideational fluency
- (4) Spontaneous flexibility
- (5) Adaptive flexibility
- (6) Originality
- (7) Redefinition

Studies have shown that, in addition to intellectual factors, creativity stems from a number of motivational factors such as inquisitiveness, persistency, thinking and toying with ideas, variety and independence, curiosity, tolerance of ambiguity and high energy and vast output of work.

Creative individuals according to Taylor are more stable, more feminine in interest and characteristic (especially in awareness of their own impulses) more dominant and self assertive, more complex, more self accepting, more resourceful and adventurous, more radical (Bohemian) more self-controlled, and probably more emotionally sensitive, and more introverted but bold.

## Personality Characteristics of Creative People

The personality characteristics of creative individuals have been examined in a number of researches. Creative persons are self-directed, can tolerate ambiguity, display a bulldog tenacity, are somewhat free from conventional mores, are spontaneous, usually display a sense of humour, are flexible, are not neat, are often intuitive rather than logical, and may be seen as disorganized. They often appear playful, radical or eccentric and marginal to the society and they dislike tradition or authority, abhorring routine and organized tasks. In other words, creative persons tend to be unique and different. High self-esteem, positive self-image, self confidence and a sense of their own personal worth appears to be significantly related to creative behaviour. Problems are plenty in the life of the creative individual, but they do not allow problems to interfere with their creative production.

The personality traits of creative adolescents have also been analysed. Getzels and Jackson (1958<sup>43</sup>, 1959<sup>44</sup>, 1960<sup>45</sup>, 1961<sup>46</sup>) study of creative adolescents indicated that the high creatives made stimulus free themes, unexpected endings, humour and playfulness. They preferred to join independent and dissimilar elements together to produce new forms. They also enjoyed risks and uncertainty of the unknown. Sixty-two per cent of the creative adolescents preferred unconventional occupations, like adventure, inventor, writer, etc. Holland (1961)<sup>47</sup> found

creative performance at high school level occurring more frequently among students who are independent, intellectual, expressive, social, consciously original and who aspire for future achievement. Hammer (1961)<sup>48</sup> observed creative adolescent artists to have deeper feelings, greater original responsiveness, determination and ambition, preference to observer role, integration of feminine and masculine components, greater independence, rebelliousness, self-awareness, self expression, greater tolerance, emotional expression. Sharma (1975-76)<sup>49</sup> stated the characteristics of creative students as cognitively complex, innovative, curious, risk taker, adventurer, original, initiative, imaginative, constructive, determination, desires to excell, discontented, independence in judgement, never bored, self-confident, sensitive, varied interest, and sincere. The inconsistent characteristic remained to be cognitively complex, fault finder, defines convention, visionary, impulsive, determination and independence of judgement, out of which the last three traits were less consistent than the former five.

According to Khiangte (1987)<sup>50</sup> creative high school students were superior to the non-creative in abstract thinking. They were also found to be assertive, affected by feelings, tenderminded, placid, doubting, venturesome and outgoing. Dallas and Gaier (1970)<sup>51</sup> reported that high creatives manifested greater independence, dominance, autonomy, unconventionality, broad interests and openness to feelings. Cashdan and Welsh

(1966)<sup>52</sup> studied several hundred adolescents and reported that the creatives were independent, non-conforming, spontaneous and energetic. Although they were sensitive to the feelings of others, they did not allow this to deter them in pursuing an important goal. They were dissatisfied with the status quo, preferred variety and change, and delighted in what was new and different. Parloff and Datta (1965)<sup>53</sup> found creative adolescents ambitious, driving, independent, autonomous, self-reliant, efficient, perceptive, imaginative and rebellious about rules and constraints.

Researches have also indicated that creative adolescents are significantly masculine (Little John 1967)<sup>54</sup> adventurous, extroverted and self-confident (Kurtzman 1967)<sup>55</sup>, less religious, orthodox (Barron 1970)<sup>56</sup>, and extroverted (Borad and others 1971)<sup>57</sup>. They are interested in artistic activities (Sharma 1974)<sup>58</sup>.

However, there is much to be explored in locating the personality traits of creative adolescents as these traits may not be so stable during the adolescence.

#### COMPONENTS OF CREATIVITY

According to Guilford, creativity consists of the components of fluency, flexibility, originality, elaboration

sensitivity to problems, and redefinition. The creative process can be achieved through the ten significant stages as identified by Reilly and Lewis (1983)<sup>59</sup>.

(i) Perceiving problems, (ii) Modifying the problem, (iii) Suspending judgement, (iv) Incubation effect, (v) Sticking with an idea, (vi) Envisioning results, (vii) Selecting the best conclusion, (viii) Willingness to facilitate a decision, (ix) Acceptance of uncertainty, (x) Hazards of systematizing the unsystematic.

Wallas (1926)<sup>60</sup> described the process of creativity as consisting of four stages :

(i) Preparation, (ii) Incubation, (iii) Illumination, (iv) Verification.

The five steps in creative problem solving identified by Parnes-Purdue (1967) are :

(i) Problem finding, (ii) Fact finding, (iii) Idea finding, (iv) Acceptance finding and (v) Implementation or execution.

## NURTURING AND STIMULATING CREATIVITY

Creativity, as a natural endowment, needs stimulation and nourishment. For promoting creativity a number of strategies should be adopted as :

- (i) Give freedom for expression.
- (ii) There should be value spontaneity, openness and flexibility.
- (iii) Guide students in thinking through process.
- (iv) Acknowledge and appreciate originality, being different, unusual and unique.
- (v) Alternate responses, critical thinking, constructive suggestions should be encouraged.
- (vi) Eliminate censorship, ridicule and criticism.
- (vii) Encourage exploration, experimentation and elaborations.

(viii) Avoid mental blocks and hesitations, both internal and external.

(ix) Creative responses should be recognized and rewarded.

## **BRAINSTORMING**

Brainstorming has been one of the most widely and successfully used techniques of teaching for the development of creative potential. Osborn (1953)<sup>61</sup> developed this idea getting technique initially for use in his advertising business which later on proved useful in any kind of situation where ideas were needed to solve problems. Later, it has been used as a major technique of creativity development. Brainstorming dramatizes new ideas, makes people focus their attention upon them and realize the importance of ideas. It shows participants of the Brainstorming session that they also have the ability to think new ideas. This is very beneficial to individual ego and self-confidence. For a successful brainstorming session, certain conditions conducive to free thinking have to be created. Therefore, in group brainstorming much depends upon the skills of the leader in creating those conditions and conducting the session successfully. The brainstorming session will become a fiasco if the leader displays his omniscience resulting in fear in the mind of more timid members to open their mouths. The

leader who allows criticism into the proceedings, likewise fails to get the best out of the participants.

## **IDENTIFICATION OF CREATIVE INDIVIDUAL**

An individual is creative to the extent to which he can demonstrate creative potential in his thinking, actions and feelings. Creative individuals can be identified in various areas like academic, artistic, mechanical and scientific by the use of available creative test and multiple non-testing techniques like observation, interview, rating scale, personality, inventory, situational tests, interest inventories, attitude scales, aptitude tests, value schedules and projective techniques etc. The personality characteristics of the creatives may also provide reliable indications for the identification of creative individual.

### **Creativity Tests**

There are a number of standardised tests used in India and abroad to measure creativity. Some of the foreign tests of creativity are :

- (i) Minnesota tests of creative thinking.
- (ii) Guilford's divergent thinking instruments.
- (iii) Wallach and Kogan tests of creativity.
- (iv) Torrance tests of creative thinking.

The tests standardized in India are :

- (i) Passi's Test of Creativity (1972).
- (ii) Baquer Mehdi's Verbal and Non-Verbal Test of Creativity (1973).
- (iii) Khiangte's Creativity Test (1987).

#### **PERSONALITY TRAITS**

According to Cattell, the basic structural element of personality is trait which is inferred from behaviour. A trait describes the consistent behaviour of an individual. A trait represents a broad reaction tendency. It expresses some pattern and regularity in behaviour overtime and across situations. There are number of traits, some traits are found common to all, and others are unique to an individual. Some traits are constitutionally determined, while others are the product of environment.

Personality is described by the large number of traits. Allport and Odbert collected 18000 terms used to describe human characteristics. Cattell reduced these terms to 35 basic traits. Through a rigorous factor analysis, Cattell discovered 12 independent factors and 4 secondary factors. Cattell regards

these 16 personality factors as source traits, since they are unitary and independent. These traits are expressed in the form of a continuous scale having a positive and negative end.

#### **PERSONALITY TRAITS OF A CREATIVE INDIVIDUAL**

Different researchers have presented different lists of personality traits attributed to the creative person. These studies have brought out the following personality traits of a potentially creative individual.

- (1) Originality of ideas and expression.
- (2) Adaptability and a sense of adventure.
- (3) Good memory and general knowledge.
- (4) A high degree of awareness, enthusiasm and concentration.
- (5) An investigative and curious nature.
- (6) Lack of tolerance for freedom, ambiguity and discomfort.
- (7) Foresight.
- (8) The ability to take independent decisions.

- (9) An ambitious nature and interest in vague, even silly ideas.
- (10) An open mind with preference for complexity, asymmetry and incompleteness.
- (11) A high degree of sensitivity towards problems.
- (12) Fluency of expression.
- (13) Flexibility in thought, perception and action.
- (14) Ability to transfer learning or training from one situation to another.
- (15) A creative imagination.
- (16) Diversity and divergence of thought even in convergent and stereotype situations.
- (17) Ability to elaborate, to work out the details of an idea or a plan.
- (18) Absence of the fear of and even attraction to the unknown, the mysterious and the unexplained.

- (19) Enthusiasm for novelty of design and even of solution of problems.
- (20) Pride in creation
- (21) Peace with his own self so that he has more time for creative pursuits.
- (22) High aesthetic values and a good aesthetic judgment.
- (23) Self respect, self discipline and a keen sense of justice.
- (24) Ebullient and easy nature with a relaxed attitude.
- (25) Awareness of obligations and responsibilities.
- (26) Ability to accept tentativeness and to tolerate and integrate the opposites.
- (27) Patterns of thought different from those of the less creative, particularly during creative activity.
- (28) Respect for the opinions of others and acceptance of disagreement and opinions different from one's own.

(29) Spontaneity and ease of expression.

(30) The capacity to fantasize and day-dream.

#### **PROBLEM SOLVING ABILITY**

Problem solving behaviour is the most complex behavior that a human being can acquire. To solve problems, any and all of his behavioral resources may be utilized. Furthermore, learning to cope with problems has pervasive effects on personality development. Engaging in and successfully solving problems teaches the person something about himself. He acquires a concept of himself as a successful problem solver, a concept that acts as a stimulus to prompt problem solving behaviour.

Intelligence has been defined as the ability to solve problem. Thus, other things being equal an older and more intelligent person can solve a problem with less fumbling and fewer errors than a younger and less intelligent child.

Problem situations require the solver to hypothesize and test solutions until he finds one. The problem solver invents solutions, in some degree he is original. The more difficult and complex the problem for the solver, the less that is known or knowable about solving it, the more inventive, the more original he must be.

Creative behaviour is behaviour that results in products or achievements judged to be creative by relevant judges. Original behaviour is a necessary condition for creative behaviour. But not all original behaviour results in creativity - either because an original idea is not translated into an achievement, or because such a translation is not judged to be creative.

Problem solving involves convergent and divergent thinking. In divergent thinking, we think in different directions and search for more than one answer to solutions. But in convergent thinking, the information lead to one answer or to a recognized or conventional answer. Convergent thinking is associated with reasoning and divergent thinking is associated with creativity. Thus, Skinner said "Problem solving is the framework or pattern within which creative thinking and reasoning take place.

#### **RATIONALE FOR THE PRESENT STUDY**

The conceptual analysis cites a number of theoretical dispositions with respect to personality dimensions among the intellectually gifted and creative individuals. While there are a number of approaches to examine the personality characteristics of the intellectually gifted and creatives separately, there is not much research to compare the personality characteristics of

the gifted and creative. Getzel and Jackson (1962)<sup>62</sup> were the first to explore the characteristics among the two groups, but the research has failed to analyse the personality and the problem solving ability of the groups specifically. Also, there is no theoretical proof and empirical studies are silent in identifying the personality and problem solving ability especially among the college students. This dearth in research has affected negatively the Special Education Programme, formulation of policies and identification of talented in India. It is envisaged that the present research will fulfill the gap in this aspect and the research perspectives shall help to understand the characteristics and abilities of the gifted and creative students. It will also pave way for evolving special education strategies and help in formulating special education policies.

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## CHAPTER III

### REVIEW OF RELATED RESEARCH

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## CHAPTER III

### REVIEW OF RELATED RESEARCH

Survey of related research is an important aspect of a research project. It means to locate, read and evaluate the past as well as current literature of research with the planned investigation. It helps one to compare the results of studies on a particular field related to one's own. It provides the investigator with an opportunity of gaining insight into the methods, and approaches employed by other research workers.

The review of various studies done in India and abroad are presented in this chapter.

#### RESEARCH RELATED TO INTELLIGENCE AND CREATIVITY

Several studies have been conducted to find out the nature, extent and trend of relationship between creativity and intelligence. Getzels and Jackson (1962)<sup>1</sup> conducted the first systematic study aimed at laying a clear cut distinction between intelligence and creativity. The study observed that the two are separate ways of thinking and this finding is also supported by Tailor (1962)<sup>2</sup> and Guilford (1962)<sup>3</sup>.

Wallach and Kogan (1965)<sup>4</sup> may be credited to have demonstrated clearly the distinction between the domains of creativity and intelligence. Apart from constructing a test to

measure creativity, the researchers observed that "creativity exist almost independent of another dimension called intelligence". Ward (1967)<sup>5</sup> on the basis of the factor analytic study of Wallach and Kogan's correlations of creativity and intelligence found two factors which he identified as general intelligence and creativity.

Fee (1968)<sup>6</sup> also further reiterated the two factors of creativity and intelligence with the factor analysis of the Wallach and Kogan's correlational data.

Similar findings were shown by Cropley (1966, 1968)<sup>7,8</sup>, Kazelskis Jenkins and Lingle (1972)<sup>9</sup>, Kogan and Pankove (1972)<sup>10</sup> who all reported a substantial independence between measures of creativity and intelligence.

Contrary to the findings that there is no association between intelligence and creativity, there are studies which obtained significant correlations between divergent and convergent abilities (Vernon, 1967; Dacey and Others, 1969; and Collaway, 1969)<sup>11,12,13</sup>. A high significant relationship between intelligence and creativity was also found in researches conducted by Torance (1962)<sup>14</sup>, Yamamoto (1963)<sup>15</sup>, Butcher (1967)<sup>16</sup>, Perry (1966)<sup>17</sup>. However, Pankove and Kogan (1972)<sup>18</sup> reported that in their study of 5th and 10th grade pupils while no correlation was observed in the creativity and intelligence

measures of the 5th grade pupils, the 10th grade data showed a statistically significant positive correlation.

Cicirelli (1965)<sup>19</sup> studied relationship between IQ, creativity and academic achievement and found an interaction between IQ and creativity as they relate to academic achievement. Nguyen (1970)<sup>20</sup> also found the relationship between creativity and intelligence is high and positive.

A number of studies indicated that creative individuals generally have above average intelligence, but above a certain level general intelligence is not reliably related to creativity, and beyond an IQ of about 120 the relationship is negligible (Mac Kinnon, 1978<sup>21</sup>; Roe, 1951<sup>22</sup>; 1951<sup>23</sup>; 1953<sup>24</sup>; Helson and Crutchfield, 1970<sup>25</sup>; Hudson, 1970<sup>26</sup>; Terman and Oden, 1959<sup>27</sup>; Drevdahl, 1956)<sup>28</sup>.

Gakhar (1975)<sup>29</sup> reported that both creativity and intelligence were two distinguishable modes of the same intellectual functioning, yet at the same time they were not distinctly independent to each other.

Dey (1984)<sup>30</sup> in his study of National Rural talent Scholarship Awardees observed that there was a positive and statistically significant correlation between the creativity and intelligence. The correlation between creativity and intelligence

was significant but considerably low as per the findings of Mehdi (1977)<sup>31</sup>.

Maddu (1980)<sup>32</sup> however mentioned that the high creative group was found to be negatively correlated ( $r = -0.096$ ) with intelligence. Intelligence appeared to be significantly and positively correlated to creativity according to Qureshi (1980)<sup>33</sup>.

According to Mishra (1978)<sup>34</sup> intelligence and creativity were statistically correlated among the high achievers in science and commerce and the low achievers in arts.

Intelligence, both verbal and non-verbal, was found to correlate highly with creativity (Dharmangadan, 1976)<sup>35</sup>. Singh (1982)<sup>36</sup> found the verbal, non-verbal and total creative thinking scores were positively and significantly related with the verbal and non-verbal intelligence of the high school boys and girls. Further, there was curvilinear relationship between the measures of creative thinking and intelligence which was suggestive of the threshold concept of IQ. Research by Rajagopalan (1988)<sup>37</sup> also revealed a positive correlation between creativity and mental ability of students of class VIII and IX.

Using the Minnesota non-verbal test of creative thinking to measure creativity and the Pathak's draw-a-man scale

to determine intelligence, Pathak (1962)<sup>38</sup> found a significant association between creativity and intelligence. Researches carried out by Raina (1968)<sup>39</sup>; Trivedi (1969)<sup>40</sup>; Sharma (1972)<sup>41</sup>, Bedi (1974)<sup>42</sup>; Joshi (1974)<sup>43</sup>; Patel and Joshi (1978)<sup>44</sup> and Chadha and Sen (1981)<sup>45</sup> also revealed significant association between creativity and intelligence. Dutt, Bountra and Sabhrawal (1977)<sup>46</sup> showed that creativity and intelligence are correlated to a certain extent, but thereafter takes different directions. Badrinath and Satyanarayanan (1979)<sup>47</sup> stated that students of high intelligence group were significantly higher than students of low intelligence group in verbal creativity and that non-verbal creativity was not related with it. The students with high IQ were found more creative than students with low IQ in verbal creative thinking ability. In the case of non-verbal creative thinking ability, IQ did not exert any significant influence (Trimurthy, 1987)<sup>48</sup>.

Sharma (1982)<sup>49</sup> found creativity was significantly higher in the high IQ group in comparison to the middle and low IQ groups, further the middle IQ was found to be significantly higher than low IQ group. Haleem (1984)<sup>50</sup> noted teachers in general rated high IQ students significantly higher than high creativity students. Sharma (1974)<sup>51</sup> showed that high level of intelligence was necessary for creative thinking.

Awasthy (1979)<sup>52</sup> using the verbal creativity test of Mehdi and the general intelligence test of Mehta found that intelligence was significantly related to fluency and total creativity of science and arts students. The same result was observed by Muddu (1982)<sup>53</sup> administering Passis Test of creativity and a group test of general mental ability test.

Safaya's (1981)<sup>54</sup> study showed that fluency, flexibility and originality aspects of verbal creativity were positively and significantly related to intelligence; so also fluency and originality dimensions of non-verbal creativity were found positively related to intelligence. On the other hand, the study revealed that flexibility and elaboration aspects were negatively related to creativity. An investigation conducted by Gakhar, Paramjit and Pushpa (1980)<sup>55</sup> revealed significant differences in the fluency, flexibility, and total creativity of the students of high, average and low intelligence, whereas, no significant difference was found in the originality of the students of high average and low intelligence. Gulati (1979)<sup>56</sup> observed that all the variables of creativity (fluency, flexibility and originality) were positively and significantly related with intelligence. Gupta (1979)<sup>57</sup> also established significantly positive relationship between creativity and intelligence. Jarial and Gural Singh (1981)<sup>58</sup> found a positively significant relationship between the verbal and non-verbal creativity and intelligence of the students.

According to Jarial et al. (1980)<sup>59</sup> there was a significant difference in the fluency, flexibility, and total creativity scores of high and low intelligent students, favouring the former group, whereas, no significant difference was found in the originality score of high and low intelligent students.

Joshi (1974)<sup>60</sup> in his study of intellectually gifted high school students of Gujarat state observed that gifted-ness was the most effective contributor to all types of creativity scores. Maddu (1982)<sup>61</sup> mentioned that intelligence was positively and significantly related to fluency, flexibility, originality dimensions of creativity. Patil (1982)<sup>62</sup> showed the superior group was out-standingly creative than the average group. Singh, Mathur and Saxena (1977)<sup>63</sup> found a significantly positive relationship between creativity and intelligence ( $r=0.92$ ). Kumar (1975)<sup>64</sup> on the other hand, found no significant relationship between intelligence and creativity. Creativity, whether verbal or non-verbal was independent of intelligence and socio-economic status (Gupta, 1980)<sup>65</sup>. Studies conducted by Holland (1961)<sup>66</sup>; Sandhu (1979)<sup>67</sup>; Khire (1971)<sup>68</sup>; Lalithamma (1973)<sup>69</sup>; Sharma (1979)<sup>70</sup>; and Safaya (1981)<sup>71</sup> also failed to reveal any relation between creativity and intelligence.

## RESEARCH RELATED TO INTELLIGENCE AND PERSONALITY CHARACTERISTICS

The relation between intelligence and personality has been examined in a number of researches conducted in India and abroad. The studies are reviewed.

Miles (1954)<sup>72</sup> found that high IQ children tend to have more hobbies, prefer playmates who are older than they are and tend to be more popular. Freehill (1961)<sup>73</sup> found that the children with high IQ have more common sense compared to their low IQ counterparts.

Hollingworth's (1942)<sup>74</sup> study of children with IQ over 180 indicated that children with extremely high IQ's often find it difficult to relate socially to their age peers and to make close friends. Terman and Oden (1947)<sup>75</sup> reported similar findings from their researches on superior children. Intellectually gifted children of elementary school through high school age appeared to evidence higher self-concept and self-esteem than do children not identified as gifted (Janos, 1983<sup>76</sup>; Karnes and Wherry, 1981<sup>77</sup>; Ketcham and Synder, 1977<sup>78</sup>; Maddux et al. 1982<sup>79</sup> and Tidwell, 1980)<sup>80</sup>. Miller (1956)<sup>81</sup> mentioned that gifted children were significantly more popular than average or retarded. Johnson (1950)<sup>82</sup>; Gallagher (1958)<sup>83</sup>; Martyn (1957)<sup>84</sup> also reported similar findings. Kerstetter (1952)<sup>85</sup> studied a group of highly

gifted children (IQ 160 and above) in special classes and found them, on the whole, socially well adjusted.

D'Heurle, Mellinger and Haggard (1959)<sup>86</sup> found that gifted girls tend to be less self-confident than gifted boys. Smith (1959)<sup>87</sup> and Lucito (1959)<sup>88</sup> noted that gifted children in general are more independent and less conforming in behaviour than average. Similar findings were obtained in a study conducted by Hottel (1960)<sup>89</sup>.

In a comparative study, Bonsall and Stefflre (1955)<sup>90</sup> acknowledged the superiority of the gifted over average children on traits such as thoughtfulness, general activity, restraint, emotional stability, and other traits. However, when the data were re-analyzed for the gifted and non-gifted students from the same socio-economic levels, little or no difference was found between the two groups. Research evidence suggests that the superior emotional stability and social adjustment of the gifted even continued during adulthood (Barbe, 1957<sup>91</sup>; Terman et al. 1959)<sup>92</sup>.

Solano (1976)<sup>93</sup> on teacher and pupil stereo types of gifted boys and girls showed that although gifted boys are viewed favourably by their peers, gifted girls are viewed quite unfavorably. Clasen and Robinson (1978)<sup>94</sup> observed that many gifted children in regular classrooms are "normalizing"

themselves by hiding their abilities so that they will be accepted by teachers and classmates.

Jarial et al. (1980)<sup>95</sup> observed no significant effect of interaction between the intelligence and personality of the students on difference aspects of creativity except originality. Joshi (1974)<sup>96</sup>, however indicated that gifted-ness is significantly related to personality.

Suri (1973)<sup>97</sup> while studying the differential Personality Traits in intellectually superior, average and below average students found the superior students differed from the average and below average and were found to be more intelligent, emotionally stable, assertive, venturesome, tough-minded, placid, controlled and relaxed while the average and below average students were found to be less intelligent, affected by feelings, obedient, expedient, shy, tender-minded, apprehensive, undisciplined, self-conflicted and tense. Walia (1973)<sup>98</sup> studied gifted adolescent and their self-concept among one hundred gifted and one hundred average subjects in the different schools and colleges of Chandigarh. The study revealed that the factor of intelligence had a significant effect on the self-perception of the individuals and on the different dimension of self.

Gupta (1973)<sup>99</sup> found that independent conformists were of high intelligence. It was also observed that there was a

significant difference at .05 level of significance between intellectually bright and dull independent conformists. Pandit (1973)<sup>100</sup> proved that the gifted had less adjustment problems than the non-gifted and that the gifted and non-gifted reacted differently to experimentally produced frustrations, the gifted evaluated the situation more positively and critically than the non-gifted.

Gupta (1985)<sup>101</sup> employed Raven's Progressive Matrices Test for assessment of intellectual level, and Edwards Personal Preference Schedule for determining the students personality characteristics. The research revealed that there was significant differences among the bright and the dull students as regards needs deference, abasement, nurturance, change, endurance, needs exhibition, autonomy, affiliation and hetero-sexuality. Sampat (1984)<sup>102</sup> stated no major problems of health of the intellectually gifted children and that they were socially well adjusted and well balanced. Singh (1985)<sup>103</sup> showed that Personality Traits were more or less independent of intelligence. High intelligent boys and girls were scholastic, suspicious, skeptical and controlled. Intelligence linked Personality Traits of high intelligent subjects showed them to be more scholastic, emotionally mature, conscientious, venturesome, tender-minded, shrewd and controlled. Sex linked personality traits of high intelligent males showed them to be scholastic, emotionally mature, conscientious, venturesome, tender-minded, suspicious and

controlled. High intelligent girls were scholastic, controlled and shrewd.

Research by Haleem (1984)<sup>104</sup> observed teachers favouring high IQ students ranked highly intelligent students much higher on intelligence-oriented personality characteristics than the teachers favoring creativity who ranked their highly creative students on creativity-oriented personality characteristics.

Bhatt (1966)<sup>105</sup> in a study of gifted children analyzed the personality of twenty gifted and twenty non-gifted children by interview technique and found that the gifted were distinctly superior to the non-gifted in intellectual pursuits, regularity in studies, leadership qualities, originality, understanding, self-confidence, politeness and in choice of companions. On the other hand, differences in the aspects of personality were not significantly related to differences in mental ability according to the research by Rao (1965)<sup>106</sup>.

#### **RESEARCH RELATED TO INTELLIGENCE AND SEX**

Several studies have been conducted to find out the gender difference in intelligence. Miles (1954)<sup>107</sup> found that high IQ children tend to be male than female. Boys were found

superior to girls in intelligence as per the research findings by Tiwari (1977)<sup>108</sup>.

Suri (1973)<sup>109</sup> stated that superior boys in comparison to superior girls were tender-minded. Pandit (1973)<sup>110</sup> reported that gifted boys were more problematic than gifted girls in their overall adjustment. Gifted girls were found to be significantly superior in their adjustment to gifted boys in all the areas except social adjustment. Kumar (1985)<sup>111</sup> found the gifted boys had better overall adjustment than the gifted girls. They were more adjusted in health, emotional and school areas than the gifted girls. But there was no difference in their home and social adjustment.

Intelligence seemed to be influenced by certain factors such as sex, faculty, cultural condition, years of schooling and increased educational opportunities. Boys were superior in intelligence to girls (Singh 1985)<sup>112</sup>. According to Kaur and Bawa (1995)<sup>113</sup> boys scored higher on verbal as well as non-verbal intelligence test, but when boys and girls were studied together, boys scored higher on verbal intelligence than on non-verbal intelligence test. It has also been found that girls scored lower in intelligence, both verbal and non-verbal than boys but they are high achievers in almost all the subjects except in mathematics Gupta (1973)<sup>114</sup> in his study of independence, conformity behaviour of intellectually Bright and Dull Pre-

adolescent students found that there was significant difference between boys and girls in their independence conformity behaviour. Sex has a significant effect upon the self ratings of the gifted and the average males and females. Gifted males were found better adjusted as compared to gifted females and gifted females had a higher ideal self than the gifted males according to research findings of Walia (1973)<sup>115</sup>.

#### **RESEARCH RELATED TO INTELLIGENCE AND SOCIO-ECONOMIC BACKGROUND**

High levels of education, occupation, and income, and harmonious marital relationships are observed consistently among parents of intellectually gifted children (Oden 1968)<sup>116</sup>. Miles (1954)<sup>117</sup> found that high IQ children tend to be among higher socio-economic classes. More gifted children come from homes where the social and economic level is above average according to Terman et al (1925)<sup>118</sup>; Gallagher and Crowder (1957)<sup>119</sup>. Barbe (1956)<sup>120</sup> and Cole (1956)<sup>121</sup> mentioned that the gifted hailed from homes with professional and managerial parents. There were significant difference among the bright and dull students as regards socio-economic status of their families, Bright children who belonged mostly to the upper and lower socio-economic groups differed significantly from each other on need interception and need order (Gupta 1985)<sup>122</sup>.

Sampat (1984)<sup>123</sup> stated that the home environment and facilities for study did contribute to the intellectual development of these children. Low social and economic status, quarrels among family members and neighbours hindered the development of gifted children. High intelligent subjects belonged to high and upper middle socio-economic status categories according to Singh (1983)<sup>124</sup> The mean intelligence score of the urban students was found significantly higher than that of the rural students (Singh 1982)<sup>125</sup>. Urban students were found superior to their rural counterparts in intelligence. (Tiwari 1977)<sup>126</sup>.

#### RESEARCH RELATED TO INTELLIGENCE AND PROBLEM SOLVING ABILITY

Freehill (1961)<sup>127</sup> found that the children with high IQ were superior in problem solving compared to their low IQ counterparts. Arenberg (1974)<sup>128</sup> showed that adults with high IQ's usually maintain the ability to solve problems until late years in life. Adults with low IQ's however, tend to show decline in problem solving early in life. Ajwani (1979)<sup>129</sup> ascertained that the subjects with high intelligence proved to be better problem solvers than those with low intelligence. Misra (1986)<sup>130</sup> mentioned that intelligent pupils attacked the problems more cautiously and efficiently. Intelligence was found to relate positively in problem solving. The trend was in favour of high

intelligent subjects performing better on problem tasks as compared to the low intelligent ones (Verma, 1986)<sup>131</sup>.

#### RESEARCH RELATED TO INTELLIGENCE AND COURSE OF STUDY

Singh (1982)<sup>132</sup> found the mean intelligence test score of the science students was significantly higher than that of the arts students. Misra (1978)<sup>133</sup> found the high achievers in arts, commerce and science were higher in their level of intelligence than the low achievers in arts, commerce and science.

Sharma (1982)<sup>134</sup> observed the students of the scientific stream possessed a higher level of verbal intelligence than those of the literary and commercial streams, and the students of the scientific and commercial streams possessed a higher level non verbal intelligence and creativity than those of the literary stream. There was no significant difference between the students of the scientific and commercial streams on these variables. Sinha (1967)<sup>135</sup> stated science students scored significantly higher on the intelligence test than the students of arts. Chatterji (1983)<sup>136</sup> reported science students achieved significantly higher verbal factor and total intelligence scores in comparison with those in all other academic groups. Commerce students ranked second in intelligence, the agriculture group ranked third in intelligence and arts students were the least intelligent.

## RESEARCH RELATED TO CREATIVITY AND PERSONALITY CHARACTERISTICS

The role of personality in creativity has been analysed in a number of investigations and has been recognised that personality variables play decisive roles in creativity. Taylor (1964)<sup>137</sup> testifies that creative adults are committed to their work, sensitive to problems in their field, and able to pull together many apparently unrelated piece of information to solve problems. Children who are divergent thinkers share several characteristics in common. They may have a reputation for wild, silly ideas, their responses are unusual and clever, and they show intellectual playfulness as well as humour. Non conformity, independence, and willingness to take risks are also typical of creative children (Torrance, 1962)<sup>138</sup>. Barron's (1958)<sup>139</sup> study of highly creative people found them more original, less suggestible and more tolerant of structured disorderliness.

Reid, King and Wickwire (1959)<sup>140</sup> examined personality characteristic of creative children by administering numerous measures to a group of several grade students. The results of this study indicated that creative children tended to be more stable emotionally, self-confident, willing to be self-critical, and less anxious than non-creative youngsters. Getzels and Jackson (1962)<sup>141</sup> also conducted several studies to explore the personality characteristics of creative adolescents. The studies were conclusive in their findings that the high creatives

displayed humour and playfulness, enjoyed taking risks, preferred to be independent and liked unconventional occupations such as adventurer, inventor, writer and artist.

Guilford and associates (1957)<sup>142</sup> analysed the relationship between traits of temperament and motivation to creative performance. Significant correlations were obtained between non-aptitude traits and fluency and originality and according to them fluency was related to impulsive-ness, self-confidence, ascendance, appreciation for originality and inclination for neuroticism. Van Zeist and Kerr (1954)<sup>143</sup> found the creative people as imaginative, subjective, curious, impulsive, enthusiastic, original, confident, unconventional, less worrying, less inhibited and less contented. Weisberg and Springer (1961)<sup>144</sup> analysed the personality of creative school children using psychiatric interview, the Rorschach test and draw a family technique. The creative children were found to have strong self-image, unconventional in response, and sensitive. Barron's (1969)<sup>145</sup> study of creative adults found them open to ideas and not hasty to passing judgement. Iwata (1968)<sup>146</sup> observed creatives as independent, introverted, dominant and having less social traits.

Bloom (1956)<sup>147</sup> revealed that a creative scientist is a zealous worker but had difficulty in making friends. Cattell and Drevdahl (1955)<sup>148</sup> and Gough (1964)<sup>149</sup> noted creative scientists

to be highly intelligent, independent-minded, dominant but at the same time sensitive and responsive to the interest of others.

Rutherford (1960)<sup>150</sup> while analysing the personality correlates of creativity found at least three basic characteristic of creative person, namely (i) Ability to differentiate various aspects of the problem, (ii) Openness of the self to experience and (iii) Self strength.

Drevdahl (1956)<sup>151</sup> analysed the personality factors related to creativity in an undergraduate population. The creative groups were found to be higher than the non-creative on the factors of radicalism vs. conservatism, and self-sufficiency vs. lack of resolution; and were lower on the factors of cyclothymia vs. schizothymia, and surgency vs. desurgency. The creative undergraduate appeared to be considerably more withdrawn and quiescent than the non-creative. Researches conducted by Drevdahl and Cattell (1958)<sup>152</sup> on artists and writers, and Cross, Cattell and Butcher (1967)<sup>153</sup> on creative artists also found the creative to be introverted, anxious and possessing a high degree of ego strength. Creative adolescent artists showed deeper feelings, greater original responsiveness, determination and ambition, preference to observer role, integration of feminine and masculine components, greater independence, rebelliousness, self-awareness, self-expression, greater tolerance, emotional expression (Hammer, 1961)<sup>154</sup>. Torrance (1959)<sup>155</sup> using Stern

Activity Index studied 240 graduate students for the inventive level of original ideas. Twenty-seven per cent upper and lower originals were compared for some characteristics. The study observed that high originals showed markedly high achievement affiliation, conjunctivity, ego-energy, exhibition, reflectiveness and understanding. Adults of creative attitude have an urge to search for answers to puzzling questions, to explore and experiment. They possessed critical attitude, i.e., the inclination to search for defects and criticise and are confident of their perceptions according to Torrance and associates (1961)<sup>156</sup>. MacKinnon (1962)<sup>157</sup> characterised the creative individual as being open-minded and keenly receptive, as opposed to the less creative person who is close-minded and strongly judgmental. Results from the MMPI, for his sample indicated that subjects showed significantly higher scores on the ego strength. Taylor (1978)<sup>158</sup> studied the nature of the relationship between cognitive style, flexibility and creativity. The flexibility index showed important correlation to both creativity and cognitive style but could not distinguish between high and low cognitive style, and only provided a limited predictor of creativity. Cognitive styles were found to be uncorrelated to age and sex difference (against the earlier finding of Witkin that females are slightly more field dependent than male). Further, no interaction effect was found between cognitive style and flexibility in relation to creativity. Hinton (1970)<sup>159</sup> endorsed

that a relationship does exist between the personality profile and the creativity of an individual.

The ability to make independent judgement enabled architects and writers to become creative according to Barron (1969)<sup>160</sup>. Holland (1961)<sup>161</sup> suggested that creative performances at the high school level occur more frequently among students who are independent, intellectual, expressive, asocial, consciously original and who aspire for future achievement.

Dellas and Gaier (1970)<sup>162</sup> reported that the roots of creativity lie in personality and motivation. Forisha (1978)<sup>163</sup> observed that throughout the literature of creativity, personality variables emerge as factors significantly affecting the development of creativity.

In a study of creativity by Nguyen (1970)<sup>164</sup> "High potential" students were separated into two groups; creative and non-creative. The creative subjects are found to be distinctly original in thinking, flexible, fluent in ideas, strong in conceptual and abstract learning without losing the sense of perceptual experience. To a lesser extent, they are feeling, and more receptive to their culture than the non-creative.

Based upon biographical information on artistic and literary creativity in adolescent girls, Anastasi and Schaefer

(1969)<sup>165</sup> noted the creative girls were more likely than the controls to have had a variety of unusual experiences, to day-dream about unusual things, to have special and unusual collections, and to have experienced eidetic imagery or had imaginary companions in childhood.

Feld (1967)<sup>166</sup> found that IQ, age, and personality when combined accounted for approximately 60 per cent of the variance in creativity scores; the more outstanding and consistent personality variables between the sexes were acceptance of impulses and fantasy. Both boys and girls seemed to be aware of their own creativity and personality type.

Daw (1966)<sup>167</sup> administered Torrance's test of creativity on senior boys and girls and found that in school and related activities the highly creative students tended to do things over and over until they were satisfied with the results. Also high creative more often appears to set high standards on goals for themselves than they can possibly reach. Yet they do not tend to speak up as much as the low creative do when someone cuts in line ahead of them.

Neuroticism-extroversion were found to have no curvilinear relationship with creativity (Srivastava 1977)<sup>168</sup>. Bhattacharya (1978)<sup>169</sup> found the high creative secondary and

higher secondary students were more warm hearted, more outgoing, more intelligent, less excitable and more adventurous than the low creative secondary students.

Dagaur (1982)<sup>170</sup> observed that introverts were more creative (flexibility and fluency) than extroverts except in the case of originality. Jhag (1979)<sup>171</sup> found the creatives and non creatives did not differ significantly on personality factor A (reserved vs. outgoing) and creative students were significantly better on abstract thinking, emotional stability, independence, self-sufficiency, self concept and intelligence and were more venturesome, relaxed, controlled and doubting.

Kishore (1981)<sup>172</sup> found scores for creativity and personality characteristics of various grades indicated that during classes VI to VIII divergent traits of personality, viz., outgoing, more intelligent, emotionally stable, excitable, assertive, happy go lucky, venturesome, doubting, self-sufficient, expedient, tough-minded, placid, undisciplined and relaxed, were found consistently associated with all the creativity measures. In the later classes IX-XI convergent personality traits different from those listed above (except intelligence) were found highly correlated with all the creativity measures. Mehdi (1977)<sup>173</sup> observed that boys and girls who were creative seemed to be sociable. Personality characteristics of the high creative group totally differed from

those of the low creative group. The creative children were controlled, striving to get acceptance or approval, ethically standard, ambitious to do well, concerned with social images, considerate of others, fore-sighted, conscientious, relaxed, unfrustrated and composed. The high creative boys were emotionally controlled and self assured. This was observed in the study conducted by Maddu (1980)<sup>174</sup>, Khiangte (1987)<sup>175</sup> reported the creative students were assertive, affected by feelings, tenderminded, placid, doubting, venturesome and out going.

Creative pupils differed from the non-creative pupils in respect of the adjustment variables such as sense of personal freedom, freedom from withdrawing tendencies, freedom from anti-social tendencies, school relations, community relation and anxiety, to a high degree. In respect of the variables comprising self-reliance, sense of personal worth, feeling of belonging, freedom from nervous symptoms, social standards and social skills, the creative pupils differed from the non-creative to a comparatively lesser degree (Nair, 1975)<sup>176</sup>.

Paramesh (1970)<sup>177</sup> observed that a creative adolescent was characterized as an individual who was neither extrovert nor introvert and was neither high nor low in neuroticism and anxiety. Stable in personality organization, the creative possessed high theoretical and aesthetic values. Srivastava (1982)<sup>178</sup> identified positive relationship between the scores on

creativity and the scores on different personality factors. Singh's (1982)<sup>179</sup> study revealed negative relationship between introversion-extroversion neuroticism-emotional stability scales and verbal and non-verbal creative thinking. Gupta (1975)<sup>180</sup> studied how far and in which way do creativity, age and sex affect the four second stratum factors, like adjustment vs. anxiety, introversion vs. extroversion, pothemia vs. cortetia, and subduedness vs. independence of personality. It was found that creativity and its components, both independently and with sex and age, affected the four second order factors. Ramajee (1984)<sup>181</sup> reiterated that the high creative adolescents exhibited a greater introversive tendency as compared to their low creative counterparts. Tripathi (1983)<sup>182</sup> testified high creatives were more warm hearted, intelligent, emotionally stable, conscientious, venturousome, tender-minded, imaginative, experimental and controlled than their low counterparts. Verma (1983)<sup>183</sup> in a study established that high creative groups were more constructive, self-assertive, more imaginative, self-accepting, intelligent, inner stable, and had a feeling of empathy than the low creatives.

According to Piyavadee (1988)<sup>184</sup> characteristics of creatives were courage in convictions, curiosity, independence in judgement, independence in thinking, pre-occupation with tasks, strong intuitive, unwillingness to accept routine solutions of problems, willingness to take risks, and imaginative. High

creative females considered creativity and imaginations necessary for life as per the study of Rani (1986)<sup>185</sup>. Haleem (1984)<sup>186</sup> while studying the Attitude of Teachers towards non-creative students of high intelligence vs. high creative students of average intelligence found that teachers in general showed a high regard for such characteristic as discipline, good grades, hard work, spirit of cooperation, than they showed for self-expression, imaginativeness, flexibility of ideas and non-conformity. Raina (1968)<sup>187</sup> in his doctoral thesis compared high creative and low creative students on the measures of cognition, personality and socio-economic status using Torrance's test. The high creative students exhibited greater achievement, autonomy, dominance, change and endurance than the low creative subjects.

Goyal (1969)<sup>188</sup> analysed the personality traits of creative children at middle school stage of Patiala District in Punjab. The study revealed that the creative pupils possessed a higher level of energy, they rejected suppression for the control of impulses, they were more of introverts and more independent in both thought and action, had open minds, could tolerate ambiguity and entertained opposing values. Ray Choudhri's (1961)<sup>189</sup> research using projective techniques and clinical ratings revealed that the artists to have among others, a high degree of sensitivity and an ability for playful 'prelogical' thinking. In yet another study, Ray Choudhri (1966)<sup>190</sup> observed measures to have sufficient emotional breadth and tendency to seek intimate

interpersonal relationship. They appeared to meet the frustration and anxiety, including situation, as a challenge.

Bali (1981)<sup>191</sup> investigated common personality factors of highly creative persons in different fields, viz., poetry, painting, science and music. The study specified that poets possessed factors like emotional sensitivity, creative mood and social will, Painters profiles consisted of factors like emotional sensitivity and creative mood. Scientists profile consisted of common factors of ego-ideal, emotional introversion and social will, and Musicians profile showed factors of ego ideal and social will.

Ahmed (1969)<sup>192</sup> examined the personality differences among high and low creative girls. The obtained results indicated that the two groups did not differ significantly on any of the personality traits except dominance. The originals or the creatives were more dominant than the unoriginal or the low creative.

Kumar (1973-74)<sup>193</sup> conducted a study on creativity in relation to personality values and achievement motivation and concluded that the high creative school-going adolescents are more introverted than the low creatives. The high creative possessed a significantly higher degree of theoretical value and are more achievement motivated than the low creative individuals.

Gopal (1974)<sup>194</sup> investigated the differentiating personality variables of creative and non-creative science and engineering students and reported that the creative science students were more reserved, emotionally stable, assertive, sober, expedient, venturesome, suspicious, imaginative, shrewd than the non-creative science students. The creative engineering students in comparison to their less creative peers were found to be more-reserved, emotionally stable, assertive, sober, expedient, venturesome, tough-minded, suspicious, imaginative, shrewd, experimenting and self-sufficient. Babu (1977)<sup>195</sup> compared the personality factor structure of two extreme categories of creative thinkers, namely, high intelligence-high creative thinkers (HI-HC) and high intelligence-low creative thinkers (HI-LC) in secondary schools of Kerala. It was found that (i) Among the fourteen variables subjected to investigation, eight variables, viz., self reliance, withdrawing tendencies (freedom form), nervous symptoms (freedom form), family relations, school relations and general anxiety discriminated significantly between the two groups, (ii) The factors identified for the HI-HC group (with respective percentage variance accounted for) were (a) Non-Anxious Disposition, (b) Group Adjustment, (c) Individual Adjustment, (d) Social Conformity, (e) Performance Anxiety and (f) Freedom Orientation, (iii) The factors identified for the HI-LC group (with respected variance accounted for) were (a) Self Adjustment, (b) Social Adjustment, (c) Social Anxiety, (d) Personal Adjustment, (e) Social

Disposition and (f) Total Adjustment, (iv) Comparison of the factor structures for the HI-HC and HI-LC groups revealed that for the two groups, there were four factors that were comparable but not identical, (v) It was indicated that the dissimilarity of the factor patterns for the HI-HC and HI-LC groups was caused by the presence of two factors in each of the groups (social conformity and freedom orientation for the HI-LC group and social Disposition and Total Adjustment for the HI-LC group) for which comparable factors did not exist in the other group. Sharma (1975-76)<sup>196</sup> observed the personality characteristics of creative VIII class students through teacher peer and self ratings. The main characteristics of creative students were cognitively complex, innovative, curious, risk-taker, adventurer, original, initiative, imaginative, constructive, determination, desire to excel, discontented, independence in judgement, never bored, self-confident, sensitive, varied interest and sincere. Gakhar's (1975)<sup>197</sup> study concluded that out of 24 personality traits 15 were correlated positively with verbal creativity while 18 were correlated positively with non-verbal creativity. Goyal (1974)<sup>198</sup> and Gupta (1977)<sup>199</sup> reported that healthier self-concept and higher self-acceptance are important personality characteristics which are conducive to higher creativity.

Gopal (1975)<sup>200</sup> observed creative science students and engineering students to be more reserved, emotionally stable, assertive, sober, expedient, venturesome, suspicious, imaginative,

shrewd, experimenting, self-sufficient and relaxed than the low creative science and engineering students.

Jha (1975)<sup>201</sup> explored and analysed personality dimensions and profiles of highly creative persons in various fields. Results of factor analysis, proved that highly creative persons have rational optimism, high ego-strength, realistic and healthy aptitude towards life, openness to experience, assertive, self confidence and tendency for self actualization. Bhargava (1979)<sup>202</sup> found that creativity was positively and significantly related with anxiety, independence, education and occupation.

Chauhan (1977)<sup>203</sup> stated that introversion trait of personality promotes originality. According to Dutt et al. (1977)<sup>204</sup> the correlation between creativity and extraversion is zero but the relationship between creativity and neuroticism was positive but not significant.

Gulati (1979)<sup>205</sup> on the other hand informed introverts performing better than extroverts on fluency and flexibility. Gupta's (1979)<sup>206</sup> study of adolescents with high and low creativity revealed that adolescents with high creativity were found to excel adolescents with low creativity on sense of humour. Further the high creative adolescents are most likely to exhibit lesser femininity than the low creative adolescents. There was no significant difference in the fluency, flexibility,

originality and total creativity of introvert and extrovert students according to Jarial et al. (1980)<sup>207</sup>.

Joshi (1974)<sup>208</sup> also observed no significant correlation between different creativity scores and different personality traits except in factors G, I, L, Q<sub>1</sub>, Q<sub>3</sub> and Q<sub>4</sub>.

Jyotsna's (1980)<sup>209</sup> study of personality correlates of high and low creative students revealed that high creative students tend to be more reserved, critical, more intelligent, more self-reliant, higher super ego strength and less frustrated than their less creative counterparts.

Kaur (1978)<sup>210</sup> acknowledged high creatives, as differentiated from low creatives, were more conscientious and persistent, and undemonstrative, inactive and phlegmatic. On the other hand, the low creatives were expedient and excitable. However, in another study, the high creatives were found to be less anxious than their low creative counterparts. The study further revealed that the high creative children were significantly more extrovert than the low creatives (Kumar, 1981)<sup>211</sup>. Kumar (1978)<sup>212</sup> reported that the high creative individuals were found to be introvert in comparison to low creative individuals.

Mallappa and Upadhyaya (1977)<sup>213</sup> found the high and low creative groups differed significantly on B, H, Q<sub>3</sub> and Q<sub>4</sub> factors of personality which shows that high creative group was more intelligent, more toward social boldness, had a stronger self-sentiment and less tense as compared to low creative group.

Paramesh and Narayanan (1976-77)<sup>214</sup> in their study of "Effect of Creativity and Intelligence on temperament" observed that high creative individuals enjoy relatively less the company of others, experience difficulty to make friends, and were less sympathetic than low creatives.

Sansanwal et al. (1979)<sup>215</sup> in their study of personality differences among high and low creative teacher-trainees established that high creative teacher trainees were more intelligent, happy-go-lucky, impulsively lively, gay, enthusiastic, trusting, adaptable, free of jealousy, easy to get on with, relaxed, tranquil, torpid and unfrustrated. But, no significant mean difference on creativity was observed between introverts and extroverts according to the study of Sharma (1979)<sup>216</sup>.

Singh's (1980)<sup>217</sup> study indicated the significantly higher score for creative students than non-creative students in two aspects of personality adjustment, i.e., sense of personal freedom and standards. Srivastava (1978)<sup>218</sup> in his research on

creativity as a function of personality types found that the subject belonging to introversion scored higher on creativity tests than extroversions. However, Vohra (1975)<sup>219</sup> study revealed no significant relationship between non-verbal creativity and personality characteristics of students.

Verma (1973)<sup>220</sup> in his factor analytic study of divergent thinking in relation to certain Personality Dimensions of Higher Secondary School adolescents reported that autonomy, non-conformity and openness of mind were functionally related to the abilities of divergent thinking.

Rao (1976)<sup>221</sup> tried to identify some correlates of creativity in boys belonging to class X. It was concluded that boys with field independence generally did better in their performance on creativity tests by displaying more originality, more adaptive flexibility, more ideational fluency, more associated fluency, more sensitivity to problems and more redefinition.

Ray Choudhuri (1963)<sup>222</sup> remarks about a group of creative musicians whose personality data were statistically analysed. The creative musicians as a group are more distinctly marked by their emotional and temperamental characteristics than by other aspects of personality. Rehman and Hussain (1973)<sup>223</sup> reported high creatives as having less need for social approval.

The creative individual is also stable in personality organisation, and is characterised by high theoretical and aesthetic values (Gakhar, 1973<sup>224</sup>; Gakhar and Luthra, 1974<sup>225</sup>).

Singh's (1978)<sup>226</sup> study showed creative males to be adventurous, self-assured, confident, secure, shy, timid, restrained and sensitive of threats. While comparing the creative and non-creative male pupil teachers, Pandey (1980)<sup>227</sup> found the creatives characterised by good nature, co-operative, easy-going and imaginative. The creatives were also found to possess high self concept and self-esteem (Singh, 1978)<sup>228</sup>.

#### RESEARCH RELATED TO CREATIVITY AND SEX

Different psychologists have probed into the relationship between creativity and sex to understand the complex nature of creativity. Crawford (1978)<sup>229</sup> investigated the relationship between creativity and sex roles. The results of the study failed to support the hypothesis that a non-stereo type sex role would be related to creativity. Positive and significant relationship was found between elaboration and feminine sex role and between originality and masculine sex role category. Panucci (1977)<sup>230</sup> noted sex differences in creativity in favour of females. Roe's (1963)<sup>231</sup> research with respect to sexual identification and interests revealed that highly creative men tend to get high scores on femininity scales, and highly creative women on

masculinity scales. Such men are more sensitive than most and have higher aesthetic interests, such women are more interested in things and ideas than other women.

Yamamoto (1960)<sup>232</sup>, Torrance (1962, 1963)<sup>233,234</sup>, Neufeld (1964)<sup>235</sup>, Solomon (1968)<sup>236</sup>, Ogletree (1968)<sup>237</sup>, Fletcher (1968)<sup>238</sup>, Bowers (1971)<sup>239</sup>, Burgess (1972)<sup>240</sup>, Cacha (1971)<sup>241</sup> reported superiority of girls over boys in creativity. However, a number of studies showed that males excel the females in creativity. Kelley (1965)<sup>242</sup> found girls scoring significantly lower than the boys in non-verbal creativity. Middents (1968)<sup>243</sup> found males excelling in non-verbal elaboration. However, researches by Karsten (1968)<sup>244</sup>, Olshin (1964)<sup>245</sup>, Castle (1965)<sup>246</sup>, Mayhon (1966)<sup>247</sup>, Jackson (1968)<sup>248</sup>, Burns (1969)<sup>249</sup>, Phillips and Torrance (1971)<sup>250</sup>, Kloss (1972)<sup>251</sup> and Ward and Cox (1974)<sup>252</sup> failed to find any significant sex difference in total creativity or other creative abilities.

Jyotsna (1980)<sup>253</sup> studied the personality correlates of high and low creative students and observed that for the male students reservedness was found to be related with creativity, and for the female students, intelligence and subduedness were found related with creativity.

Jhag (1979)<sup>254</sup> reported creative boys were adventurous while the creative girls were shy, timid, restrained and

sensitive to threat. The creative boys were more self-assured, placid, secure, complacent and serene while the creative girls were more guilt-prone, apprehensive, self-reproaching, insecure and worrying. Findings of several studies acknowledged females significantly superior to males on creativity. Singh (1975)<sup>255</sup> reported that girls were superior to boys on all dimensions of creativity and composite creativity. The superiority of the fair sex over their counterparts has been noted by Tripathy (1983)<sup>256</sup>, Hussain and Hussain (1975)<sup>257</sup>, Passi (1972)<sup>258</sup>, Raina (1971)<sup>259</sup>, Bedi (1974)<sup>260</sup>, Hussain (1974)<sup>261</sup>, Jarial and Sharma (1981)<sup>262</sup>, Raina (1980)<sup>263</sup>.

Bedi (1974)<sup>264</sup>, Passi (1972)<sup>265</sup>, Singh (1975)<sup>266</sup>, Rawat and Garg (1977)<sup>267</sup>, Arora (1978)<sup>268</sup> and Jarial (1981)<sup>269</sup> also found female students significantly superior to their male counterparts in verbal creativity. Girls have also been noted to score higher than boys on non-verbal creativity by Bedi (1974)<sup>270</sup>, Jarial (1981)<sup>271</sup> and Dutta (1982)<sup>272</sup>. Raina (1971)<sup>273</sup>, Pandit (1976)<sup>274</sup>, Singh (1978)<sup>275</sup>, Jarial and Sharma (1981)<sup>276</sup> and Hussain (1974)<sup>277</sup> have observed that females scores higher than the males in originality aspect of verbal creativity. Superiority of girls over boys in fluency aspect of creativity has been revealed in a number of researches. Goyal (1973)<sup>278</sup> found female students markedly higher on verbal fluency and flexibility than the male counterparts. Girls scored higher than boys on verbal fluency (Dhir, 1973)<sup>279</sup>. Kumari, Lalitha and

Paramji (1986)<sup>280</sup> also reported girls scoring significantly higher than boys on verbal fluency, verbal originality and elaboration. Pandit's (1976)<sup>281</sup> study also showed that females were significantly superior to males on fluency and flexibility dimension of creativity. However, the results of a number of researches indicated male superiority to females in creativity (Prakash, 1966<sup>282</sup>; Raina, 1968<sup>283</sup>; Gangneja, 1972<sup>284</sup>; Dharmangadan, 1981<sup>285</sup>; Srivastava, 1982<sup>286</sup>; Singh, 1982<sup>287</sup>; Sharma, 1977<sup>288</sup>; Trimurthy, 1987<sup>289</sup>; Sharma, 1982<sup>290</sup>; Dave, 1981<sup>291</sup>). Superiority of males over females on verbal creativity was observed by Rawat and Agrawal (1977)<sup>292</sup>, Badrinath and Satyanarayanan (1979)<sup>293</sup> and Sharma (1979)<sup>294</sup>. Passi (1972)<sup>295</sup> observed the male superiority over the females in non-verbal creativity. Studies by Pathak (1962)<sup>296</sup> and Dagaur (1982)<sup>297</sup> however failed to find any sex difference in creativity. No significant difference was observed among boys and girls in the verbal fluency, verbal flexibility and different components of non-verbal creativity according to Badrinath and Satyanarayanan (1979)<sup>298</sup>. Chadha and Sen (1981)<sup>299</sup> found no significant difference between boys and girls on flexibility, originality, elaboration, and composite creativity.

#### RESEARCH RELATED TO CREATIVITY AND SOCIO-ECONOMIC BACKGROUND

A relationship between creativity among adolescents and the socio-economic level of the home has been observed in a number of studies. Schaefer and Anastasi (1968)<sup>300</sup> found the

family background of the creative adolescent students was not only academically superior, but the parents tended to provide role models of interest and creative expression in the students field. Ogletree (1971)<sup>301</sup> observed the influence of SES on the creativity scores of the individual, and this feeling was later confirmed by Ogletree and Ujlaki (1973)<sup>302</sup>. Other researches like Rossman (1931)<sup>303</sup>, Mac Kinnon (1965)<sup>304</sup> and Solomon (1968)<sup>305</sup> found that highly creative individuals hail from the high socio-economic backgrounds. Weisberg and Springer (1961)<sup>306</sup> noted that the degree to which the father was professionally autonomous was very significantly related with the child's creativity.

The size of the family, an indicator of SES, has been found to play an important role in the creativity of children. Kennett (1974)<sup>307</sup> studied children of Class VII and came to the conclusion that the larger in the upper SES group provides a social and cultural family environment favourable to both convergent and divergent thinking. Ford (1968)<sup>308</sup> also, reported that children from upper-middle and low-middle classes seemed to be more creative than youngsters from the working class. Contrary to the above findings, some studies have reported the superiority of subjects from low SES background over those from the high and average SES (Smith, 1966<sup>309</sup>; Torrance, 1980<sup>310</sup>). There are also investigation who have revealed that there exist no significant relationship between creativity and SES (Kartsen, 1968<sup>311</sup>; Canty, 1974<sup>312</sup>; Mc Daniel, 1974<sup>313</sup>).

Several studies have shown that highly creative individuals hail from the high socio-economic backgrounds (Srivastava, 1982; Singh, 1982; Vijayalaksmi, 1980; Singh, 1977; Srivastava, 1977; Sekhar, 1980; Dave, 1981; Mishra, 1983; Tripathy, 1983; Sharma, 1982; Raina, 1969; Vohra, 1975; Rawat and Agrawal, 1977; Thorat, 1977; Pandit, 1976; Bhargava, 1979; Jarial, 1979; Singh, 1980; Ahmed, 1980; and Awasthy, 1979)<sup>314-333</sup>.

Pandey (1981)<sup>334</sup> noted that although creativity and socio-economic status is not related, a positive trend was noted in the case of the upper socio-economic status groups with creativity while a negative trend appeared in groups with the lower socio-economic status. Contrary to the above findings Singh (1980)<sup>335</sup> reported the superiority of subjects from low socio-economic status background over those from the high and average socio-economic status.

Many researches have indicated that there exist no significant relationship between creativity and socio-economic status (Badrinath and Satyanarayanan, 1979<sup>336</sup>; Agarwal, 1982<sup>337</sup> and Rani, 1986<sup>338</sup>).

#### RESEARCH RELATED TO PROBLEM SOLVING ABILITIES, COURSE OF STUDY AND CREATIVITY

Meadow and Parnes (1959)<sup>339</sup> evaluated the creative problem solving course developed by them in terms of gain in

creativity. It was found that the creative problem solving course yielded significant increase on certain ability measures associated with practical creativity as well as on personality variable dominance. Rai (1982)<sup>340</sup> reported the creative and non-creative groups differed significantly in their problem solving ability from the analysis of problem solving in science of creative and non-creative students.

The superiority of science students on creativity in comparison to their counterparts in the arts and commerce group has been established in a number of studies (Singh, 1982; Mishra, 1978; Usmani, 1981; Srivastava, 1977 and Passi, 1982)<sup>341-345</sup>. Kaur (1978)<sup>346</sup> reported that science students were significantly out-scoring than humanities students on flexibility dimension of creativity. No significant mean differences were observed in the two groups in fluency, originality and elaboration dimensions. Sharma (1982)<sup>347</sup> found the students of scientific and commercial streams possessed a higher level of creativity than those of the literary stream. There was no significant difference between the students of the scientific and commercial streams on these variables. Chatterji (1983)<sup>348</sup> in his study noted that commerce and agriculture students obtained significantly higher extraversion scores in comparison to those in the arts and science groups.

## CONCLUSION

The review reveals that there were several studies conducted on the relationship between intelligence and creativity in India and abroad. There were also studies conducted on the personality of the gifted and creatives separately. However, very few studies compared the gifted and the creative with regard to their personality characteristics and problem solving abilities.

Studies conducted in remote and tribal areas are very few. Khiangte (1986) conducted a study on the personality of the high and low creative secondary school students. This research mainly attempted to devise a measure of creativity and identify the personality characteristics of secondary school students with high and low creativity. There had been no study so far conducted to compare the gifted and the creative with regard to their personality and problem solving ability in the state of Mizoram.

The present research is undertaken while keeping the above considerations in view. The study assumes significance as it is directed to identify the gifted and the creative college students. It is envisaged that the study will throw light on the personality characteristics of the gifted and creative college students and also shall examine their abilities, socio-economic status, etc. It is hoped that it will arouse interest and motivate, that it may lead to numerous studies on giftedness and creativity in tribal and backward regions in India.

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## CHAPTER IV

### METHODOLOGY

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## CHAPTER IV

### METHODOLOGY

This chapter deals with the methodology adopted in the present investigation. The design of the present investigation is systematically presented as follows :

1. Method of study
2. Population and sample
3. Tools used
4. Collection of data and
5. Statistical techniques for analysis.

#### 1. METHOD OF STUDY

Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and whenever possible, to draw valid general conclusions from the facts discovered. Descriptive studies are more than just a collection of data. These studies evolve measurement, classification, analysis, comparison and interpretation. The present study belongs to the category of 'descriptive research' with composite characteristics of inter-group comparison. Since the main objective is to compare the gifted with the creative college students in relation to their personality and problem solving ability, the causal comparative

status survey design has been employed in the present investigation.

## 2. POPULATION AND SAMPLE

The population of the present study consists of all the students (male and female) enrolled in science, arts and commerce streams in colleges of Mizoram affiliated to the Central North Eastern Hill University. There are 29 colleges in the state out of which 8 are Government, 10 are Deficit and 11 are Private colleges. The enrolment in these colleges during 1995-96 session is 12983, having 7505 male and 5478 female students. There were 7340 students in Pre-University classes and 5643 students in B.A., B.Sc. and B.Com. classes.

The state is divided administratively into 3 districts namely Aizawl, Lunglei and Chhimituipui Districts. The population of college students in Aizawl, Lunglei and Chhimituipui Districts are 11013, 1395 and 575 respectively. The sample for the study was selected in a systematic manner. For this, seven colleges were selected at random from the list of 29 colleges in the state so as to achieve a 25 per cent representation. The students were then selected from the seven colleges at random giving approximately 10 per cent weightage to the total number of Pre-University students enrolled in the college. The sample thus selected for the study consisted of 600 Pre-University students

selected at random from seven colleges of Mizoram. Details about the sample with respect to the college, type of management, number of students, sex and course of study are given in Table 4.01.

**Table 4.01**  
**Details of sample selected for the study**  
(N = 600)

Colleges	Management	No. of students	Male	Female	Science	Com.	Art
Govt. Aizawl College	Govt.	206	107	99	81	45	80
Hrangbana College	Deficit	136	95	41	-	102	34
Zirtiri Women's College	Govt.	87	-	87	-	-	87
Govt. College Champhai	Govt.	81	34	47	-	-	81
J.Buana College	Deficit	50	27	23	-	-	50
Hnahthial College	Deficit	20	12	8	-	-	20
Govt. College Saiha	Govt.	20	11	9	-	-	20
<b>Total</b>		<b>600</b>	<b>286</b>	<b>314</b>	<b>81</b>	<b>147</b>	<b>372</b>

#### DESCRIPTION OF THE SAMPLE

The sample chosen for the study included 600 students chosen from 4 colleges in Aizawl District, 2 colleges from Lunglei District and one college from Chhimgtuipui District.

There were four government colleges and three deficit colleges in the sample. The male and female break-up of the student sample were 286 and 314, and the sample consisted 81 science students, 147 commerce and 372 arts students.

Out of 600 students selected for the sample, 81 students were identified as gifted, 93 students were identified as creative and 48 students were identified as both gifted and creative on the basis of the scores obtained in the intelligence and creativity tests. The criteria followed for selection were the scores above 75th percentile on the intelligence and creativity tests.

#### TOOLS USED

The following tools were used for the present study.

1. Standard Progressive Matrices - sets A, B, C, D, and E (Raven, 1992).
2. Creativity Test (Khangte, 1987).
3. 16 PF Questionnaire Form A (Cattell and Cattell, 1979).
4. Problem Solving Ability Test (Darchhingpuii, 1988).

5. Socio-Economic Status Index (Lalrinkimi, 1988).
6. Biographical Inventory (designed for the study).

#### 1. Standard Progressive Matrices (SPM)

The standard Progressive Matrices designed by Raven and Raven (1992) measure the educative component of 'g' as defined in Spearman's theory of cognitive ability. The scale 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.

It consists of 60 problems divided into five sets (A, B, C, D, and E) each made up of 12 problems. In each set the first problem is as nearly as possible self-evident. The problem which follows 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 possible, pleasing to look at.

The SPM was originally 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.

### *Reliability*

Raven (1958)<sup>1</sup> reported the retest reliability varying with age from .83 to .93. Sinha (1950, 1951)<sup>2</sup> obtained a reliability coefficient of .90. Dolke (1976)<sup>3</sup> reported that the test-retest reliability at one and half months interval was .83. Interval consistency reliability computed by K.R. formula was .67 and the odd-even reliability using Spearman Brown formula was .73.

### *Validity*

SPM correlated .86 with the Terman-Merill scale, and found to have a 'g' saturation of .82. (Raven, 1958)<sup>4</sup>, Sinha (1950)<sup>5</sup> reported a validity coefficient of .54. Bureau of Psychology (1958)<sup>6</sup> reported a validity coefficient of .53 with the Terman-Merill scale. .58 with National Institute of Industrial Psychology NIIP 70/23, .51 with NIIP Form Relation Test, and .53 with General Intelligence Test (Verbal).

## **2. Creativity Test (Khiangte, 1987)**

The creativity test was developed and standardised in a previous research conducted in the state (Khiangte, 1987). The

test battery is intended to measure the four primary components creativity, fluency, flexibility, originality and elaboration among the students in the age group 12-18 in Mizoram, India. Both verbal and non-verbal tests are employed. The test battery includes a seeing problem tests, an unusual uses test, a consequences test as well as tests on making things more interesting, finding similarities, constructing pictures, and completing circles. The test items are based on the Mizo culture and are developed on the models of Guilford Divergent Production Test (1967)<sup>7</sup>, Torrance Test of Creative Thinking (1966)<sup>8</sup> and Wallach and Kogan's Test of Creativity (1965)<sup>9</sup>.

(i) *Seeing Problem Test*

This test is designed to measure the degree of sensitivity to problems which is considered a component dimension of creativity. The verbal test is concerned with identifying problems in the working of simple items of day to day use.

(ii) *Unusual Uses Test*

Designed on the model of Brick Uses Test (Guilford et al, 1952)<sup>10</sup> and Torrance Uses Test (1962)<sup>11</sup>, this test consisted of three items within the psychological and physical proximity of the students. The students were requested to provide as many as interesting and unusual uses for the items as possible.

(iii) *The Consequences Test*

This test measures the creative components-fluency, flexibility and originality. Hypothetical question such as "If everybody started dancing" etc. are included on the consequences test.

(iv) *Making Things Interesting and Useful*

The Popular Mizo legend of Maurawkela's Monkey drum was used in this test. The drum has magical qualities and children in Mizoram are fond of this story. Here, the quality of the magical drum is related to improvements in common items. Students were asked to imagine situations where the magic drum could make the familiar objects more useful and interesting. The test provided scores in fluency, flexibility and originality.

(v) *Similarities*

The qualities of two objects are to be compared in this test. Two tests of similar items were provided to each students.

The test battery on creativity included three non-verbal test.

(vi) *Picture Construction Test*

The test presents the student with two figures, a triangle and a spiral. The students were requested to integrate the figures into a complete form. Originality was emphasized so as to encourage novel figures and the descriptive details offered by the students were also valued. The pictures were scored for descriptive elaboration and for originality.

(vii) *Picture Completion Test*

This activity is of two line drawings that were to be made into meaningful pictures of different objects. The students were requested to complete the drawing and to give an interesting and suitable title to each picture. The pictures were scored for originality and elaboration. Titles were scored for elaboration and originality, but the scoring was optional.

(viii) *Circles Test*

In this non-verbal test, 20 circles were given and the subjects were asked to draw in pencil as many picture as they could, the students were directed to draw unusual figures which may not have been thought of by their friends. The test was scored for originality and elaboration.

### Item Validity

The raw scores for each item for fluency, flexibility and originality on the first five verbal test, were converted into T. scores with a mean of 50 and SD of 10. Then they were added up to get the item score. The item score were correlated with the total activity scores and each of the total activity scores were also correlated with grand total. Correlation coefficient between various factors of creativity (fluency, flexibility and originality scores taken separately) and the total creativity score were calculated to determine the item validity. The results revealed that the test battery enjoys considerable internal consistency and the items and activities together are measuring the same thing.

### Reliability

Reliability was determined by the test-retest method. Test-retest reliability coefficient for this creativity test and the various sub-test was determined between the scores of subjects of first and second administration. The value of coefficients of relation (.802 for the whole test, .61 seeing problem test, .86 unusual uses test, .73 consequences test, .83 making things interesting, .64 similarities, .70 picture construction, .56 picture completion and .84 circles) are all significant at .01 level. Further test-retest reliabilities on the factor scores (fluency, .642; flexibility, .586;

originality, .605; elaboration, .552) were also found to be highly significant (Khangte, 1987)<sup>12</sup>.

Khangte's creativity test used for the present investigation along with procedures for scoring is attached in Appendix I.

### 3. 16 P.F. Questionnaire

The sixteen personality factor questionnaire (16 P.F.) is an objectively scorable test devised by basic research in psychology to give the most complete coverage of personality possible in a brief time. The test was designed for use with individuals aged sixteen and above. Forms A, B, C, and D are most appropriate for literate individuals whose educational level is roughly equivalent to that of the normal high school students. The personality factors measured by the 16 P.F. are not just unique to the test but instead rest within the context of a general theory of personality.

Each factor is listed with its alphabetic designation. The sixteen personality factors which are measured by the tool are presented in Table 4.02.

Table 4.02  
Personality factors

Sl. No.	Factor	Characteristics
1.	A	Reserved - Outgoing
2.	B	Dull - Bright
3.	C	Affected by feelings - Emotionally stable
4.	E	Humble - Assertive
5.	F	Sober - Happy go lucky
6.	G	Expedient - Conscientious
7.	H	Shy - Venturesome
8.	I	Tough-minded - Tender minded
9.	L	Trusting - Suspicious
10.	M	Practical - Imaginative
11.	N	Forth right - Astute
12.	O	Self-assured - Apprehensive
13.	Q <sub>1</sub>	Conservative - Experimenting
14.	Q <sub>2</sub>	Group-dependent - Self-sufficient
15.	Q <sub>3</sub>	Undisciplined self-conflict - Controlled
16.	Q <sub>4</sub>	Relaxed - Tense.

These sixteen dimensions are essentially independent. Any item in the test contributes to the score on one and only one factor so that no dependencies were introduced at the level of scale construction. Moreover, the experimentally obtained correlations among the sixteen scales are generally quite small so that each scale provides some new piece of information about the person being tested.

The questions are arranged in a roughly cyclic order determined by a plan to give maximum convenience in scoring by stencil and ensure variety and interest for the examinee. Responses are obtained on a separate answer sheet, not on the reusable test booklet, and the test is untimed.

The capsule description of the sixteen Primary Personality Factors' are presented in table 4.03.

**Table 4.03**  
**Description of Primary Personality Factors**

Personality Factor	Low Score Description	High Score Description
A	Reserved - detached, critical, cool, stiff	Outgoing - warm hearted, easy going, participating
B	Dull - less intelligent, concrete thinking	Bright - more intelligent, abstract thinking
C	Affected by feelings - emotionally less stable easily upset, changeable	Emotionally stable, mature faces reality, calm
E	Humble - mild, easily led, docile, accommodating, submissiveness conforming	Assertive, aggressive, competitive, stubborn, independent
F	Sober, taciturn, serious, prudent	Happy go-lucky, enthusiastic impulsively gay
G	Expedient, evades rules, feels few obligations	Conscientious, preserving, staid, rule bound, Persistent, moralistic
H	Shy, timid, threat - sensitive, restrained, diffident	Venturesome, socially bold uninhibited, spontaneous
I	Tough-minded, self-reliant, realistic, no nonsense	Tenderminded, sensitive, clinging, overprotected, dependent
L	Trusting, adaptable, free of jealousy, easy to get on with, accepting conditions	Suspicious, self-opinionated, hard to fool

contd...

Personality Factor	Low Score Description	High Score Description
M	Practical, "down to earth" concerns, careful, conventional, regulated by external realities, proper	Imaginative, wrapped up in inner urgencies, careless of practical matters, Bohemian, absent minded
N	Forthright, unpretentious, genuine but socially clumsy, natural, artless, sentimental	Astute, polished, socially aware, shrewd, calculating, worldly, penetrating
O	Self-assured, placid, secure, complacent, serene, confident	Apprehensive, self-reproaching, insecure, worrying, troubled, depressive
Q <sub>1</sub>	Conservative, respecting traditional ideas, tolerant of traditional difficulties	Experimenting, liberal, free thinking, critical, analytical
Q <sub>2</sub>	Group dependent, a "joiner" and sound follower	Self-sufficient, resourceful, prefers own decisions
Q <sub>3</sub>	Undisciplined self-conflict, follows own urges, careless of social rules	Controlled, exacting will power, socially precise, compulsive, following self-image
Q <sub>4</sub>	Relaxed, tranquil, torpid, unfrustrated, composed.	Tense, frustrated, driven over wrought

The 16 PF Questionnaire used for the present investigation along with answer sheet is attached in Appendix II.

#### 4. Problem Solving Ability Test (PSAT)

This test has been developed and used in a previous study carried out among the high school students in Mizoram

(Darchhingpuii, 1988). The problem solving ability test (PSAT) consisted of 18 multiple choice questions carrying a weightage of 1 mark each for the correct response, a cross-word" puzzle" with a weightage of 12 marks and jumbled word puzzle' carrying 10 marks. A separate answer sheet was prepared which contained necessary instructions to the candidate taking the test.

### **Reliability**

The reliability of the Problem solving Ability test was determined by test - retest and split -half methods. The test was administered to the same 35 students from K.V.M. high school in Aizawl after a gap of one month - the test scores of the students for the first and second administration were correlated and a coefficient of .602 was obtained which was significant at .01 level. In the split-half-method, the student scores (N=35) on the odd and even items were correlated, the obtained value of  $r = 0.64$  (after spearman - Brown prophecy correction) was significant at .01 level. Substantially high co-efficients of correlation by both the methods proved the reliability of the problem solving Ability test.

### *Validity*

For establishing the validity of problem solving ability test, the test scores were correlated with the teachers ratings (N=35). For this, the teachers were requested to rate the students ability in problem solving in agreement or

disagreement on a five-point continuum. The teacher ratings when correlated with the test scores returned a validity co-efficient of 0.75 which was found statistically significant at .01 level. The scores of problem solving ability was correlated with the students scores on Dubey's mathematical problem solving ability test and the resultant value of 0.816 was found to be quite high with .01 level of significance ( Darchhingpuii, 1988 )<sup>13</sup>. Darchhingpuii's problem solving ability test and the scoring keys are attached in Appendix III.

#### 5. Socio-Economic Status Index

The socio-economic status of the students were determined following the socio-economic status index (SES) developed by Lalrinkimi (1988). In order to find out the socio-economic status of the students, (1) Education (2) Occupation and (3) Income of the parents were taken as indicators. Weightage for these three items were given as follows.

**Table 4.04**  
**Indicators of Socio-Economic Index**

	Illiterate	Literate class X	Class X and above
Fathers educational qualification	0	1	2
Mothers educational qualification	0	1	2
	Not working	Earning	Officer
Fathers occupation	0	1	2
Mothers occupation	0	1	2
	Below Rs. 1000	Rs. 1000- Rs. 5000	Rs. 5000 & above
Income	0	1	2

The total score for socio-economic status was obtained by adding up the weightages assigned to the subject on the above factors. The subjects were then classified into 2 group - high and low on socio-economic status. For this, the total scores on socio-economic status of all the subjects were considered. The mean scores of the group was taken as the criterion for classification. Those who got an SES above the mean score were grouped as the high SES and the rest were placed in the low SES, group.

## 6. Biographical Inventory

The inventory contains items to elicit information on personal and social characteristics such as students age, sex, course of study, locale, parental education, occupation and

family income, birth order, the students social and cultural participation and their talents.

The biographical inventory used for the present investigation is attached in Appendix IV.

#### COLLECTION OF DATA

The collection of data was done in a systematic manner. The data were collected from seven colleges of Mizoram during the months of October - December 1995. The investigator personally visited the colleges selected for the study. The tests were administered to the pre-university students after obtaining permission from the college authority. The tests were administered by the investigator with the help of lecturers of the college during the class hours. For the administration of the tests, the purpose of the study was mentioned after establishing rapport with the students. The investigator first obtained the responses in general data sheet. After that the 16.PF. test was administered followed by problem solving ability test. The students were given rest and were provided with refreshments. Then the creativity test was administered followed by the Standard Progressive Matrices (SPM).

The time taken to complete all the tests was about five hours. In all, these tests were administered to 600 P.U. students from the seven colleges from the three districts of Mizoram.

#### **MODE OF ANALYSIS**

The data collected from the 600 students were scrutinized and tabulated after scoring the responses on intelligence, creativity, personality and problem solving ability tests using the standard scoring procedures given in the respective manuals for the various tests. Each student was assigned a serial number and their details regarding sex, age, parental education, parental occupation etc. and the scores of the different tests were entered in the tabulation sheet and are subjected to statistical treatment. For this, the following statistical tests were employed for the analysis.

##### **(i) Descriptive Statistic**

Measures of Central Tendency, Dispersion, Skewness and Kurtosis were employed to know the nature of score distribution.

##### **(ii) Test of Significance for Mean Difference**

The difference between the mean score of the groups based upon the variables such as creativity, giftedness, personality, problem solving ability, gender, socio-economic

status and course of study was tested for significance using the t-test (Garett, 1981)<sup>14</sup>.

(iii) **Pearson Product Moment Correlation**

Product moment method was applied to compute the correlation between the test scores on different variables such as intelligence, creativity, problem solving ability and the 16 personality factors. The coefficient of correlation were tested for significance by comparing the value with the table value for corresponding degrees of freedom and were interpreted following the scheme suggested by Garrett (1981)<sup>15</sup>.

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## CHAPTER V

### ANALYSIS AND INTERPRETATION OF DATA

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## CHAPTER V

### ANALYSIS AND INTERPRETATION OF DATA

The data were collected by administering the Standard Progressive Matrices (SPM), the creativity test, the Cattells 16 P.F. and the problem solving ability test (PSAT). The responses obtained from the subjects were scored following the standard scoring procedures. The scores were classified, tabulated and analysed and the details are given in the present chapter. The analysis of the data was carried out with the help of standard statistical techniques, keeping in view the objectives of the study and the findings were meaningfully interpreted. The details are given in the following sections.

#### **SECTION I: IDENTIFICATION OF GIFTED AND CREATIVE COLLEGE STUDENTS**

The first objective of the study was to identify the gifted (G) and the creative (C) students. This was done using the percentile score and those above 75th percentile on the standard progressive matrices (SPM) constituted the gifted, and those above 75th percentile on creativity test were considered the creative group. Following this criterion, out of the 600 sample, 81 students were identified as gifted (G) and 93 students were identified as creatives (C). It was further revealed that there were 48 students who obtained scores above 75th percentile both on standard progressive matrices (SPM) and creativity test. This

group was treated as the gifted-creative (GC). This type of overlapping has also been observed by other researchers like Gakhar and Kaura (1976-77)<sup>1</sup>, Getzels and Jackson (1962)<sup>2</sup>.

The study further revealed 45 males and 36 females among the gifted group, 53 males and 40 females among the creative group and 29 males and 19 females among the gifted-creative group. Among the gifted group, there were 12 science students, 28 commerce students and 41 students taking arts course, while among the creative group there were 18 science students, 36 commerce students and 39 students taking arts. Among the gifted-creative group, there were 28 science students, 14 commerce students and 6 arts students. Regarding their birth order, it was found that 26 of the gifted were first born, 39 were middle born and 16 were last born, while among the creative group 24 were first born, 48 were middle born and 20 were last born, while only one of them is an only child. Among the gifted-creative group, 20 were first born, 24 were middle born and 4 of them were last born.

The study also revealed that among the gifted group, there were 44 students coming from low socio-economic status (SES) and 37 students coming from high socio-economic status (SES) background. 71 creative students were from low socio-economic status and 22 creative students were from high socio-economic status background. Among the gifted-creative group, 26

were from low socio-economic status and 22 were from high socio-economic status background.

With regard to their results in High School Leaving Certificate (HSLC), it was found that 15 of the gifted passed in first division, 31 in second division, 33 in the third division and 2 in supplement. Among the creative group, 13 passed in first division, 39 in second division, 39 in the third division and 2 in supplement. Among the gifted-creative group, 20 passed in first division, 13 in second division, 14 in the third division and one in supplement.

The mean score of the social and cultural participation was 3.14 for the gifted, 3.92 for the creative and 3.71 for the gifted-creative group. The mean score of the talent and contribution of the gifted group was 2.06 while for the creative group it was 2.78 and for the gifted-creative group, it was 1.85. Details about the different groups with respect to sex, course of study, birth order, socio-economic status (SES), matric results, social/cultural participation and talent/contribution are presented in Table 5.01.

**Table 5.01**  
**Details about the different group**

	Gifted N=81	Creative N=93	Gifted-Creative N=48
Male	45	53	29
Female	36	40	19
Science	12	18	28
Commerce	28	36	14
Arts	41	39	6
Ist Born	26	24	20
2nd Born	39	48	24
3rd Born	16	20	4
Only Child	-	1	-
Ist Division	15	13	20
2nd Division	31	39	13
3rd Division	33	39	14
Supplement	2	2	1
Low SES	44	71	26
High SES	37	22	22
Participation	3.14	3.92	3.71
Talent	2.06	2.78	1.85

**SECTION II: PERSONALITY AND PROBLEM SOLVING ABILITY OF THE GIFTED AND CREATIVE COLLEGE STUDENTS COMPARED**

The groups were compared on the basis of personality characteristics and problem solving ability. For this, the mean and standard deviation of scores on 16 personality factors (16 P.F.) and problem solving ability test (PSAT) for the groups were calculated and the mean differences was tested applying the 't' test.

1. Personality Factor A Reserved - out going

The groups gifted (G) and creatives (C) were compared on personality factor A. For this, mean and standard deviation of the scores obtained on factor A of the Cattell's 16 PF were taken. The mean difference was tested by applying the 't' test and the details are presented in Table 5.02.

Table 5.02  
Personality factor A : Reserved-Outgoing

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	9.93	2.67				
				0.190	0.406	0.467	N.S.
C	93	10.12	2.68				

It was hypothesised that there is no significant difference between the gifted and the creative college students in respect to their personality characteristics. Reserved - out going. The obtained value of 0.467 is not significant at any level. Hence the hypothesis cannot be rejected. This shows that there is no difference in the personality of the gifted (G) and the creatives (C) with regard to their personality factor A : Reserved - outgoing. The mean of the creative group (10.12) is found to be slightly more than the gifted (G) groups (9.93). However, this difference may be due to chance factor.

## 2. Personality Factor B Less intelligent - more intelligent

The two groups, the gifted (G) and the creatives (C) were compared on personality factor B : less intelligent - more intelligent. The mean and S.D of the scores obtained on factor B was taken separately. The mean difference was tested by applying the 't' test and the details are presented in Table 5.03.

Table 5.03  
Personality factor B : Less intelligent - More intelligent

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	6.85	1.76	0.690	0.281	2.459	.05
C	93	6.16	1.94				

The hypothesis that there is no significant differences between the gifted and the creative college students with regard to their personality characteristic : less intelligent - more intelligent, was tested using the data.

The obtained value of t 2.459 was found significant at .05 level, and the mean score of the gifted group (6.85) is found to be greater than that of the creative groups (6.16). The results indicate that the gifted and the creative groups differed significantly on factor B of personality at .05 level. This reveals that the gifted groups has higher scholastic mental capacity as compared to their creative counterparts. The gifted are intelligent, fast learners and tend to be quick to grasp

ideas. On the other hand, the creative tends to be slow to learn, dull and are given to concrete interpretation.

### 3. Personality Factor C Affected by feelings - Emotionally stable.

The gifted and the creative groups were compared on personality factor C : affected by feelings - emotionally stable by finding the mean and S.D. The mean difference was tested by applying the 't' test and the details are presented in Table 5.04.

Table 5.04  
Personality factor C : Affected by feelings -  
Emotionally stable.

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	12.05	3.58				
C	93	12.47	3.49	0.420	0.538	0.781	N.S.

The obtained value of 0.781 is found to be not significant at .05 level of confidence. Therefore, the hypothesis that there is no significant difference between the gifted and the creative college students with regard to their personality characteristics : Affected by feeling - emotionally stable, cannot be rejected. The difference in the mean between the two groups may be due to chance factor and the groups do not differ in the two personality dimension.

#### 4. Personality Factor E Humble - Assertive

The gifted and the creative groups were compared by finding out the mean and S.D of the scores obtained on factor E. The mean difference was tested by applying the t test and the details are presented in Table 5.05.

Table 5.05  
Personality factor E : Humble - Assertive

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	10.01	3.74	0.230	0.571	0.403	N.S.
C	93	10.24	3.78				

The obtained value of 0.403 is not found significant at .05 level. Hence the hypothesis that there is no significant difference between the gifted and the creative college students with regard to the personality characteristic : Humble - Assertive cannot be rejected.

#### 5. Personality Factor F Sober - Happy go lucky

The two groups - gifted and creative were compared on personality factor F : sober - happy go lucky. The mean and S.D of the scores on factor F were obtained and the mean difference was tested by applying the 't' test. The details are presented in Table 5.06.

Table 5.06  
 Personality factor F : Sober - Happy go lucky

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	10.70	4.23				
C	93	12.28	4.00	1.580	0.627	2.521	.05

The obtained value of 2.521 is found significant at .05 level and this suggests that there is a significant difference between the gifted and the creative college students with regard to their personality factor F : sober - happy go lucky. Hence, the null hypothesis is rejected as the groups differed significantly on this dimension of personality at .05 level. Further examination indicates that the mean score of the creative group is greater than that of the gifted groups, and the results confirm that the creative groups are more impulsively lively, more enthusiastic and tends to be more cheerful, active and talkative than the gifted groups. The creative are also more expressive and carefree while the gifted are more serious, restrained and introspective, the gifted are sometimes pessimistic and unduly deliberate, but they are also sober and dependable.

#### 6. Personality Factor G Expedient - Conscientious

The groups - gifted and creatives are compared on personality factor G. The mean and S.D. were obtained for

the scores and the mean difference was tested by applying the t test. The details are presented in Table 5.07.

**Table 5.07**  
**Personality factor G : Expedient - Conscientious**

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	13.40	3.12				
C	93	12.92	3.30	0.480	0.468	1.026	N.S.

The hypothesis that there is no significant difference between the gifted and the creative college students in respect of personality factor G : Expedient - conscientious cannot be rejected as the obtained value 1.026 is not significant at .05 level. The mean score of the gifted group is found slightly higher than that of the creative group. Therefore, although it is not significant at any level, the gifted group tend to be slightly more rule - bound and dominated by sense of duty as opposed to the creatives who has a tendency to evade rules and feels few obligations.

#### 7. Personality Factor H Shy - Venturesome

The two groups gifted and creatives are compared on personality factor H. The mean and SD of the scores were obtained on personality factor H and the mean difference was tested by applying the t-test. Table 5.08 presents the details.

**Table 5.08**  
**Personality factor H : Shy - Venturesome**

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	8.63	4.45				
				1.350	0.678	1.992	.05
C	93	9.98	4.47				

The value of 1.992 is found significant at .05 level. Further, the mean of the creative group is found to be greater than the mean of the gifted group. The result indicates that the two groups differed significantly and the hypothesis that there is no significant difference among the gifted and the creative groups with regard to personality characteristics : Shy-Venturesome (factor H) is rejected. It may be inferred that the creatives are more socially bold, ready to try new things, spontaneous and abundant in emotional response as opposed to the gifted who are more restrained, timid, withdrawing and cautious.

#### 8. Personality Factor I Tough-Minded - Tender-Minded.

The gifted and the creative groups were compared on personality factor I : Tough-Minded - Tender-Minded. For this, the mean and SD of the scores obtained on factor I of the Cattell's 16 PF was taken. The mean difference was tested by applying the t-test of significance and the details are presented in Table 5.09.

**Table 5.09**  
**Personality factor I : Tough-Minded - Tender-Minded**

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	10.22	3.18				
				0.460	0.497	0.926	N.S.
C	93	10.68	3.37				

The hypothesis that there is no significant difference between the gifted and the creative college students in respect to the personality characteristic : Tough-minded - Tender-minded cannot be rejected as the obtained 't' value .926 is not statistically significant.

This shows that there is no significant difference in the personality of the gifted and the creative with regard to their personality characteristic : Tough-minded - Tender-minded (Factor I).

#### 9. Personality Factor L Trusting - Suspicious

The gifted and the creative groups were compared on personality factor L : Trusting - Suspicious. The mean and SD of the scores obtained on factor L are presented in Table 5.10 and the mean difference was calculated by applying t-test.

Table 5.10  
Personality factor L : Trusting - Suspicious

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	9.62	3.03				
				0.410	0.468	0.877	N.S.
C	93	10.03	3.13				

The obtained value of 't' 0.877 is not found statistically significant at any level of confidence. Hence the hypothesis that there is no significant difference between the gifted and the creative college students with regard to their personality characteristic : Trusting - Suspicious (factor L) cannot be rejected and the groups do not differ on this personality dimension.

#### 10. Personality Factor M Practical - Imaginative

The two groups gifted and creative are compared with regard to their personality characteristic : Practical - Imaginative (Factor M). For this, mean and SD of the scores obtained on factor M of Cattell's 16 PF was found and the mean difference was tested by applying the t-test. The details are presented in Table 5.11.

Table 5.11  
Personality factor M : Practical - Imaginative

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	8.95	3.42				
				1.060	0.503	2.107	.05
C	93	10.01	3.18				

The hypothesis that there is no significant difference between the gifted and the creative college students with regard to their personality characteristic : Practical - Imaginative (Factor M) was rejected as the obtained 't' value of 2.107 is statistically significant at .05 level. The mean score of the creative group is significantly higher than that of the gifted group. The result reveals that the gifted and the creative groups differed significantly on factor M of personality at .05 level. This shows that the creative groups are more imaginative, careless of practical matters and absent minded than the gifted groups. They tend to be unconventional, unconcerned over everyday matters, Bohemian, self-motivated, imaginatively creative, concerned with "essentials" and oblivious of particular people and physical realities. The gifted, on the other hand, are more careful, conventional and regulated by external realities. They tend to be anxious to do the right things, attentive to practical matters and is concerned over detail and unimaginative.

#### 11. Personality Factor N Forthright - Shrewd

The gifted and the creative groups were compared on personality factor N : Forthright - Shrewd. For this, the mean and SD of the scores obtained on factor N for the two groups was found and the mean difference was tested by applying the t-test. Table 5.12 gives the detail of the analysis.

Table 5.12  
Personality factor N : Forthright - Shrewd

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	11.30	2.96	0.830	0.459	1.808	N.S.
C	93	10.47	3.09				

The obtained 't' value 1.808 is not found significant at any level of confidence. Hence, the hypothesis that there is no significant difference between the gifted and the creative college students with regard to their personality characteristic: Forthright - Shrewd (Factor N) cannot be rejected.

#### 12. Personality Factor O Placid - Apprehensive..

The gifted and creative groups were compared on personality factor O : Placid - Apprehensive. The mean and SD of the scores obtained on factor O were taken and the mean difference was tested by applying the t-test. The details are presented in Table 5.13.

Table 5.13  
Personality factor O : Placid - Apprehensive

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	14.90	3.88	0.180	0.595	0.303	N.S.
C	93	14.72	3.95				

The hypothesis that there is no significant difference between the gifted and the creative with regard to their personality characteristic: Placid - Apprehensive cannot be rejected as the obtained 't' value of .303 is not found statistically significant.

13. Personality Factor Q<sub>1</sub> Conservative - Experimenting.

The gifted and the creative groups were compared on personality factor Q<sub>1</sub> : Conservative - Experimenting. The mean and SD of the scores were obtained on factor Q<sub>1</sub> and the mean difference was tested by applying the t-test. The details are presented in Table 5.14.

Table 5.14  
Personality factor Q<sub>1</sub> : Conservative - Experimenting

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	9.07	3.20				
C	93	10.46	2.80	1.390	0.459	3.028	.01

The obtained value 3.028 is found significant at .01 level. This gives statistical evidence to reject the hypothesis that there is no significant difference between the gifted and the creative with regard to their personality characteristic: Conservative - Experimenting (Factor Q<sub>1</sub>). Further, observation of the data indicates that the mean scores of the creative group is greater than that of the gifted group, and the group differed

significantly on factor  $Q_1$  of personality at .01 level. This shows that the creative groups are more critical, liberal, analytical and free thinking as compared to their gifted counterparts who seem to be respecting established ideas, and tolerant of traditional difficulties. The creative groups are more skeptical and inquiring regarding ideas, either old or new. They tend to be well informed, less inclined to moralize and more inclined to experiment in life generally, and more tolerant of inconvenience and change while the gifted group is more confident in what they had been taught to believe. They are cautious and compromising in regard to new ideas. Thus, they tend to oppose and postpone change, are inclined to go along with tradition, are more conservative in religion and politics.

14. Personality Factor  $Q_2$  Group dependent - Self sufficient.

The groups gifted and creative were compared on personality characteristic : Group dependent - Self sufficient (Factor  $Q_2$ ). The mean and SD of the scores were obtained on factor  $Q_2$  and the mean difference was tested by applying t-test. The details are presented in Table 5.15.

Table 5.15  
Personality factor  $Q_2$  : Group dependent - Self sufficient

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	10.07	3.01	0.490	0.458	1.069	N.S.
C	93	9.58	3.03				

The obtained 't' value of 1.069 is not significant at any level. Therefore the hypothesis that there is no significant difference between the gifted and the creative with regard to their personality characteristic: Group dependent-Self sufficient (Factor Q<sub>2</sub>) cannot be rejected.

15. Personality Factor Q<sub>3</sub>:Undisciplined self conflict-Controlled.

The groups gifted and creative were compared on personality factor Q<sub>3</sub> : Undiscipline self conflict - Controlled. The mean and SD of the scores were obtained on factor Q<sub>3</sub> and the mean difference was tested by applying t-test. The details are presented in Table 5.16.

Table 5.16  
Personality factor Q<sub>3</sub> : Undisciplined self  
conflict - Controlled

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	10.96	2.73	0.280	0.436	0.642	N.S.
C	93	10.68	3.02				

The obtained value of 0.642 is not significant at .05 level. Therefore, the hypothesis that there is no significant difference between the gifted and the creative with regard to their personality characteristic : Undisciplined self conflict - Controlled (Factor Q<sub>3</sub>) cannot be rejected.

#### 16. Personality Factor Q<sub>4</sub> Relaxed - Tense.

The gifted and the creative groups were compared on personality factor Q<sub>4</sub> : Relaxed - Tense. The mean and SD of the scores were obtained on factor Q<sub>4</sub> and the mean difference was tested by applying t-test. The details are presented in Table 5.17.

Table 5.17  
Personality factor Q<sub>4</sub> : Relaxed - Tense

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	14.63	4.14	0.900	0.614	1.466	N.S.
C	93	13.73	3.92				

The obtained value 1.466 is not significant at .05 level. Therefore, the hypothesis that there is no significant difference between the gifted and the creative with regard to their personality characteristic : Relaxed - Tense cannot be rejected. However, the mean score of the gifted is slightly greater than the creatives. This suggest that the gifted tend to be slightly more tense as compared to the creatives who seem to be relaxed.

#### 17. Problem Solving Ability

The scores of the gifted and creative students were compared on the Problem Solving Ability Test. The mean and SD of the scores were obtained on Problem Solving Ability Test and the

mean difference was tested by applying t-test. The details are presented in Table 5.18.

**Table 5.18**  
**Problem Solving Ability of Gifted and Creative college students**

Groups	N	M	S.D.	M.D.	S.E.	t	p
G	81	26.47	4.18				
C	93	25.10	4.25	1.370	0.640	2.140	.05

The obtained 't' value of 2.140 is significant at .05 level. Therefore, the hypothesis that there is no significant difference between the gifted and the creative college students with regard to their problem solving ability is rejected. Further, observation of the data indicates that the mean score of the gifted group is greater than that of the creative group, and the two groups differed significantly on problem solving ability at .05 level. The results revealed that the gifted group is better in problem solving ability when compared to the creative group.

**SECTION III : PERSONALITY AND PROBLEM SOLVING ABILITY OF THE GIFTED (G) AND GIFTED-CREATIVE (GC) COLLEGE STUDENTS COMPARED**

The gifted (G) and the gifted-creative (GC) students were compared on Cattells 16 PF and on the problem solving ability. For this, the mean and SD of the scores were worked out on all the 16 personality factors and for the problem solving

ability test (PSAT). The mean difference was tested by computing the 't' test of significance and the details are presented in Table 5.19.

The data in Table 5.19 indicates that there is no significant difference between the gifted (G) and the gifted-creative (GC) groups with regard to the Personality Factors A, B, C, E, F, G, I, L, N, O, Q<sub>1</sub>, Q<sub>2</sub>, Q<sub>3</sub>, and Q<sub>4</sub>. However, it has been found that there is a significant difference in the personality factor H and M between the gifted (G) and the gifted-creative (GC) groups. There is also statistically significant difference in the problem solving ability test scores between these two groups.

The obtained value of 't' 2.975 in factor H is significant at .05 level. The mean score of the gifted-creative (GC) group is greater than the gifted group in factor H of the Cattells 16 PF. This indicates that the gifted creative (GC) group seems to be more sociable, bold, ready to try new things and spontaneous as compared to the gifted group who are more restrained, timid, shy and cautious.

**Table 5.19**  
**Comparison of gifted (G) and gifted-creative (GC) college students on 16 Personality Factors and Problem Solving Ability**

Personality Factor	Mean/SD	G N=81	GC N=48	MD	SE	t	Inference
A	Mean	9.93	9.44	0.490	0.548	0.895	NS
	SD	2.67	3.19				
B	Mean	6.85	7.15	0.300	0.324	0.926	NS
	SD	1.76	1.79				
C	Mean	12.05	12.67	0.620	0.702	0.883	NS
	SD	3.58	4.01				
E	Mean	10.01	11.29	1.280	0.679	1.885	NS
	SD	3.74	3.72				
F	Mean	10.70	10.44	0.260	0.693	0.375	NS
	SD	4.23	3.53				
G	Mean	13.40	13.40	0.000	0.633	0.000	NS
	SD	3.12	3.67				
H	Mean	8.63	10.77	2.140	0.719	2.975	P<.01
	SD	4.45	3.62				
I	Mean	10.22	10.54	0.320	0.607	0.527	NS
	SD	3.18	3.42				
L	Mean	9.62	10.21	0.590	0.525	1.124	NS
	SD	3.03	2.79				
M	Mean	8.95	10.65	1.700	0.597	2.848	P<.01
	SD	3.42	3.19				
N	Mean	11.30	10.60	0.700	0.573	1.222	NS
	SD	2.96	3.25				

contd...

Personality Factor	Mean/SD	G N=81	GC N=48	MD	SE	t	Inference
O	Mean	14.90	14.75	0.150	0.675	0.222	NS
	SD	3.88	3.60				
Q <sub>1</sub>	Mean	9.07	9.67	0.600	0.597	1.006	NS
	SD	3.20	3.32				
Q <sub>2</sub>	Mean	10.07	10.50	0.430	0.607	0.708	NS
	SD	3.01	3.51				
Q <sub>3</sub>	Mean	10.96	11.31	0.350	0.471	0.742	NS
	SD	2.73	2.50				
Q <sub>4</sub>	Mean	14.63	13.54	1.090	0.715	1.525	NS
	SD	4.14	3.79				
PSAT	Mean	26.47	28.92	2.450	0.751	3.262	P<.01
	SD	4.18	4.09				

In factor M of the personality the obtained 't' value of 2.848 is significant at .01 level. The mean score of the gifted-creative (GC) group is higher than that of the gifted (G) group in factor M of the Cattells 16 PF, suggesting that the gifted-creative (GC) group are imaginative, careless of practical matters and absent-minded. They also tend to be unconventional, unconcerned over every-day matters, and oblivious of particular people and physical realities. The gifted group on the other hand are more careful, regulated by external realities, anxious to do the right things, attentive to practical matters and subject to the dictation of what is obviously possible.

For the problem solving ability test (PSAT), the t-test for the comparison obtained a value of 3.262 which is significant at .01 level. The mean score of the gifted-creative (GC) group was found to be greater than the gifted (G) group. The two group differed significantly on Problem Solving Ability at .05 level. The results reveal that the gifted-creative (GC) students were found to be definitely superior in problem solving ability when compared to the gifted (G) group.

**SECTION IV : PERSONALITY AND PROBLEM SOLVING ABILITY OF THE CREATIVE (C) AND GIFTED-CREATIVE (GC) COLLEGE STUDENTS COMPARED**

The two groups creative (C) and gifted-creative (GC) were compared on the Cattells 16 PF and on the problem solving ability. For this, the mean and SD of the scores were obtained on all the 16 Personality Factors and on the problem solving ability test. The mean difference was tested by applying the t-test and the details are presented in Table 5.20.

The data in Table 5.20 indicate that there is no significant difference between the creative (C) and the gifted-creative (GC) group with regard to personality factors A, C, E, G, H, I, L, M, N, O, Q<sub>1</sub>, Q<sub>2</sub>, Q<sub>3</sub> and Q<sub>4</sub>. However, it has been found that there is significant differences in the Personality Factor B and F and in the Problem Solving Ability between the creative (C) and the gifted-creative (GC) group.

In factor B, the obtained 't' value of 3.023 for the mean difference is found significant at .01 level. The mean score of the gifted-creative (GC) is greater than that of the creative (C) group in factor B. This shows that the gifted-creative (GC) group has higher scholastic mental capacity and have better abstract thinking ability. They tend to be quick to grasp ideas, are faster learners and are more intelligent as compared to the creative group. The creative on the other hand, tend to be slow to learn and are more given to concrete interpretation.

In factor F of the Personality the obtained 't' value (2.801) is significant at .01 level. The mean score of the

**Table 5.20**  
**Comparison of creative (C) and gifted-creative (GC) college students on 16 Personality Factors and Problem Solving Ability**

Personality Factor	Mean/SD	C N=81	GC N=48	MD	SE	t	Inference
A	Mean	10.12	9.44	0.680	0.538	1.264	NS
	SD	2.68	3.19				
B	Mean	6.16	7.15	0.990	0.327	3.023	P<.01
	SD	1.94	1.79				
C	Mean	12.47	12.67	0.200	0.683	0.293	NS
	SD	3.49	4.01				
E	Mean	10.24	11.29	1.050	0.665	1.579	NS
	SD	3.78	3.72				
F	Mean	12.28	10.44	1.840	0.657	2.801	P<.01
	SD	4.00	3.53				

contd...

Personality Factor	Mean/SD	C N=81	GC N=48	MD	SE	t	Inference
G	Mean	12.92	13.40	0.480	0.616	0.779	NS
	SD	3.03	3.67				
H	Mean	9.98	10.77	0.790	0.690	1.131	NS
	SD	4.47	3.62				
I	Mean	10.68	10.54	0.140	0.605	0.231	NS
	SD	3.37	3.42				
L	Mean	10.03	10.21	0.180	0.517	0.348	NS
	SD	3.13	2.79				
M	Mean	10.01	10.65	0.640	0.566	1.130	NS
	SD	3.18	3.19				
N	Mean	10.47	10.60	0.130	0.568	0.229	NS
	SD	3.09	3.25				
O	Mean	14.72	14.75	0.030	0.662	0.045	NS
	SD	3.95	3.60				
Q <sub>1</sub>	Mean	10.46	9.67	0.790	0.560	1.410	NS
	SD	2.80	3.32				
Q <sub>2</sub>	Mean	9.58	10.50	0.920	0.596	1.543	NS
	SD	3.03	3.51				
Q <sub>3</sub>	Mean	10.68	11.31	0.630	0.478	1.319	NS
	SD	3.02	2.50				
Q <sub>4</sub>	Mean	13.73	13.54	0.190	0.572	0.332	NS
	SD	3.92	3.79				
PSAT	Mean	25.10	28.92	3.820	0.737	5.185	P<.01
	SD	4.25	4.09				

creative group is greater than that of the gifted-creative group in Factor F. The result indicates that the creatives are more impulsive, lively, more enthusiastic, and tends to be cheerful, active, talkative, frank and carefree as compared to their gifted-creative (GC) counterparts, who are more serious, prudent and restrained. They tend to be more introspective, pessimistic, unduly deliberate and they also tend to be sober and dependable.

In problem solving ability, the obtained value of 5.185 between the creatives and gifted-creatives is significant at .01 level. The mean score of the gifted-creative (GC) group is significantly greater than that of the creative group. The analysis proved that the two groups differed significantly on Problem Solving Ability Test (PSAT) and the gifted-creative (GC) group is definitely superior in Problem Solving Ability as compared to the creative (C) group.

#### **SECTION V: PERSONALITY, PROBLEM SOLVING ABILITY, INTELLIGENCE AND CREATIVITY OF MALE AND FEMALE COLLEGE STUDENTS COMPARED**

The males and females were compared on the Cattells 16 personality factors, problem solving ability, intelligence (SPM), and Creativity. For this, the mean and SD of the scores were obtained. The mean difference was tested by applying t-test and the details are presented in Table 5.21.

**Table 5.21**  
**Comparison of male and female college students on the scores**  
**of 16 Personality Factors, Problem Solving Ability Test,**  
**Standard Progressive Matrices and Creativity Test**

Personality Factor	Mean/SD	Male N=81	Female N=48	MD	SE	t	Inference
A	Mean	9.39	10.59	1.200	0.227	5.277	P<.01
	SD	2.97	2.56				
B	Mean	6.41	6.46	0.050	0.192	0.261	NS
	SD	1.91	2.75				
C	Mean	12.26	10.57	1.690	0.301	5.623	P<.01
	SD	3.71	3.64				
E	Mean	10.09	8.94	1.150	0.297	3.869	P<.01
	SD	3.79	3.46				
F	Mean	11.73	10.92	0.810	0.300	2.702	P<.01
	SD	3.59	3.75				
G	Mean	13.40	13.82	0.420	0.264	1.588	NS
	SD	3.31	3.15				
H	Mean	9.81	7.99	1.820	0.334	5.441	P<.01
	SD	4.13	4.05				
I	Mean	9.82	12.02	2.200	0.234	9.394	P<.01
	SD	2.87	2.86				
L	Mean	10.13	9.73	0.400	0.237	1.689	NS
	SD	2.81	2.99				
M	Mean	10.45	9.02	1.430	0.253	5.663	P<.01
	SD	3.07	3.11				
N	Mean	10.63	11.84	1.210	0.252	4.797	P<.01
	SD	3.10	3.07				

contd...

Personality Factor	Mean/SD	Male N=81	Female N=48	MD	SE	t	Inference
O	Mean	14.60	17.09	2.490	0.715	3.482	P<.01
	SD	3.83	12.02				
Q <sub>1</sub>	Mean	10.35	9.04	1.310	0.234	5.606	P<.01
	SD	2.92	2.79				
Q <sub>2</sub>	Mean	9.60	9.61	0.010	0.255	0.039	NS
	SD	3.21	3.01				
Q <sub>3</sub>	Mean	11.37	10.90	0.470	0.249	1.887	NS
	SD	2.90	3.20				
Q <sub>4</sub>	Mean	13.34	14.88	1.540	0.304	5.067	P<.01
	SD	3.78	3.65				
PSAT	Mean	25.21	24.36	0.850	0.364	2.335	P<.05
	SD	4.72	4.14				
SPM	Mean	39.30	37.76	1.540	0.922	1.670	NS
	SD	10.91	11.68				
Creativity	Mean	221.54	205.42	16.120	4.846	3.326	P<.01
	SD	64.84	52.52				
Verbal	Mean	163.89	151.02	12.876	4.212	3.057	P<.01
	SD	55.60	46.66				
Non-Verbal	Mean	57.76	54.24	3.513	1.322	2.658	P<.01
	SD	17.27	14.86				

From Table 5.21, gender difference is observed in personality factors A, C, E, F, H I, M, N, O, Q<sub>1</sub> and Q<sub>4</sub>. Significant sex differences were also found in the problem

solving ability and creativity both in verbal and non-verbal creativity. However, there is no significant difference in the SPM score between males and females.

The obtained 't' value for comparison in factor A of 5.277 is significant at .01 level. Also, the mean score of the females are greater than the males. This shows that the females are more warm hearted, good natured, easy going and emotionally expressive. They are ready to co-operate, are attentive to people, soft hearted, kindly and adaptable. They are also better able to remember names of people as compared to the males who are more detached, critical and cool. The males tend to be stiff, skeptical and aloof. They like things rather than people, working alone, and avoiding compromise of viewpoints. At times, they may tend to be critical, obstructive or hard.

In factor C of the 16 PF, the obtained value of 5.623 is found significant at .01 level. Also the mean score of the male is found to be greater than that of the female. This shows that the males are more emotionally mature, stable, realistic about life, calm and better able to maintain solid group morale as compared to the females. The females tend to be low in frustration tolerance for unsatisfactory conditions, changeable and plastic, evading necessary reality demands and easily annoyed.

For factor E the obtained 't' value of 3.869 is significant at .01 level. Also, the mean score of the male is found greater than that of the female. This indicates that the males are more self-assured, aggressive and independent-minded. They tend to be competitive, stubborn, hostile or extrapunitive, authoritarian and disregards authority as compared to the females who are mild, accommodating, docile and conforming. The females are often dependent, confessing and anxious than the males.

The obtained 't' value for the comparison in Factor F is 2.702 which is significant at .01 level. The mean score of the males were found to be greater than that of the females. This shows that the males are more impulsive, lively, enthusiastic, and carefree. They tend to be cheerful, active, talkative, frank, and expressive as compared to the females who are serious, prudent, restrained and introspective. The females tend to be pessimistic, sober and dependable.

For Factor H, the obtained 't' value of 5.441 is found significant at .01 level. Also the mean score of the males is higher than that of the females. This shows that the male students are socially bold, uninhibited, spontaneous and abundant in emotional response. However, they tend to be careless of detail, ignore danger signals, and tend to be pushy as oppose to the female who are more shy, timid and cautious. The females usually has inferiority feelings, tends to be slow in expressing

themselves, dislikes occupations with personal contacts, and prefers one or two close friends to large groups as compared to their venturesome counterparts : the males. The obtained value of 't' 9.394 in Factor I is found significant at .01 level. Further, the mean score of the females was found higher than the males. This indicates that the males and the females differ significantly with regard to their personality factor : Tough-minded - Tender-minded at .01 level. The females were found to be more dependent, over-protected and sensitive as opposed to the males. The females were found to be tender-minded, day dreaming, artistic and feminine. They are sometimes demanding of attention and help, impatient and impractical. They dislike crude people and rough occupations as opposed to the males. The males are more self reliant, realistic, practical and masculine. They are independent, responsible, but skeptical of subjective, cultural elaborations. They are sometimes unmoved, hard, cynical, smug and tough-minded as compared to the females.

For Factor M, the obtained 't' value of 5.662 is found significant at .05 level. The mean score of the male students were found to be greater than the females. This shows that the males are more absent-minded, careless of practical matters, unconventional, self-motivated, imaginatively creative, concerned with 'essentials' and oblivious of particular people and physical realities as compared to the females who are more careful, conventional, proper and anxious to do the right things. The

females tend to be attentive to practical matters, are concerned over detail and able to keep their head in emergencies, but they are sometimes unimaginative. The results reveal the gender difference in Personality Factor M - Practical-Imaginative.

The obtained 't' value of 4.797 in Factor N is significant at .01 level. The mean score of the females are greater than the males. This shows that the females are comparatively more calculating, worldly, penetrating and tends to be more polished, shrewd and analytical than the males. The males are more natural, artless and tends to be unsophisticated, simple and awkward. The males are more easily pleased and content with what comes and are natural and spontaneous as compared to the females.

For Factor O, the obtained 't' value of 3.482 is significant at .01 level. This shows that there is significant difference in the Personality Factor O between the male and the female. The mean score of the female is found to be higher than the males suggesting that the females are more depressed, moody, a worrier, full of foreboding, and brooding and has a childlike tendency to anxiety in difficulties as compared to the males. Males on the other hand are more confident, self-assured, placid with unshakable nerve. The males tend to have a mature, unanxious confidence in themselves and their capacity to deal with things as compared to the females.

For Factor  $Q_1$ , the obtained value of 't' 5.606 is found significant at .01 level. This indicates that the male and female differ significantly in factor  $Q_1$ . The mean score of the male group is found greater than the females. This shows that the males are comparatively more critical, liberal, analytical and experimenting than the females. The males tend to be interested in intellectual matters and has doubts on fundamental issues and they are also skeptical and inquiring regarding ideas. The females are more conservative, respecting established ideas and is confident in what they have been taught to believe, and accept the "tried and true" despite inconsistencies, when something else might be better. They are cautious and compromising in regard to new ideas, are inclined to go along with tradition, are more conservative in religion and politics, and tend not to be interested in analytical "intellectual" thought.

For Factor  $Q_4$ , the obtained value of 't' 5.067 is found to be statistically significant at .01 level. The mean score of the females were found to be greater than the males suggesting that the males and females differ significantly in Personality Factor  $Q_4$ . The females are more tense, excitable, restless, fretful and impatient as compared to the males. The females are inactive and their frustration represents an excess of stimulated, but undischarged drive as opposed to the males, who are more Tranquil, unfrustrated, relaxed, composed and satisfied.

For Factor B, the obtained value of 't' 0.261 is not significant at any level. Therefore, there is no significant difference between the male and female with regard to their Personality characteristic : less intelligent - more intelligent.

For Factor G, the obtained value of 't' 1.588 is not significant at any level. Although the mean score of the female is slightly higher, it is not statistically significant. This shows that there is no significant difference in the personality characteristic : Expedient - Conscientious between the males and the females.

For Factor L, the obtained 't' value of 1.689 is not significant at any level of confidence indicating that there is no gender difference in personality factor L : Trusting - Suspicious.

For factor Q<sub>2</sub>, the obtained value of 't' 0.039 is not significant at any level. This shows that there is no significant difference between the males and the females in respect of their personality characteristic : Group dependent - Self sufficient.

For factor Q<sub>3</sub>, the obtained value of 't' 1.887 is not significant at .05 level. The result shows the males and the females did not differ with regard to personality factor Q<sub>3</sub>.

In problem solving ability test, the 't' value of 2.335 is found significant at .05 level. Also the mean score of the male is greater than the females. The result indicates that the male and female differed significantly in their Problem Solving Ability, and the males are significantly superior in problem solving ability as compared to the females. This result corresponds with the findings of Verma (1986)<sup>3</sup>.

On the intelligence test (SPM), the obtained 't' value of 1.670 is not significant at any level. This shows that the males and the females do not show any statistical difference in their scores on intelligence.

For the creativity test, the obtained 't' value of 3.326 is found significant at .01 level. This means that there is a statistically significant differences between the males and the females with regard to their creativity. The mean score of the males are found greater than that of the females. The results revealed that the males are superior in their creativity as compared to the females. This finding is supported by research findings of Sharma (1977)<sup>4</sup>, Sharma (1982)<sup>5</sup>, Prakash (1966)<sup>6</sup>, Raina (1968)<sup>7</sup>, Gangneja (1972)<sup>8</sup>.

In Verbal Creativity, the obtained 't' value of 3.057 is found statistically significant at .01 level. This means that the males and females differed significantly in verbal

creativity. The mean score of the male is found to be greater than that of the female. The results revealed that the males are definitely superior in verbal creativity as compared to the females. The findings is supported by many other research findings such as Trimurthy (1987)<sup>9</sup>, Badrinath and Satyanarayanan (1979)<sup>10</sup>, Torrance (1973)<sup>11</sup>, Rawat and Agrawal (1977)<sup>12</sup>, Sharma (1979)<sup>13</sup>, Dharmangadan (1981)<sup>14</sup>. The obtained value of 't' 2.658 in non-verbal creativity is found significant at .01 level. The males and the females differed significantly as per the results of the study. The mean score of the male is found to be greater than the female, suggesting that the males are better in non-verbal creativity than the females. Trimurthy (1987)<sup>15</sup>, Kelley (1965)<sup>16</sup>, Passi (1972)<sup>17</sup>, Middents (1968)<sup>18</sup> are some other research studies who supported the present findings.

#### **SECTION VI: PERSONALITY, PROBLEM SOLVING ABILITY, INTELLIGENCE AND CREATIVITY OF SCIENCE AND COMMERCE COLLEGE STUDENTS COMPARED**

The science and commerce students were compared on the 16 personality factors (16 PF), problem solving ability test (PSAT), intelligence (SPM) and creativity (verbal and non-verbal). For this, the mean and SD of the scores were obtained. The mean differences were tested applying the 't' test and the details are presented in Table 5.22.

From Table 5.22, it is found that science and commerce students showed significant difference in the personality factors

B and I, problem solving ability test (PSAT), intelligence (SPM) and creativity test.

The obtained 't' value of 2.284 in factor B is significant at .05 level. The mean score of the science students is greater than the commerce students. This shows that the science students are more intelligent, quick to grasp ideas, fast learners and has higher scholastic mental capacity as compared to the commerce students.

In factor I, the obtained value of 't' 4.617, is significant at .01 level. The mean score of the science students is greater than the commerce students. This implies that the science students are more tender-minded, dependent, over-protected and more sensitive as compared to the commerce students who are tough-minded, practical and independent.

**Table 5.22**  
**Comparison of science and commerce college students on the scores of 16 Personality Factors, Problem Solving Ability Test, Standard Progressive Matrices and Creativity Test**

Personality Factor	Mean/ Sd	Science N=81	Commerce N=147	MD	SE	t	Inference
A	Mean	9.49	9.72	0.230	0.384	0.599	NS
	SD	2.49	3.23				
B	Mean	6.99	6.47	0.520	0.228	2.284	P<.05
	SD	1.56	1.79				
C	Mean	12.90	12.59	0.310	0.481	0.644	NS
	SD	3.57	3.30				
E	Mean	11.22	11.27	0.050	0.525	0.095	NS
	SD	3.79	3.81				
F	Mean	11.12	11.64	0.520	0.474	1.097	NS
	SD	3.45	3.38				
G	Mean	12.94	12.37	0.570	0.453	1.257	NS
	SD	3.17	3.46				
H	Mean	11.41	10.59	0.820	0.523	1.567	NS
	SD	3.62	4.06				
I	Mean	11.68	9.65	2.030	0.440	4.617	P<.01
	SD	3.17	3.19				
L	Mean	9.94	10.07	0.130	0.401	0.324	NS
	SD	2.90	2.89				
M	Mean	10.33	10.67	0.340	0.420	0.810	NS
	SD	2.79	3.43				
N	Mean	10.73	10.71	0.020	0.439	0.046	NS
	SD	3.28	2.96				

contd...

Personality Factor	Mean/ Sd	Science N=81	Commerce N=147	MD	SE	t	Inference
O	Mean	13.91	13.62	0.290	0.496	0.585	NS
	SD	3.49	3.74				
Q <sub>1</sub>	Mean	10.04	10.01	0.030	0.408	0.074	NS
	SD	3.00	2.85				
Q <sub>2</sub>	Mean	10.73	10.61	0.120	0.454	0.264	NS
	SD	3.30	3.25				
Q <sub>3</sub>	Mean	11.26	11.25	0.010	0.357	0.028	NS
	SD	2.42	2.84				
Q <sub>4</sub>	Mean	12.77	12.82	0.050	0.477	0.105	NS
	SD	3.37	3.59				
PSAT	Mean	29.59	25.51	4.080	0.501	8.142	P<.01
	SD	3.11	4.40				
SPM	Mean	44.72	41.32	3.400	1.456	2.336	P<.05
	SD	10.81	9.97				
Creativity	Mean	269.10	233.04	36.060	8.780	4.107	P<.01
	SD	66.22	58.08				
Verbal	Mean	206.25	177.71	28.540	7.562	3.774	P<.01
	SD	57.07	49.96				
Non-Verbal	Mean	63.26	55.31	7.950	2.505	3.174	P<.01
	SD	17.88	18.50				

In problem solving ability test the 't' value was found significant at .01 level. The mean score of the science students were found to be higher than that of the commerce students

thereby indicating that the science students have better problem solving ability than the commerce students.

In Standard Progressive Matrices (SPM), the obtained value of 2.336 is significant at .05 level. The mean score of the science students is found higher when compared to the commerce students, suggesting that the science students are more intelligent as compared to the commerce students.

In creativity test, the obtained 't' value in the composite score is 4.107, in verbal creativity 3.174, and in non-verbal creativity 3.174. The values are significant at .01 level. The mean score of the science students are found to be higher than the commerce students in all the three tests. This shows that the science students tend to be more creative than the commerce students, which is true for verbal and non-verbal creative thinking abilities also.

#### **SECTION VII: PERSONALITY, PROBLEM SOLVING ABILITY, INTELLIGENCE AND CREATIVITY OF SCIENCE AND ARTS COLLEGE STUDENTS COMPARED**

The science and arts students were compared on the 16 personality factors (PF), problem solving ability test (PSAT), intelligence (SPM) and creativity. For this, the mean and SD of the scores were obtained. The mean differences were tested applying 't' test and the details are presented in Table 5.23.

Table 5.23 indicates that there is a significant difference in the personality factors A, B, C, E, G, H, M, N, O, Q<sub>2</sub> and Q<sub>4</sub> between the science and the arts students. However, there is no significant difference in the personality factors F, I, L, Q<sub>1</sub> and Q<sub>3</sub> between these two groups. It has also been found that in PSAT, SPM and creativity test, both verbal and non-verbal, there is a significant difference in scores between the science and the arts students. The mean score of the science students were found to be higher than that of the art students in all these tests. The results reveal that the science students

**Table 5.23**  
**Comparison of science and arts college students on the scores**  
**of 16 Personality Factors, Problem Solving Ability Test,**  
**Standard Progressive Matrices and Creativity Test**

Personality Factor	Mean/ Sd	Science N=81	Arts N=372	MD	SE	t	Inference
A	Mean	9.49	10.25	0.760	0.310	2.451	P<.05
	SD	2.49	2.70				
B	Mean	6.99	6.20	0.790	0.198	3.983	P<.01
	SD	1.56	1.86				
C	Mean	12.90	10.53	2.370	0.441	5.373	P<.01
	SD	3.57	3.72				
E	Mean	11.22	8.38	2.840	0.451	6.301	P<.01
	SD	3.79	3.10				
F	Mean	11.12	11.20	0.080	0.432	0.185	NS
	SD	3.45	3.86				

contd...

Personality Factor	Mean/ Sd	Science N=81	Arts N=372	MD	SE	t	Infer- ence
G	Mean	12.94	14.26	1.320	0.384	3.434	P<.01
	SD	3.17	2.97				
H	Mean	11.41	7.59	3.820	0.449	8.498	P<.01
	SD	3.62	3.87				
I	Mean	11.68	11.34	0.340	0.382	0.891	NS
	SD	3.17	2.84				
L	Mean	9.94	9.86	0.080	0.356	0.225	NS
	SD	2.90	2.92				
M	Mean	10.33	9.18	1.150	0.348	3.309	P<.01
	SD	2.79	3.03				
N	Mean	10.73	11.59	0.860	0.3999	2.157	P<.05
	SD	3.28	3.12				
O	Mean	13.91	11.69	2.220	0.427	5.201	P<.01
	SD	3.49	3.44				
Q <sub>1</sub>	Mean	10.04	9.43	0.610	0.366	1.668	NS
	SD	3.00	2.90				
Q <sub>2</sub>	Mean	10.73	8.95	1.780	0.395	4.507	P<.01
	SD	3.30	2.83				
Q <sub>3</sub>	Mean	11.26	11.04	0.220	0.318	0.692	NS
	SD	2.42	3.27				
Q <sub>4</sub>	Mean	12.77	14.99	2.220	0.421	5.274	P<.01
	SD	3.37	3.71				
PSAT	Mean	29.59	23.43	6.160	0.400	15.406	P<.01
	SD	3.11	3.88				

contd...

Personality Factor	Mean/ Sd	Science N=81	Arts N=372	MD	SE	t	Inference
SPM	Mean	44.72	36.03	8.690	1.334	6.515	P<.01
	SD	10.81	11.19				
Creativity	Mean	269.10	193.03	76.070	7.738	9.830	P<.01
	SD	66.22	46.20				
Verbal	Mean	206.25	138.34	67.910	6.659	10.197	P<.01
	SD	57.07	39.24				
Non-Verbal	Mean	63.26	54.56	8.700	2.119	4.106	P<.01
	SD	17.88	14.22				

have better problem solving ability, have better intelligence, and are more creative as compared to the arts students as per the finding of the present research.

**SECTION VIII : PERSONALITY, PROBLEM SOLVING ABILITY, INTELLIGENCE AND CREATIVITY OF COMMERCE AND ARTS COLLEGE STUDENTS COMPARED**

The commerce and arts students were compared on the 16 personality factors (PF), problem solving ability test (PSAT), intelligence (SPM) and creativity. For this, the mean and SD of the scores were calculated. The mean differences were tested applying the 't' test and the details are presented in Table 5.24.

From Table 5.24, it is observed that there is a significant difference in scores on personality factors C, E, G, H, I, M, N, O, Q<sub>1</sub>, Q<sub>2</sub> and Q<sub>4</sub> between the arts and commerce

students. However, they do not differ in personality factors A, B, F, L, and Q<sub>3</sub>. It is further found that in PSAT, SPM, composite creativity and verbal creativity, there is a significant difference in scores between the commerce and the arts students. The mean score of the commerce students is found to be higher than the arts students in all these tests. The result revealed that the commerce students have higher problem solving ability, higher intelligence and higher verbal creativity than the arts students. However, in non-verbal creativity, it is found that the commerce and the arts students do not show any significant difference in their scores.

**Table 5.24**  
**Comparison of commerce and arts college students on the scores of 16 Personality Factors, Problem Solving Ability Test, Standard Progressive Matrices and Creativity Test**

Personality Factor	Mean/ Sd	Commerce N=147	Arts N=372	MD	SE	t	Inference
A	Mean	9.72	10.25	0.530	0.301	1.761	NS
	SD	3.23	2.70				
B	Mean	6.47	6.20	0.270	0.176	1.531	NS
	SD	1.79	1.86				
C	Mean	12.59	10.53	2.060	0.334	6.175	P<.01
	SD	3.30	3.72				
E	Mean	11.27	8.38	2.890	0.353	8.188	P<.01
	SD	3.81	3.10				
F	Mean	11.64	11.20	0.440	0.343	1.282	NS
	SD	3.38	3.86				

contd...

Personality Factor	Mean/ Sd	Commerce N=147	Arts N=372	MD	SE	t	Infer- ence
G	Mean	12.37	14.26	1.890	0.324	5.828	P<.01
	SD	3.46	2.97				
H	Mean	10.59	7.59	3.000	0.390	7.685	P<.01
	SD	4.06	3.87				
I	Mean	9.65	11.34	1.690	0.302	5.605	P<.01
	SD	3.19	2.84				
L	Mean	10.07	9.86	0.210	0.282	0.744	NS
	SD	2.89	2.92				
M	Mean	10.67	9.18	1.490	0.324	4.605	P<.01
	SD	3.43	3.03				
N	Mean	10.71	11.59	0.880	0.293	3.005	P<.01
	SD	2.96	3.12				
O	Mean	13.62	11.69	1.930	0.356	5.416	P<.01
	SD	3.74	3.44				
Q <sub>1</sub>	Mean	10.01	9.43	0.580	0.279	2.079	P<.05
	SD	2.85	2.90				
Q <sub>2</sub>	Mean	10.61	8.95	1.660	0.306	5.419	P<.01
	SD	3.25	2.83				
Q <sub>3</sub>	Mean	11.25	11.04	0.210	0.289	0.726	NS
	SD	2.84	3.27				
Q <sub>4</sub>	Mean	12.82	14.99	2.170	0.353	6.146	P<.01
	SD	3.59	3.71				
PSAT	Mean	25.51	23.43	2.080	0.415	5.013	P<.01
	SD	4.40	3.88				

contd...

Personality Factor	Mean/ Sd	Commerce N=147	Arts N=372	MD	SE	t	Inference
SPM	Mean	41.32	36.03	5.290	0.994	5.320	P<.01
	SD	9.97	11.19				
Creativity	Mean	233.04	193.03	40.010	5.356	7.470	P<.01
	SD	58.08	46.20				
Verbal	Mean	177.71	138.34	39.370	4.596	8.567	P<.01
	SD	49.96	39.29				
Non-Verbal	Mean	55.31	54.56	0.750	1.695	0.443	NS
	SD	18.50	14.22				

**SECTION IX : PERSONALITY AND PROBLEM SOLVING ABILITY OF THE LOW SOCIO-ECONOMIC STATUS (SES) AND HIGH SOCIO-ECONOMIC STATUS (SES) GROUP OF GIFTED COLLEGE STUDENTS COMPARED**

The low socio-economic status (SES) and the high socio-economic status (SES) group of the gifted were compared on the 16 personality factors (16 PF) and problem solving ability test (PSAT). For this, the mean and SD of the scores were obtained. The difference were tested applying 't' test and the details are presented in table 5.25.

**Table 5.25**  
**Comparison of low and high socio-economic status group of**  
**gifted (G) college students on the scores of 16 Personality**  
**Factors, and Problem Solving Ability Test**

Personality Factor	Mean/ Sd	LSES N=44	HSES N=37	MD	SE	t	Infer- ence
A	Mean	10.02	9.81	0.210	0.584	0.360	NS
	SD	2.95	2.30				
B	Mean	6.89	6.81	0.080	0.399	0.201	NS
	SD	1.60	1.93				
C	Mean	12.39	11.65	0.740	0.793	0.934	NS
	SD	3.57	3.54				
E	Mean	9.77	10.30	0.530	0.813	0.652	NS
	SD	4.19	3.11				
F	Mean	10.00	11.54	1.540	0.917	1.680	NS
	SD	4.44	3.81				
G	Mean	14.07	12.59	1.480	0.673	2.198	P<.05
	SD	3.11	2.94				
H	Mean	8.43	8.46	0.030	0.995	0.030	NS
	SD	4.38	4.53				
I	Mean	9.57	11.00	1.430	0.694	2.062	P<.05
	SD	3.06	3.15				
L	Mean	9.89	9.30	0.590	0.684	0.863	NS
	SD	2.76	3.30				
M	Mean	9.25	8.59	0.660	0.761	0.867	NS
	SD	3.37	3.45				

contd...

Personality Factor	Mean/ Sd	LSES N=44	HSES N=37	MD	SE	t	Infer- ence
N	Mean	11.41	11.16	0.250	0.668	0.374	NS
	SD	2.77	3.17				
O	Mean	14.75	15.08	0.330	0.837	0.394	NS
	SD	4.49	2.99				
Q <sub>1</sub>	Mean	9.48	8.59	0.890	0.709	1.256	NS
	SD	3.10	3.24				
Q <sub>2</sub>	Mean	10.43	9.65	0.780	0.663	1.176	NS
	SD	3.06	2.90				
Q <sub>3</sub>	Mean	11.18	10.70	0.480	0.625	0.769	NS
	SD	2.25	3.19				
Q <sub>4</sub>	Mean	14.91	14.30	0.610	0.901	0.677	NS
	SD	4.60	3.50				
PSAT	Mean	26.77	26.11	0.660	0.941	0.701	NS
	SD	3.87	4.49				

From Table 5.25, it is found that there is no significant differences in the Personality Factors between the high SES group and the Low SES groups of the gifted students except on personality factors G and I. The mean score of the Low SES group is greater than that of the high SES group in factor G. This shows that the low SES groups are more conscientious, persevering and rule bound as compared to the high SES group who seems to be more expedient, evades rules and feels few obligations.

The mean score of the high SES group is also greater than the low SES group in factor I. This indicates that the high SES group are tender-minded, dependent, over-protective and sensitive and the low SES group are tough-minded, self-reliant and realistic. However, in PSAT, the results do not show significant difference between the low SES and high SES group. Therefore, it is inferred that the problem solving ability is not affected by the SES of the gifted students.

**SECTION X : PERSONALITY AND PROBLEM SOLVING ABILITY OF THE LOW SOCIO-ECONOMIC STATUS (SES) AND HIGH SOCIO-ECONOMIC STATUS (SES) GROUP OF CREATIVE COLLEGE STUDENTS COMPARED**

The low socio-economic status and the high socio-economic status students of the creative (C) group were compared on the 16 personality factors (PF) and problem solving ability test (PSAT). For this, the mean and SD of the scores were obtained. The mean difference were tested applying 't' test and the details are presented in Table 5.26.

**Table 5.26**  
**Comparison of low and high socio-economic status group of**  
**creative (C) college students on the scores of 16 Personality**  
**Factors, and Problem Solving Ability Test**

Personality Factor	Mean/ SD	LSES N=71	HSES N=22	MD	SE	t	Infer- ence
A	Mean	9.83	11.05	1.220	0.542	2.253	P<.05
	SD	2.79	2.01				
B	Mean	6.04	6.55	0.510	0.423	1.205	NS
	SD	2.01	1.64				
C	Mean	12.56	12.18	0.380	0.826	0.460	NS
	SD	3.53	3.34				
E	Mean	9.96	11.14	1.180	0.900	1.311	NS
	SD	3.78	3.66				
F	Mean	12.46	11.68	0.780	1.094	0.713	NS
	SD	3.74	4.69				
G	Mean	12.94	12.86	0.080	0.676	0.118	NS
	SD	3.13	2.65				
H	Mean	9.94	10.09	0.150	1.124	0.133	NS
	SD	4.40	4.67				
I	Mean	10.30	11.91	1.610	0.787	2.045	P<.05
	SD	3.34	3.19				
L	Mean	10.13	9.73	0.400	0.883	0.453	NS
	SD	2.87	3.82				
M	Mean	10.18	9.45	0.730	0.773	0.944	NS
	SD	3.16	3.17				
N	Mean	10.38	10.77	0.390	0.763	0.511	NS
	SD	3.06	3.15				

contd...

Personality Factor	Mean/SD	LSES N=71	HSES N=22	MD	SE	t	Inference
O	Mean	14.37	15.86	1.490	0.896	1.662	NS
	SD	3.99	3.57				
Q <sub>1</sub>	Mean	10.44	10.55	0.110	0.652	0.169	NS
	SD	2.86	2.61				
Q <sub>2</sub>	Mean	9.58	9.59	0.010	0.688	0.015	NS
	SD	3.12	2.72				
Q <sub>3</sub>	Mean	10.72	10.55	0.170	0.804	0.211	NS
	SD	2.89	3.41				
Q <sub>4</sub>	Mean	13.38	14.86	1.480	1.046	1.415	NS
	SD	3.67	4.46				
PSAT	Mean	24.63	26.59	1.960	0.973	2.015	P<.05
	SD	4.25	3.90				

From Table 5.26, it has been found that there are no significant differences in the Personality Factors B, C, E, F, G, H, L, M, N, O, Q<sub>1</sub>, Q<sub>2</sub>, Q<sub>3</sub> and Q<sub>4</sub> between the low SES and high SES group of the creative students. However, it has been found that they differed significantly in the personality factors A and I. The mean score of the high SES group in factor A is greater than that of the low SES group. This shows that the high SES group are more outgoing, warm hearted and easy going as compared to their reserved, detached, critical and cool low SES groups. Further, in factor I, the mean score of the high SES group was found to be greater than that of the low SES group, suggesting that the high

SES group are more tender-minded and sensitive as compared to the low SES group who seems to be more tough-minded and realistic.

In problem solving ability test (PSAT), it has been found that the groups differed significantly at .05 level. The mean score of the high SES group in the PSAT is found greater than that of the low SES group. The results reveal that the creative students belonging to high SES group have better problem solving ability when compared to those from low SES group.

**SECTION XI : PERSONALITY AND PROBLEM SOLVING ABILITY OF THE LOW SOCIO-ECONOMIC STATUS (SES) AND HIGH SOCIO-ECONOMIC STATUS (SES) GROUP OF GIFTED-CREATIVE COLLEGE STUDENTS COMPARED**

The low socio-economic status and the high socio-economic status group of the gifted-creative (GC) were compared on the 16 personality factors (PF) and problem solving ability test (PSAT). For this, the mean and SD of the scores were obtained. The mean differences were tested applying 't' test and the details are presented in Table 5.27.

**Table 5.27**  
**Comparison of low and high socio-economic status group of gifted-creative (C) college students on the scores of 16 Personality Factors, and Problem Solving Ability Test**

Personality Factor	Mean/ SD	LSES N=26	HSES N=22	MD	SE	t	Inference
A	Mean	9.58	9.27	0.310	0.954	0.325	NS
	SD	2.50	3.84				
B	Mean	7.08	7.23	0.150	0.501	0.299	NS
	SD	2.07	1.38				
C	Mean	13.15	12.09	1.060	1.150	0.922	NS
	SD	4.04	3.91				
E	Mean	10.69	12.00	1.310	1.082	1.211	NS
	SD	3.22	4.12				
F	Mean	10.92	9.86	1.060	1.036	1.023	NS
	SD	3.00	4.00				
G	Mean	13.23	13.59	0.360	1.059	0.340	NS
	SD	3.71	3.61				
H	Mean	11.15	10.32	0.830	1.068	0.777	NS
	SD	3.11	4.11				
I	Mean	10.23	10.91	0.680	1.011	0.673	NS
	SD	2.87	3.94				
L	Mean	10.31	10.09	0.220	0.806	0.273	NS
	SD	2.81	2.76				
M	Mean	10.85	10.41	0.440	0.901	0.488	NS
	SD	3.50	2.74				
N	Mean	10.65	10.55	0.100	0.918	0.109	NS
	SD	3.64	2.71				

contd...

Personality Factor	Mean/ SD	LSES N=26	HSES N=22	MD	SE	t	Inference
O	Mean	15.35	14.05	1.300	1.030	1.262	NS
	SD	3.43	3.66				
Q <sub>1</sub>	Mean	9.69	9.64	0.050	0.960	0.052	NS
	SD	3.31	3.32				
Q <sub>2</sub>	Mean	11.04	9.86	1.180	0.989	1.193	NS
	SD	3.74	3.11				
Q <sub>3</sub>	Mean	10.73	12.00	1.270	0.699	1.818	NS
	SD	2.46	2.37				
Q <sub>4</sub>	Mean	13.88	13.14	0.740	1.121	0.660	NS
	SD	3.10	4.42				
PSAT	Mean	27.42	30.68	3.260	1.036	3.146	P<.01
	SD	4.62	2.36				

The analysis as shown in Table 5.27 indicates that the low and high SES group of gifted-creative (GC) do not show any statistically significant difference with respect to Personality Factors. However, in Problem Solving Ability, it is observed that the two groups differed significantly at .01 level. The mean score of the high SES group is found greater than the low SES group. The result signifies that among the gifted-creative (GC) students, the students coming from high SES group have better problem solving ability as compared to their low SES counterparts.

SECTION XII : INTERCORRELATIONS OF SCORES OBTAINED BY GIFTED COLLEGE STUDENTS ON VARIABLES INTELLIGENCE, CREATIVITY, PROBLEM SOLVING ABILITY AND THE 16 PERSONALITY FACTORS

Intercorrelation of the scores of the gifted college students (N=81) on variables intelligence (SPM), creativity, problem solving ability test (PSAT), and the 16 personality factors (16 PF) were worked out. The coefficient of correlation obtained on Pearson Product Moment Method are stated in Table 5.28.

Table 5.28  
Intercorrelation of the scores of gifted students (N=81) on variable Intelligence, Creativity, Problem Solving Ability Test and 16 Personality Factors

	SPM
SPM	1.000
Creativity	.1492
PSAT	.1773
A	.0371
B	- .0122
C	- .2041
E	.0740
F	- .0125
G	- .0030
H	.0736
I	- .0229
L	.0658
M	.0069
N	- .0184
O	- .0908
Q <sub>1</sub>	- .0071
Q <sub>2</sub>	.2915**
Q <sub>3</sub>	- .1900
Q <sub>4</sub>	.1705

Note : \* - Significant at .05 level  
\*\* - Significant at .01 level.

The scores of the gifted students on variable intelligence and creativity showed very low but positive correlation. The gifted students showed low positive correlation between intelligence and problem solving ability. Low positive correlations were obtained between intelligence and personality factors A, E, H, L, M, and Q<sub>4</sub>. The correlation is positive and significant at .01 level for factor Q<sub>2</sub> indicating that self sufficiency traits of personality is a trait that very much relates to the gifted students. However, the correlation is found to be very low. The correlations were low but negative for intelligence and personality factors B, C, F, G, I, N, O, Q<sub>1</sub>, Q<sub>3</sub>.

**SECTION XIII : INTERCORRELATIONS OF SCORES OBTAINED BY CREATIVE COLLEGE STUDENTS ON VARIABLES INTELLIGENCE, CREATIVITY, PROBLEM SOLVING ABILITY AND THE 16 PERSONALITY FACTORS**

Intercorrelation of the scores on variables intelligence (SPM), creativity, problem solving ability test (PSAT), and the 16 personality factors (16 PF) of the creative college students (N=93) were calculated following Pearson Product Moment Method. The results are given in Table 5.29.

**Table 5.29**  
**Intercorrelation of the scores of creative students (N=93) on**  
**variable Intelligence, Creativity, Problem Solving Ability**  
**Test and 16 Personality Factors**

	Creativity
SPM	.3360**
Creativity	1.0000
PSAT	.2003
A	- .0338
B	.1763
C	.1849
E	.0052
F	.0770
G	- .0199
H	.0527
I	- .0534
L	- .0121
M	- .0038
N	- .0823
O	.0115
Q <sub>1</sub>	.1409
Q <sub>2</sub>	- .0049
Q <sub>3</sub>	- .0816
Q <sub>4</sub>	- .1756

Note : \* - Significant at .05 level.  
 \*\* - Significant at .01 level.

The analysis revealed that creative college students obtained low but positive and significant correlation between the creativity and intelligence scores (.01 level) indicating that intelligence is a quality possessed by creative students. The problem solving ability was found to have low positive correlation with creativity.

The personality factors A, G, I, L, M, N, Q<sub>2</sub>, Q<sub>3</sub>, Q<sub>4</sub> were found to be negatively correlated while the other factors such as B, C, E, F, H, O, and Q<sub>1</sub> were found to be positively

correlated. However, it is to be mentioned that the correlations were very low and insignificant in almost all the cases.

**SECTION XIV : INTERCORRELATIONS OF SCORES OBTAINED BY GIFTED-CREATIVE COLLEGE STUDENTS ON VARIABLES INTELLIGENCE, CREATIVITY, PROBLEM SOLVING ABILITY AND THE 16 PERSONALITY FACTORS**

The scores of gifted-creative (GC) group of students (N=48) on variable intelligence, creativity, problem solving ability test, and the 16 personality factors (16 PF) were inter-correlated using Pearson Product Moment Method. The coefficient of correlation obtained for the analysis are given in Table 5.30.

**Table 5.30**  
**Intercorrelation of the scores of gifted-creative students (N=48) on variables Intelligence, Creativity, Problem Solving Ability Test and 16 Personality Factors**

	SPM	Creativity	PSAT
SPM	1.000		
Creativity	.0407	1.000	
PSAT	.4235**	.4195**	1.0000
A	-.1859	-.3079*	-.1202
B	.2297	.1150	.3144*
C	.0293	-.0371	-.0753
E	.1606	.0162	.1317
F	-.2255	-.0154	-.0724
G	-.3067*	.1313	.1228
H	-.1161	.0514	.0240
I	.2488	.0263	.1297
L	-.1028	.2084	.0690
M	.0517	.0110	-.1142
N	.1319	.2088	.2266
O	-.0294	.0047	.0637
Q <sub>1</sub>	.3139*	.2723	.3232*
Q <sub>2</sub>	.1024	-.1429	-.1247
Q <sub>3</sub>	-.0141	.2568	.1369
Q <sub>4</sub>	-.0398	-.0641	-.2567

\* - Significant at .05 level  
 \*\* - Significant at .01 level

The results revealed that the gifted-creative (GC) group showed negligibly low but positive correlation between intelligence and creativity. The problem solving ability was found positively and substantially correlated to both intelligence and creativity and is significant at .01 level. This indicates that the problem solving ability is a quality that relates to intelligence and creativity of the gifted-creative (GC) students. Scrutiny of correlation between intelligence and personality factors showed low but positive correlation in the case of personality factors B,C,E,I,M,N, and Q<sub>2</sub> and for factor Q<sub>1</sub> it was positive and significant at .05 level which indicates that the experimenting traits of personality is a trait that relates to intelligence of the gifted-creative (GC) groups. The results also revealed that the gifted-creative (GC) group showed negative low correlation between intelligence and creativity for factors A,F,H,L,O,Q<sub>3</sub> and Q<sub>4</sub>. The coefficient of correlation was negative and significant at .05 level for factor G which indicates that expedient traits of personality is related to the intelligence of the gifted-creative (GC) group.

The creativity scores of the gifted-creative (GC) group showed positive correlations with personality factors B,E,G,H,I,L,M,N,O,Q<sub>1</sub> and Q<sub>3</sub> and negative correlations for factors C,F,Q<sub>2</sub> and Q<sub>4</sub> and is significant at .05 level for factor A, indicating that reservedness is a personality trait that relates with creativity of the gifted-creative (GC) group.

Positive correlation were obtained between problem solving ability test and personality factors such as E,G,H,I,L,N,O,Q<sub>1</sub> and Q<sub>3</sub> and it was found significant at .05 level for factors B and Q<sub>1</sub>. This indicates that more intelligent and experimenting traits of personality relates significantly with problem solving ability of the gifted- creative (GC) group. However, there was negative low correlation between problem solving ability test and personality factors A,C,F,M,Q<sub>2</sub> and Q<sub>4</sub>.

**SECTION XV : INTERCORRELATIONS OF SCORES OBTAINED BY 600 STUDENTS ON VARIABLES INTELLIGENCE, CREATIVITY, PROBLEM SOLVING ABILITY AND THE 16 PERSONALITY FACTORS**

The scores of the 600 students on the variables intelligence, creativity, problem solving ability, and the sixteen factors of personality were correlated applying Pearson Product Moment Method. The intercorrelations were done with a view to find out the relationship between the main variables under study. The coefficient of correlations obtained for the analysis are shown in Table 5.31.

Table 5.31  
Intercorrelation of the scores of the students (N=600) on  
variable Intelligence, Creativity, Problem Solving Ability  
Test and 16 Personality Factors

	SPM	Creativity	PSAT
SPM	1.000		
Creativity	.2639**	1.000	
PSAT	.5722**	.5153**	1.0000
A	-.1223**	-.0916*	-.0859**
B	.2027**	.1135*	.2126**
C	.1425**	.1843**	.1074*
E	.1094*	.2021**	.0720
F	-.0640	.0254	-.0519
G	-.0261	-.1001*	-.0639
H	.0439	.2238**	.0881*
I	-.0087	-.0602	.0458
L	.0228	.0544	.0030
M	-.0508	.0813	-.1029*
N	-.0002	-.0738	.0278**
O	-.1201**	-.1509**	-.1236**
Q <sub>1</sub>	-.0602	.1154**	.0138
Q <sub>2</sub>	.1149*	.0882*	.0851
Q <sub>3</sub>	-.0299	-.0758	.0132
Q <sub>4</sub>	-.0215	-.0656	-.0249

\* - Significant at .05 level

\*\* - Significant at .01 level

The data in Table 5.31 reveals that there is low positive correlation between the intelligence and creativity of the students which is significant at .01 level indicating that creativity is related to Intelligence among the college students. This result is in agreement with the findings of a number of researches conducted in India and abroad (Mehdi 1977<sup>19</sup>, Vernon 1967<sup>20</sup>, Perry 1966<sup>21</sup>).

The students problem solving ability test score is found positively correlated with the intelligence and creativity.

The correlation is substantial and significant at .01 level indicating that the problem solving ability is a quality related to intelligence and creativity. The intelligence was found positively correlated with personality factors H and L, but the correlation was low. Low positive correlation was also found between intelligence and personality factors B and C at .01 level of significance and personality factors E and Q<sub>2</sub> at .05 level of significance, indicating that personality traits like more intelligent, emotionally stable, assertive and self-sufficient are related to the intelligence of the students. However, the correlation were very low and the coefficient of correlations ranged from .2027 to .0228. The intelligence was found negatively correlated with personality factors F, G, I, M, N, Q<sub>1</sub>, Q<sub>3</sub> and Q<sub>4</sub>. Negative and significant correlation was found between intelligence and personality factors A and O at .01 level indicating that personality traits like Reserved and Placid is negatively related to intelligence. The coefficient of correlations were low and ranged between -.1223 and -.0002.

The creativity score of the students was found to be positively correlated with personality factors F, L, M but it is found to be very low. Low positive and significant correlation was also found between creativity score and personality factors C, E, H and Q<sub>1</sub> at .01 level and in personality factors B and Q<sub>2</sub> at .05 level indicating that the personality traits such as emotionally stable, assertive, venturesome, experimenting, more

intelligent and self-sufficient are the traits that is related to the creativity score of the students. Low negative correlations were obtained for creativity and personality factors I, N, Q<sub>3</sub> and Q<sub>4</sub>. However, low negative but significant correlation were obtained for creativity and personality factor O at .01 level and in personality factors A and G at .05 level indicating that the personality traits such as placid, reserved and expedient are related to creativity score of the students.

The problem solving ability test score of the students were found to be low but positive in the case of personality factors E, I, L, N, Q<sub>1</sub>, Q<sub>2</sub> and Q<sub>3</sub>. The correlation of problem solving ability test score of the students were low but positive and significant for personality factor B at .01 level and for personality factor C and H at .05 level indicating that the personality traits like more intelligent, emotionally stable and venturesome are related to the problem solving ability test score. However, the correlation was low but negative in the case of personality factors A, F, G and Q<sub>4</sub>. It was also revealed that there was low negative and significant correlation between problem solving ability test score and personality factors such as O at .01 level and personality factors M at .05 level indicating that the personality traits like placid and practical are negatively related to the problem solving ability test score of the students.

## CONCLUSIONS OF THE STUDY

The research realized all the objectives proposed and also the hypothesis advanced for the study. The identification of intellectually gifted and creative college students has been done with the standard techniques. The intellectually gifted included 81 college students while the creative group contained 93 students. The research also recognized 48 intellectually superior cum creative group of students known as the gifted-creative group. There are 45 males and 36 females among the gifted, 53 males and 40 females among the creatives and 29 males and 19 females among the gifted-creative group. There are 12 science, 28 commerce and 41 arts students among the gifted, 18 science, 36 commerce and 39 arts students among the creatives and 20 science, 24 commerce and 4 arts students among the gifted-creative group. There were 26 first born, 39 middle born and 16 last born among the gifted, 24 first born, 48 middle born, 20 last born and one is an only child among the creatives and 20 first born, 24 middle born and 4 last born among the gifted-creative group. There were 44 low SES and 37 high SES gifted students, 71 low and 22 high SES creative students and 26 low and 22 high SES gifted-creative students. Among the gifted, 15 students passed in Ist division, 31 in 2nd division, 33 in 3rd division and 2 in supplement. Among the creative, 13 students passed in Ist division, 39 in 2nd division, 39 in 3rd division and 2 in supplement. Among the gifted-creative group, 20 students passed in Ist division, 13 in

2nd division, 14 in 3rd division and one in supplement. 3.14 is the mean score of social and cultural participation among the gifted, 3.92 among the creatives and 3.71 among the gifted-creative group. The mean score of talents and contribution was 2.06 for the gifted, 2.78 for the creatives and 1.85 for the gifted-creative group.

The comparison of personality characteristics of the gifted and creative revealed that the personality factors B, F, H, M and  $Q_1$  differed significantly. The problem solving ability of the two groups showed a statistically significant difference. The gifted were more intelligent, sober, shy, practical and conservative, whereas creatives are less intelligent, happy go lucky, venturesome, imaginative and experimenting. The gifted have better problem solving ability than the creatives.

The gifted and the gifted-creative group of college students showed a significant difference in the personality characteristic H, M and also in the problem solving ability. The gifted were more shy and practical while the gifted-creative were more venturesome and imaginative. The gifted-creatives were also better problem solvers compared to the gifted group.

The creative and the gifted-creative students differed significantly in their personality characteristic B and F and also in their problem solving ability. The creatives were less

intelligent and happy-go-lucky while the gifted-creative were more intelligent and sober. The gifted-creative were also better problem solvers compared to the creative group.

The comparison of personality characteristic of male and female revealed that the personality factor A, C, E, F, H, I, M, N, O, Q<sub>1</sub> and Q<sub>4</sub> differed significantly. The problem solving ability and the creativity of the two groups showed a statistically significant difference. The males were more emotionally stable, assertive, happy-go-lucky, venturesome, imaginative and experimenting. Males were also better problem solvers and more creative than the females. The females on the other hand were more out going, tender-minded, shrewd, apprehensive and tense.

The science students and the commerce students differed significantly in their personality factors B and I and also in their problem solving ability, intelligence and creative abilities. The science students were more intelligent and tender-minded whereas the commerce students were less intelligent and tough-minded. The science students were also better problem solvers, more intelligent and possessed better creative ability than the commerce students.

The comparison of personality characteristic of science and arts students revealed that the personality factor A, B, C,

E, G, H, M, N, O, Q<sub>2</sub> and Q<sub>4</sub> differed significantly. The problem solving ability, intelligence and creativity of the two groups also showed a statistically significant difference. The science students were more intelligent, emotionally stable, assertive, venturesome, imaginative apprehensive and self-sufficient, while the arts students were more out going, conscientious, shrewd, and tense. The science students have better problem solving ability, higher intelligence and were more creative as compared to the arts students.

The commerce students and the arts students differed significantly in their personality factor C, E, G, H, I, M, N, O, Q<sub>1</sub>, Q<sub>2</sub> and Q<sub>4</sub>. The problem solving ability, intelligence and creativity of the two groups also showed a statistically significant difference. The commerce students were more emotionally stable, assertive, venturesome, imaginative apprehensive, experimenting and self-sufficient whereas the arts students were more conscientious, tender-minded, shrewd and tense. The commerce students were also better problem solvers, have higher intelligence and were more creative as compared to the arts students.

The comparison of personality characteristic between the low SES and high SES group of the gifted revealed that the personality factor G, and I differed significantly. The low SES

group of gifted students were more conscientious and tough-minded while the high SES group were more expedient and tender-minded.

The low SES and the high SES group of creative students showed a significant difference in the personality characteristic A and I and also in the problem solving ability. The low SES creative students were more reserved and tough minded whereas the high SES creative students were more outgoing and tender-minded. The high SES creative students also have better problem solving ability as compared to the low SES creative students.

The low SES gifted-creative group and the high SES gifted-creative group did not differ significantly in the 16 personality factors. However, The high SES gifted-creative group are better problem solvers than the low SES gifted-creative group.

Intercorrelation of the scores of gifted on different variables showed low, positive and significant correlation between intelligence and personality factor Q<sub>2</sub> indicating that self-sufficiency trait is a trait that relates to the gifted students.

Intercorrelation of the scores of creative college students on different variables showed low, positive and significant correlation between creativity and intelligence

indicating that intelligence is a quality possessed by creative students.

The problem solving ability of the gifted-creative was positively and substantially correlated to both intelligence and creativity indicating that problem solving ability is a quality that relates to intelligence and creativity of the gifted-creative students. The coefficient of correlation was positive and significant for factor  $Q_1$  which indicates that experimenting traits of personality relates to intelligence of the gifted-creative group. There was negative significant correlation for factor G indicating that expedient traits of personality is related to intelligence of the gifted-creative group. The creativity scores of the gifted-creative group is negative and significant for factor A indicating that reservedness is a personality trait that relates with creativity of the gifted-creative group. Positive correlation between problem solving ability and personality factors B and  $Q_1$  of the gifted-creative was significant which indicates that more intelligent and experimenting trait of personality relates with problem solving ability of the gifted-creative group.

Intercorrelation of the scores of college students on different variables showed low, positive and significant correlation between intelligence and creativity, indicating that creativity is related to intelligence among the college students.

The problem solving ability of the college students is positively and significantly correlated with intelligence and creativity indicating that problem solving ability is a quality that relates to intelligence and creativity of the college students. There was low positive and significant correlation between intelligence and personality factors B, C, E and Q<sub>2</sub> indicating that personality traits like more intelligent, emotionally stable, assertive and self-sufficient are related to the intelligence score of the college students. There was low negative and significant correlation between intelligence and personality factors A and O indicating that personality traits like reservedness and placid is negatively related to intelligence.

There was low positive and significant correlation between creativity and personality factors C, B, E, H, Q<sub>1</sub> and Q<sub>2</sub> indicating that the personality traits such as emotionally stable, assertive, venturesome, experimenting, more intelligent and self-sufficient are the traits that is related to the creativity score of the college students. There was low negative but significant correlation between creativity and personality factors A, G, and O which indicates that personality traits like placid, reserved and expedient are related to creativity score of the college students. There was low positive and significant correlation between problem solving ability score and personality factors B, C, and H which indicates that personality traits like more intelligent, emotionally stable and venturesome are related

to the problem solving ability score. There was low negative and significant correlation between problem solving ability score and personality factors such as M and O indicating that the personality traits like placid and practical are negatively related to problem solving ability score of the college students.

## DISCUSSION

The results of the present study reveal that the gifted were more intelligent, sober, shy, practical and conservative whereas the creatives were more happy-go-lucky, venturesome, impulsive, expedient and less intelligent than the gifted. Since there is no previous reference available on comparing the gifted and the creative on the Cattell's 16 personality factors and problem solving ability, no studies can be cited here, either in support or in contradiction to the results obtained in the present study. However, a number of studies have been conducted on the characteristic of gifted or characteristic of creative individuals. Kirk (1970)<sup>22</sup>, Bonsall and Stefflre (1955)<sup>23</sup>, Getzels and Jackson (1958<sup>24</sup>, 1959<sup>25</sup>, 1960<sup>26</sup>, 1961<sup>27</sup>), Sharma (1975-76)<sup>28</sup>, Khiangte (1987)<sup>29</sup>, Cashdan and Welsh (1966)<sup>30</sup>, Parloff and Datta (1965)<sup>31</sup>. The findings of these studies agree with the personality characteristic of the gifted and personality characteristic of the creative found in the present study.

The results also reveal that males have higher creative ability than the females. This finding is supported by research findings of Kelley (1965)<sup>32</sup>, Middents (1968)<sup>33</sup> who found that males excell the females in creativity. The present study also reveals that males have better problem solving ability as compared to the females. The reason for male superiority over the females in creativity and problem solving ability can be attributed to the past culture and social life of the Mizo society. Mizo society is patriarchal, therefore, women in the past had no status in the society. In a male dominated Mizo society, the position of women used to be considered lower than their male counterparts, while the women occupied a place of honour within the family, she had no place in the socio-political life of the Mizos. Women were neither expected to offer any guidance or direction for the development of the society, nor did they themselves look for any prominent place than what they enjoyed in their society. Due to social change as a result of conversion to Christianity and the spread of education, Mizo women now-a-days begin to enjoy equal rights with man in all social and political spheres. In spite of these changes, the past culture and social life of the Mizo society may still have a bearing on the life of the Mizo people, resulting in lower problem solving ability and less creativeness on the part of the female college students in Mizoram.

The result also reveals that science students are more creative, and have higher intellectual ability than the commerce or arts students. The arts students are more inferior in intelligence and creative ability than the science or commerce students. A number of studies agree with this findings. Singh (1982)<sup>34</sup>, Mishra (1978)<sup>35</sup>, Usmani (1981)<sup>36</sup>, Srivastava (1977)<sup>37</sup>, Passi (1982)<sup>38</sup>, Sharma (1982)<sup>39</sup>, Sinha (1967)<sup>40</sup> and Chatterji (1983)<sup>41</sup>. The study also reveals that science students have better problem solving ability than the commerce or arts students. The reason for the superiority of science students to the commerce or arts students in creativity, intelligence and problem solving ability could be that in Mizoram, most of the bright students who passed HSLC in first or second division would most probably take up science subject, and those students who passed HSLC in third division or in supplement would hardly get seats for science course in the college. Therefore, the brighter students and the more intelligent students would take up science course, while the less intelligent students would take up arts course, resulting in science students being more creative, having higher intelligence and better problem solving ability than the commerce or arts students.

The study also reveals that the creatives and gifted-creative who come from high socio-economic status have better problem solving ability than their low socio-economic status counterparts. Researchers like Rossman (1931)<sup>42</sup>, Mac Kinnon

(1965)<sup>43</sup> and Solomon (1968)<sup>44</sup> also found similar findings. Students from higher socio-economic status background on the whole seem to have better educational facilities at home, get more reading material and more toys, especially of intellectual as well as creative nature. Thus, the environment is more favourable to them for the development of their creativity and other capacities. This may be the reason for the high socio-economic status group to have better problem solving ability than the low socio-economic status group among the creative and gifted-creative college students.

#### **TENABILITY OF HYPOTHESES**

The hypotheses with respect to 16 personality factors and problem solving ability advanced in the present research were tested with the help of standard statistical techniques from the data collected for the study, and the results are stated below.

Hypotheses 1-16 stated that there is no significant difference between the gifted and creative students with regard to the 16 personality characteristics. The null hypothesis with respect to comparison of personality characteristic in the case of Factor B (hypothesis '2' less intelligent - more intelligent), factor F (hypothesis '5' sober-happy go lucky), Factor H (hypothesis '7' shy - venturesome), Factor M (hypothesis '10' practical - imaginative) and Factor Q<sub>1</sub> (hypothesis '13'

conservative - experimenting) were rejected as statistical test returned 't' values which were significant at .05 or .01 levels and the groups differed significantly. However, in the case of the other 11 personality factors A, C, E, G, I, L, N, O, Q<sub>2</sub>, Q<sub>3</sub> and Q<sub>4</sub>, the null hypotheses cannot be rejected as the test did not yield any significant difference.

Hypothesis 17 stated that there is no significant difference in the problem solving ability of the gifted and creative students. This assumption was rejected as the 't' test returned statistically significant values (.05 level) and the two groups differed significantly in their problem solving ability.

Hypothesis 18 in null format stating that there is no significant difference in personality and problem solving ability of students grouped on the basis of gender, course of studies and socio-economic status were tested with the help of standard statistical techniques. The results are as follows.

The null hypothesis with respect to comparison of personality characteristic and problem solving ability between male and female in case of personality factor A (reserved-out going), factor C (affected by feeling - emotionally stable), factor E (humble - assertive), factor F (sober - happy-go-lucky), factor H (shy - timid), factor I (tough-minded - tender-minded), factor M (practical - imaginative), factor N (forth-right -

shrewd), factor O (self assured - apprehensive), factor Q<sub>1</sub> (conservative - experimenting), factor Q<sub>4</sub> (relaxed - tense) and problem solving ability were rejected as statistical test returned significant 't' values which is significant at .05 or .01 levels and the groups differed significantly. However, in the case of the other 5 personality factors B, G, L, Q<sub>2</sub> and Q<sub>3</sub>, the null hypothesis cannot be rejected as the test did not yield any significant difference.

With respect to comparison of personality factors and problem solving ability between science and commerce students in case of personality factor B (dull - bright), factor I (tough-minded - tender-minded) and problem solving ability, the null hypothesis were rejected as statistical test returned significant 't' values which is significant at .05 or .01 levels and the groups differed significantly. In the case of the other 14 personality factors A, C, E, F, G, H, L, M, N, O, Q<sub>1</sub>, Q<sub>2</sub>, Q<sub>3</sub> and Q<sub>4</sub>, the null hypothesis cannot be rejected as the test did not yield any significant difference.

In comparing the personality characteristic and problem solving ability between science and arts students, the null hypothesis were rejected in case of personality factor A (reserved-out going), factor B (dull -bright), factor C (affected by feelings - emotionally stable), factor E (humble - assertive), factor G (expedient - conscientious), factor H (shy-venturesome),

factor M (practical - imaginative), factor N (forth-right - shrewd), factor O (self assured - apprehensive), factor Q<sub>2</sub> (group dependent - self-sufficient), factor Q<sub>4</sub> (relaxed - tense) and problem solving ability, as statistical test returned 't' values which are significant at .05 or .01 levels and the groups differed significantly. However, in the case of the other 5 personality factors F, I, L, Q<sub>1</sub> and Q<sub>3</sub>, the null hypothesis cannot be rejected as the test did not yield any significant difference.

Again, the null hypothesis with regard to comparison of personality factors and problem solving ability between commerce and arts students were rejected in the case of personality factor C (affected by feeling - emotionally stable), factor E (humble - assertive), factor G (expedient - conscientious), factor H (shy - venturesome), factor I (tough-minded - tender-minded), factor M (practical - imaginative), factor N (forth-right - shrewd), factor O (self assured - apprehensive), factor Q<sub>1</sub> (conservative - experimenting), factor Q<sub>2</sub> (group dependent - self-sufficient), factor Q<sub>4</sub> (relaxed - tense) and problem solving ability, as statistical test returned 't' values which are significant at .05 or .01 levels and the groups differed significantly. However, in the case of the other 5 personality factors A, B, F, L, and Q<sub>3</sub>, the null hypothesis cannot be rejected as the test did not yield any significant difference.

With respect to comparison of personality characteristic and problem solving ability between low and high socio-economic status gifted students also, the null hypothesis were rejected in case of personality factor G (expedient - conscientious) and factor I (tough-minded - tender-minded) as the 't' test returned statistically significant values (.05 levels) and the two groups differed significantly. In the case of the other 14 personality factors A, B, C, E, F, H, L, M, N, O, Q<sub>1</sub>, Q<sub>2</sub>, Q<sub>3</sub>, Q<sub>4</sub> and problem solving ability, the null hypothesis cannot be rejected as the test did not yield any significant difference.

The null hypothesis with respect to comparison of personality characteristic and problem solving ability between low and high socio-economic status creative students were rejected in the case of personality factor A (reserved-out going), factor I (tough-minded - tender-minded), and problem solving ability, as statistical test returned 't' values which are significant at .05 levels and the two groups differed significantly. However, in the case of the other 14 personality factors B, C, E, F, G, H, L, M, N, O, Q<sub>1</sub> Q<sub>2</sub>, Q<sub>3</sub> and Q<sub>4</sub>, the null hypothesis cannot be rejected as the test did not yield any significant difference.

When personality characteristic and problem solving ability between low and high gifted-creative students were

compared, the null hypothesis was rejected in case of problem solving ability, as the 't' test returned statistically significant values (.01 level) therefore, the two groups differed significantly. However, in the case of all the 16 personality factors, the null hypothesis cannot be rejected as the test did not yield any significant difference.

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## CHAPTER VI

### SUMMARY AND CONCLUSION

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## CHAPTER VI

### SUMMARY AND CONCLUSION

#### INTRODUCTION

In the past, people have always been interested in men and women who have superior ability. However, one finds that in many societies because of socio-cultural conditions, talents have remained anonymous in spite of interest in such people. Now, of course, one finds practically all societies greatly concerned with identifying talent and providing opportunities for its upward mobility. The national planners in India, have also emphasized the development of human resources through the cultivation of talents through special educational programmes (National Education Policy, 1986). It has rightly pointed that the talent needs to be assessed, nursed and nurtured through effective educational endeavours. The education Commission (1964-66) has also observed that the talent has to be identified early and allowed to grow in the best atmosphere and under the best teachers. However, not much attention seems to have been paid to the education of the gifted and creatives in India.

The exceptionals, with superior intellectual and creative abilities are badly neglected. The contribution of the gifted and creative is highly significant to the growth of the society. They create new horizons and set new standards in

science, technology, literature, fine arts, industry, social leadership, and in other walks of life. No sooner does society become devoid of nature's gift of talents it would start to stagnate and ultimately perish (Mohsin, 1963). They can make original contributions in their area of work and contribute to the society's most precious resources.

Arnold Toyanbee (1964) considered the creative and gifted as society's great asset and stated that they have the type of talent which can make history, through reshaping man's world. It has been estimated that approximately 200 out of every 1000 children are gifted and can contribute significantly to the welfare of the society. But, as the gifted children are neglected in schools and colleges, held on par with the average child, their talents are lost, often irrevocably, both to themselves and to society. Therefore, their talent should be identified in time, cultivated and utilized for the good of society.

#### **NEED FOR AND SIGNIFICANCE OF THE STUDY**

Understanding the personality of the pupil is extremely indispensable for any teacher entrusted with the education of any type of children whatsoever. Such an understanding is particularly indispensable for a teacher of exceptional children obviously because their individual differences are all the more sharply drawn in certain significant respects. With a complete

understanding of the individual personality of the talented child his education becomes a relatively smooth, progressive and even pleasant process.

Until the late nineteenth century, very few systematic studies have been done on the gifted and creative students. In India, not much work seems to have been done in the area of giftedness and creativity. In a tribal and remote area like Mizoram, there is only one investigation undertaken in the field of special education. The study by Varparhi Khiangte in 1987 is mainly meant to develop a creativity test. This indicates the necessity of undertaking research in this field. Also the education of the exceptional children has not been paid much attention. Therefore, the present study has been designed to identify the gifted and the creative college students in Mizoram. The personality characteristics and the problem solving ability of the gifted and the creative has been studied. Personality and problem solving ability differences with regard to gender, course of study and differences in socio-economic status of the gifted and creative are also analyzed.

#### **STATEMENT OF THE PROBLEM**

"A Study of the Gifted and Creative College Students in Mizoram in Relation to their Personality and Problem Solving Ability".

## OBJECTIVES OF THE STUDY

The major objectives of the present study are :

1. To identify the intellectually gifted students from the colleges of Mizoram.
2. To identify highly creative college students.
3. To study the personality characteristics of the gifted and creative college students.
4. To study the problem solving ability of the gifted and creative college students.
5. To find out the existing provisions for the education of the gifted and make suggestions for special education schemes in the state of Mizoram.

## HYPOTHESES

1. There is no significant difference between the gifted and creative college students with respect to 16 personality factors.

2. There is no significant difference between the gifted and creative college students in their problem solving ability.
3. There is no significant difference in personality, problem solving ability of students grouped on the basis of gender, course of study and socio-economic status (SES).
4. There is a constellation of personality characteristics and problem solving ability of the students belonging to groups such as gifted and creative.

#### **DEFINITION OF TERMS USED**

##### **Giftedness**

Paul Witty (1958) defines giftedness as remarkable performance in any potentially valuable human endeavour. For the present research, the term gifted is taken to mean the students with potentially high intellectual ability and is measured by the standard Progressive matrices by Raven (1992).

##### **Creativity**

Creativity is taken as a divergent thinking process enabling the pupils for creative outputs (novel and useful) and measured through verbal and non-verbal creativity tests on four primary traits - fluency, flexibility, originality and elaboration.

## Personality

Personality is more or less stable and enduring organization of person's character, temperament, intellect and physique which determine his unique adjustment to the environment (Eysenck, 1970). It is that which permits a prediction of what a person will do in a given situation (Cattell, 1972). For the present research, the personality characteristics are defined in terms of the sixteen personality traits and measured by the 16 PF questionnaire (Cattell and Cattell, 1979). The 16 personality factors are :

1. Factor A Reserved-outgoing
2. Factor B Dull-bright
3. Factor C Affected by feelings-emotionally stable
4. Factor E Humble-assertive
5. Factor F Sober-happy go lucky
6. Factor G Expedient-conscientious
7. Factor H Shy-venturesome
8. Factor I Tough minded-tender minded
9. Factor L Trusting-suspicious
10. Factor M Practical-imaginative
11. Factor N Forthright-astute
12. Factor O Self assured-apprehensive
13. Factor Q<sub>1</sub> Conservative-experimenting
14. Factor Q<sub>2</sub> Group dependent-self sufficient

15. Factor Q<sub>3</sub> Undisciplined self conflict-controlled
16. Factor Q<sub>4</sub> Relaxed-tense.

### **Problem Solving Ability**

The skill of the students in understanding and analyzing a problem and applying the scientific knowledge and method to solve them is designated as problem solving ability in the present study, and is measured by a Problem Solving Ability Test (PSAT).

### **SAMPLE**

The sample for the study consisted of 600 students (286 males and 314 females) selected at random from Pre-university classes of seven colleges in Mizoram.

### **TOOLS**

1. Standard Progressive Matrices (J.C. Raven, 1992).
2. 16 PF Questionnaire (Cattell and Cattell, 1979).
3. Creativity Test (Khangte, 1987).
4. Problem Solving Ability Test (Darchhingpuii, 1988).

5. Socio-economic Status Index (Lalrinkimi, 1988).
6. Biographical Inventory devised by the investigator for the study. The inventory contains items to elicit information on personal and social characteristics such as students age, sex, course of study, locale, parents education, parents occupation and income, birth order, the students social and cultural participation and their creative talents.

#### COLLECTION OF DATA

For the present study the investigator collected the data from students of seven colleges of Mizoram during October-December, 1995. The investigator personally visited the colleges selected for the study. The tests were administered to the pre-university students after obtaining permission from the college authority. After establishing rapport with the students, the investigator obtained the responses in general data sheet. After that the 16 PF test was administered followed by Problem Solving Ability Test (PSAT). The students were given some rest and refreshments were provided. Then the creativity test was administered followed by the Standard Progressive Matrices (SPM) Test. The time taken to complete all the tests was about five hours. In all, these tests were administered to 600 P.U. students from the seven colleges from the three districts of Mizoram.

## ANALYSIS OF DATA

The data collected from the 600 students were tabulated after scoring the responses on intelligence, creativity, personality and problem solving ability tests using the standard scoring procedures. Each student was assigned a serial number and their details regarding sex, age, parental education, parental occupation etc. were entered in the tabulation sheet. The socio-economic status of the students was found out following the socio-economic status index (Lalrinkimi, 1988).

The identification of the gifted and creative students were done following a standard criterion. The students who have the score above the 75th percentile in the ascending order in the intelligence and creativity tests were classified as the gifted and the creative. A 't' test was employed to compare the mean scores of the groups based on intelligence, creativity, sex, SES and locale. Pearson Product Moment method was applied to compute intercorrelations between the test scores of students in various groups. The coefficients of correlation were tested for significance by comparing the value with the table values for corresponding degrees of freedom and were interpreted following the scheme suggested by Garrett (1981).

## RESULTS

The following are the main findings of the study.

1. From 600 students, 81 students were identified as gifted (G), 93 students were identified as creatives (C). It was also found that there are 48 students who were gifted-creative (GC). This type of overlapping has also been observed by other researchers (Gakhar and Kaura, 1976; Getzels and Jackson, 1966). There are 45 gifted males and 36 gifted females, 53 creative males and 40 creative females and 29 gifted-creative males and 19 gifted-creative females. There were 12 science, 28 commerce and 41 arts gifted students, 18 science, 36 commerce and 39 arts creative students, and 20 science, 24 commerce and 4 arts gifted-creative students. There were also 44 low and 37 high socio-economic status (SES) gifted students, 71 low and 22 high SES creative students and 26 low and 22 high SES gifted-creative students.
2. The personality and the problem solving ability scores of the gifted and the creative students were compared applying the 't' test. The results revealed that the creatives had significantly higher mean scores than the gifted groups on personality factors F, H, and M at .05 level, and on factor Q<sub>1</sub>, at .01 level of significance. However, on factor B, the

mean personality score of the gifted is higher than the mean scores of the creative group, and were found significant at .05 level. Also, the gifted had significantly higher mean score than the creative group in the Problem Solving Ability Test (PSAT) at .05 level.

On the basis of the above findings, it may be concluded that the above five personality factors differentiated between the gifted and the creative students with regard to their personality characteristics. The creative students were found to be cheerful, active, talkative, frank, expressive, happy go lucky, and impulsive. They were also found to be socially bold, ready to try new things, spontaneous, uninhibited and venture-some. They were also unconcerned over everyday matters, self motivated, imaginatively creative and careless of practical matters. They are also skeptical and inquiring regarding ideas, either old or new and are inclined to experiment in life generally and more tolerant of inconvenience and change. The gifted students on the other hand, were found to be more intelligent, quick to grasp ideas, abstract in thinking and bright. The analysis of data on the problem solving ability test revealed that the gifted students were also superior in problem solving ability as compared to the creative students.

3. Personality scores and problem solving ability scores of the gifted and gifted-creative (GC) were compared and it was

found that the gifted-creative (GC) group differed significantly from the gifted group on personality factors H, and M and on the problem solving ability test at .01 level indicating the gifted-creative to be venturesome, and imaginative than the gifted (G) group. They were also found to be better problem solvers than the gifted group.

4. Personality scores and problem solving ability scores of the creative (C) and gifted-creative (GC) were compared. It was found that the two groups differed significantly on personality factors B and F and also on the problem solving ability test at .01 level, indicating that the gifted-creative (GC) students to be more intelligent, while the creative (C) groups are more serious as compared to their counterparts. It also reveals that the gifted-creative (GC) students have better problem solving ability than the creative (C) groups.
5. Sex differences in personality, problem solving ability, intelligence and creativity of the total sample were compared. It was found that the male students differed significantly from the females on personality factors A, C, E, F, H, I, M, N, O, Q<sub>1</sub> and Q<sub>4</sub> at .01 level. The male possessed higher mean score on factors C, E, F, H, M, and Q<sub>1</sub>, while the females scored higher than the males on factors A, I, N, O, and Q<sub>4</sub>. It was also found that the two

sexes differed significantly in problem solving ability test at .05 level and in creativity test at .01 level. However, there was no significant difference in the mean score of the standard progressive matrices between the two sexes. The results revealed that the males are more emotionally stable, assertive, happy go lucky, venturesome, imaginative and experimenting while the females are more outgoing, tender-minded, shrewd, apprehensive and controlled. The males are better problem solvers and are more creative than the females. However, there is no significant difference in the intelligence score of both the sexes.

6. Scores on personality, problem solving ability test (PSAT), standard progressive matrices (SPM) and creativity test of the science and commerce students were compared and it was found that there was significant difference in the personality factor B and I at .05 and .01 level respectively. There was also a significant difference in the mean score of the problem solving ability test, and creativity test at .05 level and in the standard progressive matrices score at .05 level indicating that the science students are more intelligent and tender-minded in their personality as compared to the commerce students. They were also found to possess better problem solving ability, higher intelligence and are more creative as compared to their counterparts (the commerce students).

7. The science and arts students were compared in their scores in personality, problem solving ability test (PSAT), standard progressive matrices (SPM) and creativity test. It was found that there was significant difference between the two groups in the personality factors A and N at .05 level and in the factors B, C, E, G, H, M, O, Q<sub>2</sub> and Q<sub>4</sub> at .01 level. There was also a significant difference between the two groups at .01 level in the problem solving ability test, standard progressive matrices and creativity scores. The findings indicate that the science students are more intelligent, emotionally mature, assertive, venturesome, imaginative, apprehensive and self-sufficient than the arts students, while the arts students are more outgoing, conscientious, shrewd, and tense as compared to the science students. The findings also reveal that the science students have better problem solving ability, and are more intelligent and more creative as compared to the arts students.

8. Commerce and arts students were compared in their scores in personality, problem solving ability test (PSAT), standard progressive matrices (SPM) and creativity test. It was found that there was significant difference in personality factors C, E, G, H, I, M, N, O, Q<sub>2</sub> and Q<sub>4</sub> at .01 level and in the factor Q<sub>1</sub> at .05 level between the two groups. It was also found that there was significant differences at .01 level

between the two groups in the problem solving ability test, standard progressive matrices and creativity test scores. The findings reveal that the commerce students are emotionally stable, assertive, venturesome, imaginative, apprehensive, experimenting, self-sufficient, while the arts students are conscientious, tender-minded, shrewd and tense. The findings also reveal that the commerce students are superior in problem solving ability, intelligence and creativity than the arts students.

9. The high socio-economic status (SES) group and the low socio-economic status (SES) group of the gifted students were compared in their personality and problem solving ability test (PSAT) scores. It was found that there was significant difference in the personality factor G and I at .01 level indicating that the low socio-economic status (SES) group were more conscientious and that the high socio-economic status (SES) group were more tender-minded as compared to their counterparts. The difference in the mean score of the problem solving ability test (PSAT) was not significant indicating there was no difference in the problem solving ability between these two groups.
10. Personality score and problem solving ability scores of students belonging to low and high socio-economic status groups among the creative students were compared. It was

found that they differed significantly in personality factor A and I at .05 level. Also, they differed significantly in their mean score of problem solving ability test (PSAT) at .05 level. This indicates that the high socio-economic status (SES) group were more outgoing and tender-minded as compared to the low socio-economic status (SES) group. They were also found to have better problem solving ability as compared to their counterparts (the low SES group).

11. The high and the low socio-economic status (SES) group of the gifted-creative (GC) were compared in their scores on personality and problem solving ability test (PSAT). It was found that there is no significant difference in the personality factors between these two groups. But the mean difference in the problem solving ability test (PSAT) scores were found to be significant at .01 level. This indicates the high socio-economic status (SES) group were better problem solvers as compared to the low socio-economic status (SES) group among the gifted-creative (GC) students.
12. The intercorrelation of the scores of the gifted students on variables intelligence, creativity, problem solving ability and 16 personality factors were worked out and it was found that there was low but positive correlation on variable intelligence and creativity, intelligence and problem solving ability, intelligence and personality factors A, E,

H, L, M, Q<sub>2</sub> and Q<sub>4</sub>. However, the correlations were low but negative for intelligence and personality factor B, C, F, G, I, N, O, Q<sub>1</sub> and Q<sub>3</sub>.

13. The intercorrelation of the scores on variable intelligence, creativity, problem solving ability and the 16 personality factors of the creative students were calculated. It was found that there was low but positive correlation between creativity and intelligence, creativity and problem solving ability, and creativity and personality factors such as B, C, E, F, H, O, and Q<sub>1</sub>, while other personality factors such as A, G, I, L, M, N, Q<sub>2</sub>, Q<sub>3</sub> and Q<sub>4</sub> were found to have low but negative correlation with creativity.
  
14. The scores of gifted-creative (GC) group of students on variable intelligence, creativity, problem solving ability and the 16 personality factors were intercorrelated and it was found that the group showed low positive correlation between intelligence and creativity. Problem solving ability was found positively and substantially correlated to both intelligence and creativity. There was low positive correlation between intelligence and personality factors B, C, E, I, M, N, Q<sub>1</sub> and Q<sub>2</sub>, whereas it was negative for factors A, G, H, L, O, Q<sub>3</sub> and Q<sub>4</sub>. There was positive but low correlation between creativity and personality factors B, E, G, H, I, L, M, N, O, Q<sub>1</sub> and Q<sub>3</sub> and correlations were

negative for factors A, C, F, Q<sub>2</sub> and Q<sub>4</sub>. Positive correlations were observed between problem solving ability and personality factors B, E, G, H, I, L, N, O, Q<sub>1</sub> and Q<sub>3</sub>. However, it was negative for factors A, C, F, M, Q<sub>2</sub> and Q<sub>4</sub>.

15. The scores of 600 students on variable intelligence, creativity, problem solving ability and 16 personality factor were correlated. It was found that there was low positive correlation between intelligence and creativity. Problem solving ability was found positively and substantially correlated with intelligence and creativity. Intelligence was found positively correlated with personality factors B, C, E, H, L, Q<sub>2</sub> and negatively correlated with personality factors A, F, G, I, M, N, O, Q<sub>1</sub>, Q<sub>3</sub> and Q<sub>4</sub>.

Creativity was found to be positively correlated with personality factors B, C, E, F, H, L, M, Q<sub>1</sub> and Q<sub>2</sub>, but it was found very low. Low negative correlations were found for creativity and personality factors A, G, I, N, O, Q<sub>3</sub> and Q<sub>4</sub>. Problem solving ability of the students were found to be low but positively correlated in the case of personality factors B, C, E, H, I, L, N, Q<sub>1</sub>, Q<sub>2</sub> and Q<sub>3</sub>. However, it was low and negatively correlated in the case of personality variables A, F, G, M, O and Q<sub>4</sub>.

## EXISTING PROVISION IN MIZORAM FOR THE EDUCATION OF THE GIFTED AND SOME SUGGESTIONS

In spite of the high literacy rate, Mizoram has failed to offer special education for the gifted. The state offers merit scholarship to students who perform well in primary, middle and high school leaving certificate examinations. The State Council of Educational Research and Training (SCERT) awards prize money and certificates to those outstanding students who do well in science and mathematics subjects in primary, middle and high school leaving certificate examinations.

A small amount of prize money is also granted to students of classes VIII and IX who has scored high marks in science and mathematics in their promotion examinations in the high schools in the state.

The Mizoram scholarship Board, under the Higher and technical Education Department also awards post matric merit scholarships to meritorious students in arts, commerce, science and technical streams for the pre-university, degree and post-graduate levels. Post matric merit science scholarship and book grants are awarded by the Mizoram Planning Department to selected B.Sc. and M.Sc. students.

Inspite of the fact that there are gifted students in the schools and colleges of Mizoram (the investigator has

identified a number of gifted college students). No special education for the gifted has been undertaken by the state of Mizoram. The gifted are not provided the opportunities for the realisation of their potentialities, as a result, their education remain neglected. This may be one of the main drawbacks of the educational system in Mizoram. Proper education arrangements for such students will have to be made. Few suggestions are offered by the investigator for special education schemes of the gifted in Mizoram.

1. A programme can be launch where the gifted students will be identified from the different schools/colleges of Mizoram so that suitable curriculum, method of teaching and evaluation techniques can be evolved for them under the common system of education.
2. Teachers should be oriented to know about the personality characteristic and problem solving ability of the gifted to help them in fostering the growth of their abstract thinking, intellectual potentiality and problem solving abilities.
3. The gifted child should be provided with all the necessary freedom and opportunities to develop their talents to the maximum.

4. The gifted can be provided with supplementary work and enriched curriculum which is superior and richer in content and practice than that for the average student.
5. Since the intellectually gifted tend to be more advanced in mental development and all round learning capacity, the gifted can be given double promotion or acceleration in their respective schools.
6. The gifted can be grouped together and put in one section or in a separate institution with special teachers and enriched curriculum.
7. The education of the gifted should guard against the development of cynicism, conceit, snobbery, defiance, introversion and other unhealthy and wasteful social habits in them.
8. The scholarship provided to meritorious students are too meagre to give them stimulation for advancement. Hence, they may be provided with substantial scholarship so that they can pursue on to higher learning of their interest.
9. The state should take initiatives in a number of activities for the college students such as competitions in literary, creative and scientific activities.

10. It is also proposed to establish higher educational institutions at the tertiary level on the lines of Navodaya Vidhyalaya at the secondary stage.
11. A special night known as "merit nite" can be arranged to honour the gifted students who have secured the top position in different board exams.

### **Suggestions for Further Research**

Beyond the problem of incorporating the findings of the present research into policies and programmes for the gifted and creative college students in the state of Mizoram, certain other related issues seem to be significant and as such are recommended for further investigation.

1. Development of intelligence test for the students of higher secondary stage among tribals in North Eastern Regions.
2. Curriculum innovation and enrichment for fostering creative potential at the higher secondary stage.
3. Home environment as related to the development of giftedness and creativity among the tribal students.
4. Socio-cultural correlates of creativity and giftedness with special reference to tribal pupils.

5. Parental perception and child rearing practices as related to the development of creativity and giftedness among the tribal students.
6. A comparative study of the personality factor patterns and problem solving ability among the gifted and backward children.
7. A study of the personality patterns of the creative and non-creative college students in North Eastern Region.

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APPENDIX I

Name \_\_\_\_\_

Class \_\_\_\_\_

C R E A T I V I T Y      T E S T

I N S T R U C T I O N S

1. The activities in this booklet have been given with the purpose to see how quickly and imaginatively you can think.
2. Answer each question carefully.
3. There are no right or wrong responses to any of the questions.
4. Each question will have an instruction.
5. Do not turn to the next question until you are told to do so.

# I. SEEING PROBLEMS TEST

Study carefully the instructions given below :

1. On page 3 of this booklet, you will find the names of three (3) objects. When these objects are used, they can give us a number of problems. Try to find out as many problems as you can think of.
2. You will be given 6 minutes to answer the question. You can use the time as you like; you are not bound to answer the first one first.
3. You will be told the time after every 2 minutes.
4. You are to begin only when told to commence.
5. Stop writing when it is announced "Time is Over".
6. Write your answer in the space provided, without disturbing your friends.
7. Clear any doubt you may have before the signal to start is given.
8. Follow the example given below.

## Example

Object : Electric Iron

Sl. No.	Problems
1.	Needs electricity
2.	Causes burns
3.	Damages clothes
4.	Rusts easily
5.	Is expensive
6.	.....
7.	.....
8.	.....

**1. Object : TV (Television)**

Sl. No.          Problem

Sl. No.

Problem

**2. Object : Gun**

Sl. No.          Problem

Sl. No.

Problem

**3. Object : Thatched House**

Sl. No.          Problem

Sl. No.

Problem

## II UNUSUAL USES TEST

Please read the following instruction carefully.

1. On the next page, you will find the names of common objects. These objects can be used in a number of ways. You may think of the size, shape and colour of the object in any way you wish. Try to write as many uses of the object as you can.
2. Try to think of uses that your friend may not have thought of. Be clear and precise in writing your answer.
3. The time given for answering the question is 12 minutes. You may use the time as you like. You will be informed about the time after every 4 minutes.
4. You are to begin only when told to commence.
5. Stop writing when it is announced "Time is Over".
6. Write your answer in the space provided, without disturbing your friends.
7. Clear any doubt that you may have before beginning.
8. Follow the example given below.

### Example

Object : Pencil

Sl. No.

Uses

- |    |                       |
|----|-----------------------|
| 1. | Use as a ruler        |
| 2. | Use to block holes    |
| 3. | Use to poke at things |
| 4. | Use as a baton        |
| 5. | Use as a scratcher    |
| 6. | .....                 |
| 7. | .....                 |
| 8. | .....                 |

**4. Object : Bottle gourd**

Sl. No.      Uses

Sl. No.

Uses

**5. Object : Mizo basket**

Sl. No.      Uses

Sl. No.

Uses

**6. Object : Bamboo**

Sl. No.      Uses

Sl. No.

Uses

### III CONSEQUENCES TEST

Please study the instructions given below carefully.

1. On the 7 are written three impossible statements that may never happen in real life. Suppose the events expressed in these statements happen to occur all of a sudden, please write down the consequences you envisage to follow these events.
2. The time given for the activity is 6 minutes. You may make use of the time as you like. You will be told about the time after every 2 minutes.
3. You are to begin only when the signal to start is given.
4. Stop writing when it is announced "Time is Over".
5. Clear any doubt you may have before you begin.
6. Follow the example given below.

#### Example

Sentence : If all people became dumb .....

Sl. No.	What may happen
1.	There will be less noise
2.	Everyone will learn sign-language
3.	There will be no singing
4.	Telephone will be useless
5.	No cheering crowds at games
6.	.....
7.	.....
8.	.....

**7. Sentences : If all the people started dancing .....**

Sl. No.	What may happen	Sl. No.	What may happen

**8. Sentences : If all the hills turned into plains .....**

Sl. No.	What may happen	Sl. No.	What may happen

**9. Sentences : If it did not rain at all .....**

Sl. No.	What may happen	Sl. No.	What may happen

#### IV. MAKING THINGS MORE INTERESTING AND USEFUL.

Please study the instruction very carefully.

1. If you had the magic drum of Maurawkela (Mizo folk-tale) which will give you anything you may wish as you beat the drum; how will you make the following toys more interesting and attractive?
2. Write down in the space provided, all that you will add to make the toys more attractive.
3. You will be given 10 minutes for this activity, and you will be informed about the time after every 5 minutes.
4. Start writing only when the signal to commence is given.
5. Stop writing when it is announced "Time is Over".
6. Try to think of answers that your friends may not have thought of.

---

10. Billy-cart

Sl. No.            How to make the billy-cart more interesting

---

---

11. Toy propeller

Sl. No.            How to make the toy-propeller more interesting

---

## V. SIMILARITIES TEST

Please study the instruction very carefully.

1. On page 11, two objects having various similarities and relations are given. Write down their similarities.
2. Try to think of and write as many peculiar connections as possible between the two objects.
3. The time given for this exercise is 8 minutes. You will be informed about the time after every 4 minutes.
4. You are to begin only when told to commence.
5. Clear any doubts you may have before answering.
6. Follow the example given below.

### Example

Bee-hive and office

Sl. No.	Similarities
1.	Both have a special house
2.	Both have workers
3.	Both have idlers
4.	Both have leader
5.	Both will not tolerate diturbance.
6.	.....
7.	.....
8.	.....

---

**12. Fish and Frog**

**Sl. No.            Similarities**

---

**Sl. No.            Similarities**

---

---

**13. Flower and Tree**

**Sl. No.            Similarities**

---

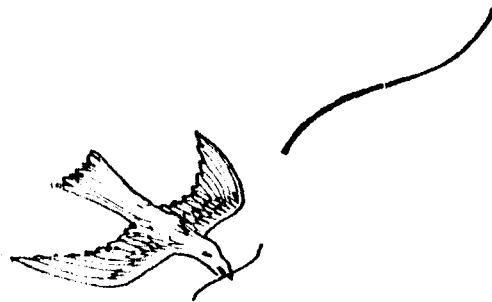
**Sl. No.            Similarities**

---

Please study the instruction very carefully.

1. On the next page, there are two simple drawings. Using them, draw a complete picture and try to make it very interesting and original.
2. To show your power of imagination, try to produce a very interesting title for your picture. Write it down on the space given below the drawing.
3. Do not make a copy of any other drawings you might have seen. The originality and the interest that the picture arouses is far more important than its beauty or likeness.
4. The time given for this activity is 10 minutes. You will be informed about the time after every 5 minutes.
5. You are to begin only at the given signal.
6. Stop writing when the allotted time is over.
6. Follow the example given below.

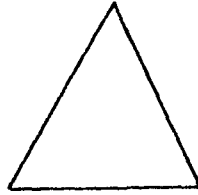
**Example**



**Title :** Is there enough for everyone's need ?

---

14.



Title :

---

15.



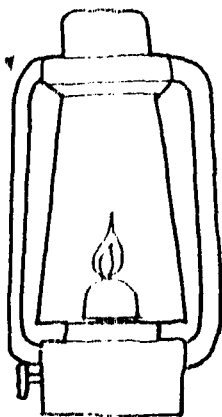
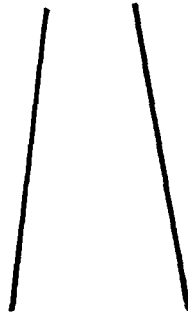
Title :

## VII. PICTURE COMPLETION TEST

Please study the instruction very carefully.

1. On page 15, you will find two incomplete figures. Your task is to complete them in any way you like. Try to make the picture as interesting and unusual as possible. Think of a picture which you feel no one else would be able to make.
2. When you have completed your picture, give a title to it in the space provided for it. Try to make the title as interesting and novel as possible, which will show how imaginatively you can think.
3. You will be given 6 minutes to do this activity. The time will be announced after every 3 minutes.
4. Start only when the signal is given, and stop writing when the time is over.
5. Follow the example given below.

### Example



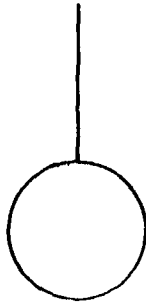
Title : You are the light of the world



Title : A Mizo woman going to market.

---

16.



Title :

---

17.



Title :

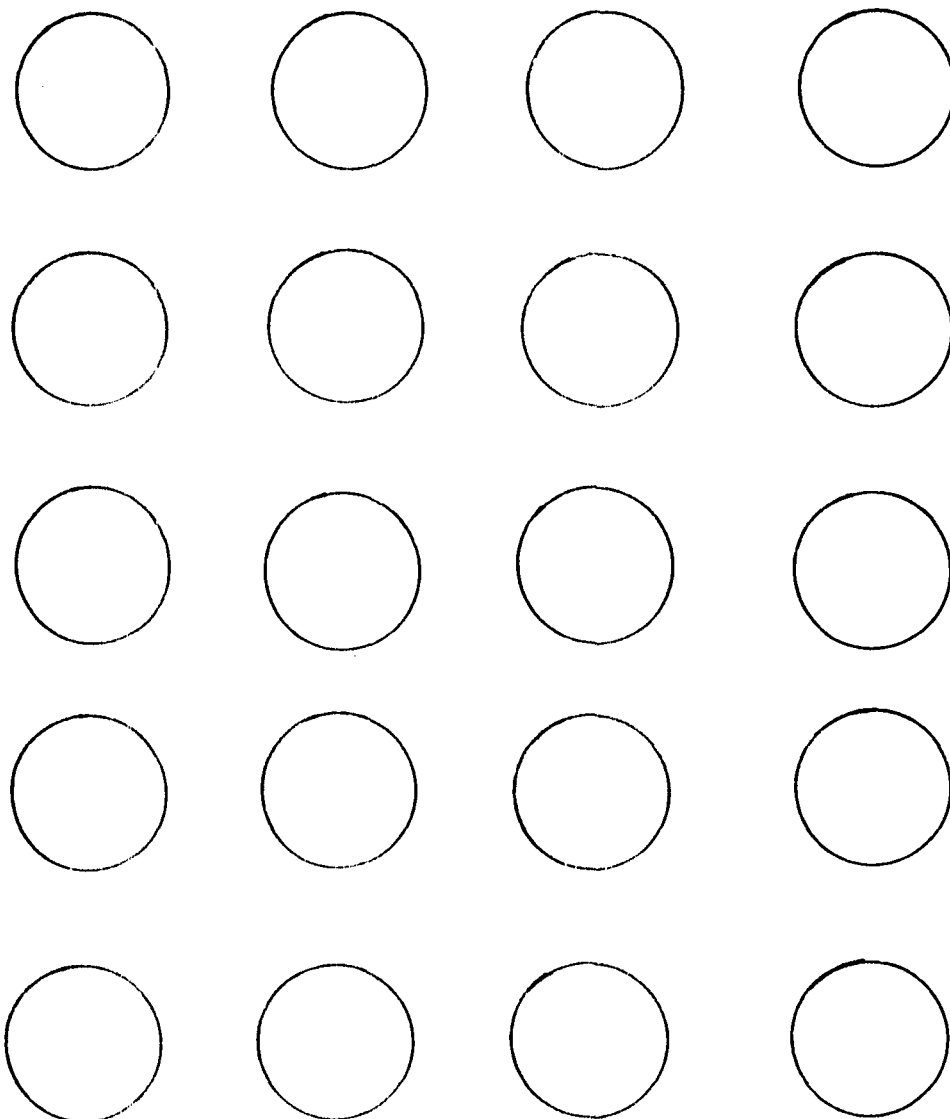
VIII. CIRCLES TEST

Please study the following instruction carefully.

1. Using the following circles as base, try to draw as many pictures as you can within 5 minutes. There must be a circle in each of your drawing. You must add to the circle inside, outside, or both with a pencil.
2. Try to draw unusual figures which your friends may not have thought of.
3. If the figure is not clear, write the title next to it.
4. You are to begin only at the given signal, and stop drawing when 5 minutes are over.

---

18.



**CREATIVITY TEST  
(SCORING SHEET)**

Activity No.	Item No.	Fluency	Flexibility	Originality
I	1			
	2			
	3			
II	4			
	5			
	6			
III	7			
	8			
	9			
IV	10			
	11			
V	12			
	13			
Total				

Activity No.	Item No.	Elaboration	Originality	For Titles	
				Elaboration	Originality
VI	14				
	15				
VII	16				
	17				
VIII	18				
Total					

**SCORE SUMMARY**

	Fluency	Flexibility	Elaboration	Originality
Total				
	Verbal	Non-Verbal	Composite Creativity	
Total				

## PROCEDURE FOR SCORING

The scoring for the test was done in a systematic manner.

### Fluency

In scoring for fluency, irrelevant responses and repetitions were deleted first. The remaining number of responses were counted and entered as the fluency score.

### Flexibility

All responses belonging to the same approach thought on trend were considered as one category.

### Originality

Uncommonness in responses, i.e., the responses given by less than 5 per cent of the students were scored for originality. All others were given no score. The relative weightage for originality scoring are as follows.

Percent of Response	Originality Weightage
0.1% to 0.99%	5
1.0% to 1.99%	4
2.0% to 2.99%	3
3.0% to 3.99%	2
5.0% and above	1

### Elaboration

The non-verbal tests, i.e., activities VI, VII and VIII were considered for scores on the creativity factor-elaboration. The ability to add relevant and meaningful details to the

response to the figural stimulus was appraised. If the figure was not relevant and meaningful, it was ignored. The total elaboration score consisted of a score of 1 for the primary response plus one score each for all the additional details.

### The Title

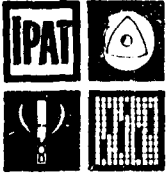
In scoring the title for elaboration, the primary response was identified first and all additional ideas were taken as elaborations. The essential response was given a score of 1 with one score for each additional idea. For instance "A Mizo youth returning home after community work" was rewarded for the number of ideas included in the title plus :

- one for Mizo youth
- one for returning home, and
- one for community work.

The title was evaluated for originality based on the following. ▽

- names of the subjects like cat, dog, man, etc. - no score
- a descriptive title like "Mizo youth", "clever jackal" - score of 1
- an imaginative title such as "A white elephant" - score of 2
- an abstract title which is beyond observation, but relevant and appropriate - a score of 3 (e.g., Jesus, who was crucified for sinners).

The scores for fluency, flexibility, originality, and elaboration on different activities obtained by students were added to obtain the total scores on the four components of creativity. The composite creativity score was calculated by converting the raw component scores into standard scores.

APPENDIX - II  
**16 PF****FORM A**

**WHAT TO DO:** Inside this booklet are some questions to see what attitudes and interests you have. There are no "right" and "wrong" answers because everyone has the right to his own views. To be able to get the best advice from your results, you will want to answer them exactly and truly.

If a separate "Answer Sheet" has not been given to you, turn this booklet over and tear off the Answer Sheet on the back page.

Write your name and all other information asked for on the top line of the Answer Sheet.

First you should answer the four sample questions below so that you can see whether you need to ask anything before starting. Although you are to read the questions in this booklet, you must record your answers on the answer sheet (alongside the same number as in the booklet).

There are three possible answers to each question. Read the following examples and mark your answers at the top of your answer sheet where it says "Examples." Fill in the left-hand box if your answer choice is the "a" answer, in the middle box if your answer choice is the "b" answer, and in the right-hand box if you choose the "c" answer.

**EXAMPLES:**

- |   |  |
|---|--|
| 1. I like to watch team games.<br>a. yes,    b. occasionally,    c. no.                         | 3. Money cannot bring happiness.<br>a. yes (true),    b. in between.    c. no (false). |
| 2. I prefer people who:<br>a. are reserved,<br>b. (are) in between,<br>c. make friends quickly. | 4. Woman is to child as cat is to:<br>a. kitten,    b. dog.    c. boy.                 |

In the last example there is a right answer—kitten. But there are very few such reasoning items.

Ask *now* if anything is not clear. The examiner will tell you in a moment to turn the page and start.

When you answer, keep these four points in mind:

1. You are asked not to spend time pondering. Give the first, natural answer as it comes to you. Of course, the questions are too short to give you all the particulars you would sometimes like to have. For instance, the above question asks you about "team games" and you might be fonder of football than basketball. But you are to reply "for the average game," or to strike an average in situations of the kind stated. Give the best answer you can at a rate not slower than five or six a minute. You should finish in a little more than half an hour.
2. Try *not* to fall back on the middle, "uncertain" answers except when the answer at either end is really impossible for you—perhaps once every four or five questions.
3. Be sure not to skip anything, but answer every question, somehow. Some may not apply to you very well, but give your best guess. Some may seem personal; but remember that the answer sheets are kept confidential and cannot be scored without a special stencil key. Answers to particular questions are not inspected.
4. Answer as honestly as possible what is true of you. Do not merely mark what seems "the right thing to say" to impress the examiner.

**DO NOT TURN PAGE UNTIL TOLD TO DO SO**

1. I have the instructions for this test clearly in mind.  
a. yes, b. uncertain, c. no.
2. I am ready to answer each question as truthfully as possible.  
a. yes, b. uncertain, c. no.
3. I would rather have a house:  
a. in a sociable suburb,  
b. in between,  
c. alone in the deep woods.
4. I can find enough energy to face my difficulties.  
a. always, b. generally, c. seldom.
5. I feel a bit nervous of wild animals even when they are in strong cages.  
a. yes (true), b. uncertain, c. no (false).
6. I hold back from criticizing people and their ideas.  
a. yes, b. sometimes, c. no.
7. I make smart, sarcastic remarks to people if I think they deserve it.  
a. generally, b. sometimes, c. never.
8. I prefer semiclassical music to popular tunes.  
a. true, b. uncertain, c. false.
9. If I saw two neighbors' children fighting, I would:  
a. leave them to settle it,  
b. uncertain,  
c. reason with them.
10. On social occasions I:  
a. readily come forward,  
b. in between,  
c. prefer to stay quietly in the background.
11. It would be more interesting to be:  
a. a construction engineer,  
b. uncertain,  
c. a writer of plays.
12. I would rather stop in the street to watch an artist painting than listen to some people having a quarrel.  
a. true, b. uncertain, c. false.
13. I can generally put up with conceited people, even though they brag or show they think too well of themselves.  
a. yes, b. in between, c. no.
14. You can almost always notice on a man's face when he is dishonest.  
a. yes, b. in between, c. no.
15. It would be good for everyone if vacations (holidays) were longer and everyone had to take them.  
a. agree, b. uncertain, c. disagree.
16. I would rather take the gamble of a job with possibly large but uneven earnings, than one with a steady, small salary.  
a. yes, b. uncertain, c. no.
17. I talk about my feelings:  
a. only if necessary,  
b. in between,  
c. readily, whenever I have a chance.
18. Once in a while I have a sense of vague danger or sudden dread for reasons that I do not understand.  
a. yes, b. in between, c. no.
19. When criticized wrongly for something I did not do, I:  
a. have no feeling of guilt,  
b. in between,  
c. still feel a bit guilty.
20. Money can buy almost everything.  
a. yes, b. uncertain, c. no.
21. My decisions are governed more by my:  
a. heart,  
b. feelings and reason equally,  
c. head.
22. Most people would be happier if they lived more with their fellows and did the same things as others.  
a. yes, b. in between, c. no.
23. I occasionally get puzzled, when looking in a mirror, as to which is my right and left.  
a. true, b. uncertain, c. false.
24. When talking, I like:  
a. to say things, just as they occur to me,  
b. in between,  
c. to get my thoughts well organized first.
25. When something really makes me furious, I find I calm down again quite quickly.  
a. yes, b. in between, c. no.

(End, column 1 on answer sheet.)

26. With the same hours and pay, it would be more interesting to be:  
 a. a carpenter or cook,  
 b. uncertain,  
 c. a waiter in a good restaurant.
27. I have been elected to:  
 a. only a few offices,  
 b. several,  
 c. many offices.
28. "Spade" is to "dig" as "knife" is to:  
 a. sharp, b. cut, c. point.
29. I sometimes can't get to sleep because an idea keeps running through my mind.  
 a. true, b. uncertain, c. false.
30. In my personal life I reach the goals I set, almost all the time.  
 a. true, b. uncertain, c. false.
31. An out-dated law should be changed:  
 a. only after considerable discussion,  
 b. in between,  
 c. promptly.
32. I am uncomfortable when I work on a project requiring quick action affecting others.  
 a. true, b. in between, c. false.
33. Most of the people I know would rate me as an amusing talker.  
 a. yes, b. uncertain, c. no.
34. When I see "sloppy," untidy people, I:  
 a. just accept it,  
 b. in between,  
 c. get disgusted and annoyed.
35. I get slightly embarrassed if I suddenly become the focus of attention in a social group.  
 a. yes, b. in between, c. no.
36. I am always glad to join a large gathering, for example, a party, dance, or public meeting.  
 a. yes, b. in between, c. no.
37. In school I preferred (or prefer):  
 a. music,  
 b. uncertain,  
 c. handwork and crafts.
38. When I have been put in charge of something, I insist that my instructions are followed or else I resign.  
 a. yes, b. sometimes, c. no.
39. For parents, it is more important to:  
 a. help their children develop their affections,  
 b. in between,  
 c. teach their children how to control emotions.
40. In a group task I would rather:  
 a. try to improve arrangements,  
 b. in between,  
 c. keep the records and see that rules are followed.
41. I feel a need every now and then to engage in a tough physical activity.  
 a. yes, b. in between, c. no.
42. I would rather mix with polite people than rough, rebellious individuals.  
 a. yes, b. in between, c. no.
43. I feel terribly dejected when people criticize me in a group.  
 a. true, b. in between, c. false.
44. If I am called in by my boss, I:  
 a. make it a chance to ask for something I want,  
 b. in between,  
 c. fear I've done something wrong.
45. What this world needs is:  
 a. more steady and "solid" citizens,  
 b. uncertain,  
 c. more "idealists" with plans for a better world.
46. I am always keenly aware of attempts at propaganda in things I read.  
 a. yes, b. uncertain, c. no.
47. As a teenager, I joined in school sports:  
 a. occasionally,  
 b. fairly often,  
 c. a great deal.
48. I keep my room well organized, with things in known places almost all the time.  
 a. yes, b. in between, c. no.
49. I sometimes get in a state of tension and turmoil as I think of the day's happenings.  
 a. yes, b. in between, c. no.
50. I sometimes doubt whether people I am talking to are really interested in what I am saying.  
 a. yes, b. in between, c. no.

(End, column 2 on answer sheet.)

51. If I had to choose, I would rather be:  
 a. a forester,  
 b. uncertain,  
 c. a high school teacher.
52. For special holidays and birthdays, I:  
 a. like to give personal presents,  
 b. uncertain,  
 c. feel that buying presents is a bit of a nuisance.
53. "Tired" is to "work" as "proud" is to:  
 a. smile, b. success, c. happy.
54. Which of the following items is different in kind from the others?  
 a. candle, b. moon, c. electric light.
55. I have been let down by my friends:  
 a. hardly ever,  
 b. occasionally,  
 c. quite a lot.
56. I have some characteristics in which I feel definitely superior to most people.  
 a. yes, b. uncertain, c. no.
57. When I get upset, I try hard to hide my feelings from others.  
 a. true, b. in between, c. false.
58. I like to go out to a show or entertainment:  
 a. more than once a week (more than average),  
 b. about once a week (average),  
 c. less than once a week (less than average).
59. I think that plenty of freedom is more important than good manners and respect for the law.  
 a. true, b. uncertain, c. false.
60. I tend to keep quiet in the presence of senior persons (people of greater experience, age, or rank).  
 a. yes, b. in between, c. no.
61. I find it hard to address or recite to a large group.  
 a. yes, b. in between, c. no.
62. I have a good sense of direction (find it easy to tell which is North, South, East, or West) when in a strange place.  
 a. yes, b. in between, c. no.
63. If someone got mad at me, I would:  
 a. try to calm him down,  
 b. uncertain,  
 c. get irritated.
64. When I read an unfair magazine article, I am more inclined to forget it than to feel like "hitting back."  
 a. true, b. uncertain, c. false.
65. My memory tends to drop a lot of unimportant, trivial things, for example, names of streets or stores in town.  
 a. yes, b. in between, c. no.
66. I could enjoy the life of an animal doctor, handling disease and surgery of animals.  
 a. yes, b. in between, c. no.
67. I eat my food with gusto, not always so carefully and properly as some people.  
 a. true, b. uncertain, c. false.
68. There are times when I don't feel in the right mood to see anyone.  
 a. very rarely,  
 b. in between,  
 c. quite often.
69. People sometimes warn me that I show my excitement in voice and manner too obviously.  
 a. yes, b. in between, c. no.
70. As a teenager, if I differed in opinion from my parents, I usually:  
 a. kept my own opinion,  
 b. in between,  
 c. accepted their authority.
71. I would prefer to have an office of my own, not sharing it with another person.  
 a. yes, b. uncertain, c. no.
72. I would rather enjoy life quietly in my own way than be admired for my achievements.  
 a. true, b. uncertain, c. false.
73. I feel mature in most things.  
 a. true, b. uncertain, c. false.
74. I find myself upset rather than helped by the kind of criticism that many people offer one.  
 a. often, b. occasionally, c. never.
75. I am always able to keep the expression of my feelings under exact control.  
 a. yes, b. in between, c. no.

(End, column 3 on answer sheet.)

76. In starting a useful invention, I would prefer:  
 a. working on it in the laboratory,  
 b. uncertain,  
 c. selling it to people.
77. "Surprise" is to "strange" as "fear" is to:  
 a. brave, b. anxious, c. terrible.
78. Which of the following fractions is not in the same class as the others?  
 a.  $\frac{3}{7}$ , b.  $\frac{3}{9}$ , c.  $\frac{3}{11}$ .
79. Some people seem to ignore or avoid me, although I don't know why.  
 a. true, b. uncertain, c. false.
80. People treat me less reasonably than my good intentions deserve.  
 a. often, b. occasionally, c. never.
81. The use of foul language, even when it is not in a mixed group of men and women, still disgusts me.  
 a. yes, b. in between, c. no.
82. I have decidedly fewer friends than most people.  
 a. yes, b. in between, c. no.
83. I would hate to be where there wouldn't be a lot of people to talk to.  
 a. true, b. uncertain, c. false.
84. People sometimes call me careless, even though they think I'm a likable person.  
 a. yes, b. in between, c. no.
85. "Stage-fright" in various social situations is something I have experienced:  
 a. quite often,  
 b. occasionally,  
 c. hardly ever.
86. When I am in a small group, I am content to sit back and let others do most of the talking.  
 a. yes, b. in between, c. no.
87. I prefer reading:  
 a. a realistic account of military or political battles,  
 b. uncertain,  
 c. a sensitive, imaginative novel.
88. When bossy people try to "push me around," I do just the opposite of what they wish.  
 a. yes, b. in between, c. no.
89. Business superiors or members of my family, as a rule, find fault with me only when there is real cause.  
 a. true, b. in between, c. false.
90. In streets or stores, I dislike the way some persons stare at people.  
 a. yes, b. in between, c. no.
91. On a long journey, I would prefer to:  
 a. read something profound, but interesting,  
 b. uncertain,  
 c. pass the time talking casually with a fellow passenger.
92. In a situation which may become dangerous, I believe in making a fuss and speaking up even if calmness and politeness are lost.  
 a. yes, b. in between, c. no.
93. If acquaintances treat me badly and show they dislike me:  
 a. it doesn't upset me a bit,  
 b. in between,  
 c. I tend to get downhearted.
94. I find it embarrassing to have praise or compliments bestowed on me.  
 a. yes, b. in between, c. no.
95. I would rather have a job with:  
 a. a fixed, certain salary,  
 b. in between,  
 c. a larger salary, which depended on my constantly persuading people I am worth it.
96. To keep informed, I like:  
 a. to discuss issues with people,  
 b. in between,  
 c. to rely on the actual news reports.
97. I like to take an active part in social affairs, committee work, etc.  
 a. yes, b. in between, c. no.
98. In carrying out a task, I am not satisfied unless even the minor details are given close attention.  
 a. true, b. in between, c. false.
99. Quite small setbacks occasionally irritate me too much.  
 a. yes, b. in between, c. no.
100. I am always a sound sleeper, never walking or talking in my sleep.  
 a. yes, b. in between, c. no.

(End, column 4 on answer sheet.)

101. It would be more interesting to work in a business:  
 a. talking to customers,  
 b. in between,  
 c. keeping office accounts and records.
102. "Size" is to "length" as "dishonest" is to  
 a. prison, b. sin, c. stealing.
103. AB is to dc as SR is to:  
 a. qp, b. pq, c. tu.
104. When people are unreasonable, I just:  
 a. keep quiet,  
 b. uncertain,  
 c. despise them.
105. If people talk loudly while I am listening to music, I:  
 a. can keep my mind on the music and not be bothered,  
 b. in between,  
 c. find it spoils my enjoyment and annoys me.
106. I think I am better described as:  
 a. polite and quiet,  
 b. in between,  
 c. forceful.
107. I attend social functions only when I have to, and stay away any other time.  
 a. yes, b. uncertain, c. no.
108. To be cautious and expect little is better than to be happy at heart, always expecting success.  
 a. true, b. uncertain, c. false.
109. In thinking of difficulties in my work, I:  
 a. try to plan ahead, before I meet them,  
 b. in between,  
 c. assume I can handle them when they come.
110. I find it easy to mingle among people at a social gathering.  
 a. true, b. uncertain, c. false.
111. When a bit of diplomacy and persuasion are needed to get people moving, I am generally the one asked to do it.  
 a. yes, b. in between, c. no.
112. It would be more interesting to be:  
 a. a guidance worker helping young people find jobs,  
 b. uncertain,  
 c. a manager in efficiency engineering.
113. If I am quite sure that a person is unjust or behaving selfishly, I show him up, even if it takes some trouble.  
 a. yes, b. in between, c. no.
114. I sometimes make foolish remarks in fun, just to surprise people and see what they will say.  
 a. yes, b. in between, c. no.
115. I would enjoy being a newspaper writer on drama, concerts, opera, etc.  
 a. yes, b. uncertain, c. no.
116. I never feel the urge to doodle and fidget when kept sitting still at a meeting.  
 a. true, b. uncertain, c. false.
117. If someone tells me something which I know is wrong, I am more likely to say to myself:  
 a. "He is a liar,"  
 b. in between,  
 c. "Apparently he is misinformed."
118. I feel some punishment is coming to me even when I have done nothing wrong.  
 a. often, b. occasionally, c. never.
119. The idea that sickness comes as much from mental as physical causes is much exaggerated.  
 a. yes, b. in between, c. no.
120. The pomp and splendor of any big state ceremony are things which should be preserved.  
 a. yes, b. in between, c. no.
121. It bothers me if people think I am being too unconventional or odd.  
 a. a lot, b. somewhat, c. not at all.
122. In constructing something I would rather work:  
 a. with a committee,  
 b. uncertain,  
 c. on my own.
123. I have periods when it's hard to stop a mood of self-pity.  
 a. often, b. occasionally, c. never.
124. Often I get angry with people too quickly.  
 a. yes, b. in between, c. no.
125. I can always change old habits without difficulty and without slipping back.  
 a. yes, b. in between, c. no.

(End, column 5 on answer sheet.)

126. If the earnings were the same, I would rather be:  
a. a lawyer,  
b. uncertain,  
c. a navigator or pilot.
127. "Better" is to "worst" as "slower" is to:  
a. fast, b. best, c. quickest.
128. Which of the following should come next at the end of this row of letters: xooxxxooxxx?  
a. oxxx, b. ooxx, c. xooo.
129. When the time comes for something I have planned and looked forward to, I occasionally do not feel up to going.  
a. true, b. in between, c. false.
130. I can work carefully on most things without being bothered by people making a lot of noise around me.  
a. yes, b. in between, c. no.
131. I occasionally tell strangers things that seem to me important, regardless of whether they ask about them.  
a. yes, b. in between, c. no.
132. I spend much of my spare time talking with friends about social events enjoyed in the past.  
a. yes, b. in between, c. no.
133. I enjoy doing "daring," foolhardy things "just for fun."  
a. yes, b. in between, c. no.
134. I find the sight of an untidy room very annoying.  
a. yes, b. in between, c. no.
135. I consider myself a very sociable, outgoing person.  
a. yes, b. in between, c. no.
136. In social contacts I:  
a. show my emotions as I wish.  
b. in between,  
c. keep my emotions to myself.
137. I enjoy music that is:  
a. light, dry, and brisk,  
b. in between,  
c. emotional and sentimental.
138. I admire the beauty of a poem more than that of a well-made gun.  
a. yes, b. uncertain, c. no.
139. If a good remark of mine is passed by, I:  
a. let it go,  
b. in between,  
c. give people a chance to hear it again.
140. I would like to work as a probation officer with criminals on parole.  
a. yes, b. in between, c. no.
141. One should be careful about mixing with all kinds of strangers, since there are dangers of infection and so on.  
a. yes, b. uncertain, c. no.
142. In traveling abroad, I would rather go on an expertly conducted tour than plan by myself the places I wish to visit.  
a. yes, b. uncertain, c. no.
143. I am properly regarded as only a plodding, half-successful person.  
a. yes, b. uncertain, c. no.
144. If people take advantage of my friendliness, I do not resent it and I soon forget.  
a. true, b. uncertain, c. false.
145. If a heated argument developed between other members taking part in a group discussion, I would:  
a. like to see a "winner,"  
b. in between,  
c. wish that it would be smoothed over.
146. I like to do my planning alone, without interruptions and suggestions from others.  
a. yes, b. in between, c. no.
147. I sometimes let my actions get swayed by feelings of jealousy.  
a. yes, b. in between, c. no.
148. I believe firmly "the boss may not always be right, but he always has the right to be boss."  
a. yes, b. uncertain, c. no.
149. I get tense as I think of all the things lying ahead of me.  
a. yes, b. sometimes, c. no.
150. If people shout suggestions when I'm playing a game, it doesn't upset me.  
a. true, b. uncertain, c. false.

(End, column 6 on answer sheet.)

151. It would be more interesting to be:  
 a. an artist,  
 b. uncertain,  
 c. a secretary running a club.
152. Which of the following words does not properly belong with the others?  
 a. any, b. some, c. most.
153. "Flame" is to "heat" as "rose" is to:  
 a. thorn, b. red petals, c. scent.
154. I have vivid dreams, disturbing my sleep.  
 a. often,  
 b. occasionally,  
 c. practically never.
155. If the odds are really against something's being a success, I still believe in taking the risk.  
 a. yes, b. in between, c. no.
156. I like it when I know so well what the group has to do that I naturally become the one in command.  
 a. yes, b. in between, c. no.
157. I would rather dress with quiet correctness than with eye-catching personal style.  
 a. true, b. uncertain, c. false.
158. An evening with a quiet hobby appeals to me more than a lively party.  
 a. true, b. uncertain, c. false.
159. I close my mind to well-meant suggestions of others, even though I know I shouldn't.  
 a. occasionally, b. hardly ever, c. never.
160. I always make it a point in deciding anything, to refer to basic rules of right and wrong.  
 a. yes, b. in between, c. no.
161. I somewhat dislike having a group watch me at work.  
 a. yes, b. in between, c. no.
162. Because it is not always possible to get things done by gradual, reasonable methods, it is sometimes necessary to use force.  
 a. true, b. in between, c. false.
163. In school I preferred (or prefer):  
 a. English,  
 b. uncertain,  
 c. mathematics or arithmetic.
164. I have sometimes been troubled by people's saying bad things about me behind my back, with no grounds at all.  
 a. yes, b. uncertain, c. no.
165. Talk with ordinary, habit-bound, conventional people:  
 a. is often quite interesting and has a lot to it,  
 b. in between,  
 c. annoys me because it deals with trifles and lacks depth.
166. Some things make me so angry that I find it best not to speak.  
 a. yes, b. in between, c. no.
167. In education, it is more important to:  
 a. give the child enough affection,  
 b. in between,  
 c. have the child learn desirable habits and attitudes.
168. People regard me as a solid, undisturbed person, unmoved by ups and downs in circumstances.  
 a. yes, b. in between, c. no.
169. I think society should let reason lead it to new customs and throw aside old habits or mere traditions.  
 a. yes, b. in between, c. no.
170. I think it is more important in the modern world to solve:  
 a. the question of moral purpose,  
 b. uncertain,  
 c. the political difficulties.
171. I learn better by:  
 a. reading a well-written book,  
 b. in between,  
 c. joining a group discussion.
172. I like to go my own way instead of acting on approved rules.  
 a. true, b. uncertain, c. false.
173. I like to wait till I am sure that what I am saying is correct, before I put forth an argument.  
 a. always,  
 b. generally,  
 c. only if it's practicable.
174. Small things sometimes "get on my nerves" unbearably, though I realize they are trivial.  
 a. yes, b. in between, c. no.
175. I don't often say things on the spur of the moment that I greatly regret.  
 a. true, b. uncertain, c. false.

(End, column 7 on answer sheet.)

176. If asked to work with a charity drive, I would  
**a. accept,**  
**b. uncertain,**  
**c. politely say I'm too busy.**
177. Which of the following words does not belong with the others?  
**a. wide, b. zigzag, c. straight**
178. "Soon" is to "never" as "near" is to  
**a. nowhere, b. far, c. away.**
179. If I make an awkward social mistake, I can soon forget it.  
**a. yes, b. in between, c. no.**
180. I am known as an "idea man" who almost always puts forward some ideas on a problem.  
**a. yes, b. in between, c. no.**
181. I think I am better at showing .  
**a. nerve in meeting challenges,**  
**b. uncertain,**  
**c. tolerance of other people's wishes.**
182. I am considered a very enthusiastic person.  
**a. yes, b. in between, c. no.**
183. I like a job that offers change, variety, and travel, even if it involves some danger.  
**a. yes, b. in between, c. no.**
184. I am a fairly strict person, insisting on always doing things as correctly as possible.  
**a. true, b. in between, c. false.**
185. I enjoy work that requires conscientious, exacting skills.  
**a. yes, b. in between, c. no.**
186. I'm the energetic type who keeps busy.  
**a. yes, b. uncertain, c. no.**
187. I am sure there are no questions that I have skipped or failed to answer properly.  
**a. yes, b. uncertain, c. no.**

(End of test.)



EXAMPLES

1. I like to watch team games.  
a. yes, b. occasionally, c. no.
2. I prefer people who:  
a. are reserved,  
b. (are) in between,  
c. make friends quickly.
3. Money cannot bring happiness.  
a. yes (true),  
b. in between,  
c. no (false).
4. Woman is to child as cat is to:  
a. kitten, b. dog, c. boy.

ANSWER SHEET: THE 16 P. F. TEST, FORM A

NAME \_\_\_\_\_

SEX \_\_\_\_\_ AGE \_\_\_\_\_ DATE \_\_\_\_\_

(Write M or F) (Nearest Year)

1	a	b	c
2	a	b	c
3	a	b	c
4	a	b	c

FILL IN THE BOX COMPLETELY ERASE ENTIRELY ANY ANSWER YOU WISH TO CHANGE

1	a	b	c	26	a	b	c	51	a	b	c	76	a	b	c	101	a	b	c	126	a	b	c	151	a	b	c	176	a	b	c
2	a	b	c	27	a	b	c	52	a	b	c	77	a	b	c	102	a	b	c	127	a	b	c	152	a	b	c	177	a	b	c
3	a	b	c	28	a	b	c	53	a	b	c	78	a	b	c	103	a	b	c	128	a	b	c	153	a	b	c	178	a	b	c
4	a	b	c	29	a	b	c	54	a	b	c	79	a	b	c	104	a	b	c	129	a	b	c	154	a	b	c	179	a	b	c
5	a	b	c	30	a	b	c	55	a	b	c	80	a	b	c	105	a	b	c	130	a	b	c	155	a	b	c	180	a	b	c
6	a	b	c	31	a	b	c	56	a	b	c	81	a	b	c	106	a	b	c	131	a	b	c	156	a	b	c	181	a	b	c
7	a	b	c	32	a	b	c	57	a	b	c	82	a	b	c	107	a	b	c	132	a	b	c	157	a	b	c	182	a	b	c
8	a	b	c	33	a	b	c	58	a	b	c	83	a	b	c	108	a	b	c	133	a	b	c	158	a	b	c	183	a	b	c
9	a	b	c	34	a	b	c	59	a	b	c	84	a	b	c	109	a	b	c	134	a	b	c	159	a	b	c	184	a	b	c
10	a	b	c	35	a	b	c	60	a	b	c	85	a	b	c	110	a	b	c	135	a	b	c	160	a	b	c	185	a	b	c
11	a	b	c	36	a	b	c	61	a	b	c	86	a	b	c	111	a	b	c	136	a	b	c	161	a	b	c	186	a	b	c
12	a	b	c	37	a	b	c	62	a	b	c	87	a	b	c	112	a	b	c	137	a	b	c	162	a	b	c	187	a	b	c
13	a	b	c	38	a	b	c	63	a	b	c	88	a	b	c	113	a	b	c	138	a	b	c	163	a	b	c	188	a	b	c
14	a	b	c	39	a	b	c	64	a	b	c	89	a	b	c	114	a	b	c	139	a	b	c	164	a	b	c	189	a	b	c
15	a	b	c	40	a	b	c	65	a	b	c	90	a	b	c	115	a	b	c	140	a	b	c	165	a	b	c	190	a	b	c
16	a	b	c	41	a	b	c	66	a	b	c	91	a	b	c	116	a	b	c	141	a	b	c	166	a	b	c	191	a	b	c
17	a	b	c	42	a	b	c	67	a	b	c	92	a	b	c	117	a	b	c	142	a	b	c	167	a	b	c	192	a	b	c
18	a	b	c	43	a	b	c	68	a	b	c	93	a	b	c	118	a	b	c	143	a	b	c	168	a	b	c	193	a	b	c
19	a	b	c	44	a	b	c	69	a	b	c	94	a	b	c	119	a	b	c	144	a	b	c	169	a	b	c	194	a	b	c
20	a	b	c	45	a	b	c	70	a	b	c	95	a	b	c	120	a	b	c	145	a	b	c	170	a	b	c	195	a	b	c
21	a	b	c	46	a	b	c	71	a	b	c	96	a	b	c	121	a	b	c	146	a	b	c	171	a	b	c	196	a	b	c
22	a	b	c	47	a	b	c	72	a	b	c	97	a	b	c	122	a	b	c	147	a	b	c	172	a	b	c	197	a	b	c
23	a	b	c	48	a	b	c	73	a	b	c	98	a	b	c	123	a	b	c	148	a	b	c	173	a	b	c	198	a	b	c
24	a	b	c	49	a	b	c	74	a	b	c	99	a	b	c	124	a	b	c	149	a	b	c	174	a	b	c	199	a	b	c
25	a	b	c	50	a	b	c	75	a	b	c	100	a	b	c	125	a	b	c	150	a	b	c	175	a	b	c	200	a	b	c

RAW SCORE

A

B

C

E

F

G

H

I

L

M

N

O

Q<sub>1</sub>

Q<sub>2</sub>

Q<sub>3</sub>

Q<sub>4</sub>

- Do not write here.
- NORMS USED:
- MS
  - Coll
  - Gau Pop
  - A
  - B
  - A + B
  - M
  - F

## APPENDIX III

NORTH-EASTERN HILL UNIVERSITY  
DEPARTMENT OF EDUCATION  
SHILLONG

### PROBLEM SOLVING ABILITY TEST (PSAT)

#### Directions

This test consists of 20 items. In your daily life you may come across certain problems of varied nature. This test aims at knowing your reactions toward various activities useful in finding solutions to such problems. Each problem in the test is provided with four possible solutions, marked by letter a, b, c and d. You are required to read each item carefully and then decide what your first reaction to it is. Encircle the letter corresponding to correct reaction against the corresponding question number in the answer sheet provided for marking answer.

#### Example

There is a widespread of malarial disease in our state now a days, and many people have lost their lives because of this disease. To safeguard yourself and your family from this dreadful disease, you want to eradicate the insect which is responsible for this disease. Read the list of insects below. Which one will you eradicate ?

- (a) house-fly.
- (b) male anopheles.
- (c) female anopheles.
- (d) bed bug.

1. While playing in your college field, a dog comes and bites one of your playmates. What would be your first reaction to help him ?

- (a) I will chase the dog.
- (b) I will call a doctor.
- (c) I will suggest taking him to the hospital.
- (d) I will give him first aid.

2. While trying to peel pineapple, you find that your kitchen knife gets rusted. What will you do to prevent rusting of your other knives which do not yet get rusted ?

- (a) I will wash them nicely with water.
- (b) I will oil and then store them like that.
- (c) I will paint them.
- (d) I will wash them with hot water occasionally.

3. Your younger brother drinks kerosene oil from the bottle by mistake, thinking that it is filtered water. What will you do first to help him in this situation ?

- (a) I will make him drink plenty of pure water.
- (b) I will make him pass stool quickly.
- (c) I will give him an emetic of warm salt water.
- (d) I will give him sleeping pills.

4. You are interested in physical exercise. You want to take exercise which involves maximum expenditure of energy. Which of the given exercises will you choose ?
- (a) Swimming
  - (b) Horse ridding
  - (c) Jogging
  - (d) Cycling
5. While cooking dinner with your sister at home, her clothes catches fire suddenly. What will be your first reaction in this problematic situation ?
- (a) I will shout for help.
  - (b) I will try to put out the fire by covering her with blanket.
  - (c) I will call a doctor.
  - (d) I will run away from the scene so that I am safe from fire.
6. You are going to make an omlette. How can you tell that the egg is safe for eating without breaking it first ?
- (a) I will know by shaking it.
  - (b) I will know by smelling it.
  - (c) I will know by immersing it in a bowl of water.
  - (d) I will know it from its appearance.
7. You want to have cool water for your family during summer, but you do not have a refrigerator in your home. How will you manage to have cool water all through the hot season ?
- (a) I will keep water in an earthenware pot.
  - (b) I will keep water in an alluminium vessel.
  - (c) I will keep water in a stainless vessel.
  - (d) I will keep water in bamboo tubes.

8. While having work experience class in your college garden, one of your friends nose bleeds profusely. What will you do first to help him ?
- (a) I will run and call his parents.
  - (b) I will tremble with fear.
  - (c) I will call a doctor.
  - (d) I will try to stop the bleeding immediately.
9. While preparing tea for the visitors who are in a kind of hurry to leave, you find that the glass in which you pour tea cracks. What will you do so that the rest of the glasses do not crack ?
- (a) I will boil the rest of the glasses first.
  - (b) I will wash the rest of the glasses with warm water before pouring tea in them.
  - (c) I will wait till the tea gets cold.
  - (d) I will quickly pour tea hoping that they will not crack like the first one.
10. You take part in the "needle and thread" race in your college sports. How will you thread the needle so that you win the race ?
- (a) I will close one eyes and thread it.
  - (b) I will open both the eyes and thread it.
  - (c) I will poke the eye of the needle with the point of another needle and then thread it.
  - (d) I will look through the eye of the needle against the sun and thread it.
11. Cholera breaks out in your locality. What preventive measure will you and your family take in this regard ?
- (a) I will disinfect the house.
  - (b) We will take bath everyday.

- (c) We will drink only boiled and cold water when we feel thirsty.
- (d) We will close our mouths and noses with handkerchief when we happen to see cholera patient.
12. In this hilly area of ours you feel cold, specially during winter nights. You want to keep your bedroom warm throughout the night during this season. What will you choose to keep the room warm at night ?
- (a) gas stove
- (b) electric stove
- (c) charcoal
- (d) coal
13. You are working in your chemistry laboratory. Unfortunately caustic soda (NaOH) gets into your eye. What will be your reaction to this ?
- (a) I will wash my eye with Ammonium Hydroxide ( $\text{NH}_4\text{OH}$ ) immediately.
- (b) I will wash my eye with warm water immediately.
- (c) I will wash my eye with boric acid immediately.
- (d) I will wash my eye with sulphuric acid ( $\text{H}_2\text{SO}_4$ ) immediately.
14. You have a new sitting room which is quite big and nice. But when you talk, an 'echo' is produced, and you do not like this. What will you do to stop the echo. ?
- (a) I will put carpet on the floor.
- (b) I will put sufficient number of furniture.
- (c) I will paint the wall.
- (d) I will wash the room thoroughly with water everyday.

15. In warm weather, milk gets spoiled easily. How will you prevent the milk from getting spoiled ?
- (a) I will boil it so as to kill the germs which may be present in it to cause spoilage.
  - (b) I will boil it nicely and after that I will cover it.
  - (c) I will protect it from flies and warm it occasionally.
  - (d) I will boil it and then keep it in a cool place uncovered.
16. There is something wrong with the electric current in your house. When you open the water tap you get a shock. How will you act in this dangerous situation ?
- (a) I will call an electrician.
  - (b) I will try my level best to make it alright.
  - (c) I will put off the main switch first of all.
  - (d) I will open the tap wearing rubber slippers.
17. While your parents are away, the baby under your care gets fever and convulses. What will you do first in this problematic situation ?
- (a) I will call a doctor quickly.
  - (b) I will pour cold water at the back of his head.
  - (c) I will keep him very warm with blanket.
  - (d) I will call all the neighbours.
18. The climate of this hilly area has changed a lot and become very hot, specially during summer. In what way can you best solve this problem ?
- (a) I will suggest that every house has an air conditioner.
  - (b) I will suggest that every house has ceiling fans.
  - (c) I will suggest that every family plant trees in the compound of the house.
  - (d) I will suggest that more ice-cream be produced at cheaper price.

19. The physical, spiritual and moral lives of our present society are in danger. Certain things are responsible for this. Below is a list of such things written in jumbled form. Re-arrange each word so that they make sense.

- (i) P O U M I
- (ii) N E R H I O
- (iii) R R O T P N O I C U
- (iv) D R M X A N A
- (v) Q O R U I L
- (vi) B N G I L M A G
- (vii) G G M S N G U I L
- (viii) C D E I I S U
- (ix) P A E R
- (x) F T H E T

20. In the puzzle below, six scientists with one invention each are given. Try and detect them.

R	M	Q	T	T	A	W	S	E	M	A	J
O	A	V	U	O	P	N	E	S	R	N	E
N	Z	D	V	I	X	K	L	H	O	V	N
A	E	S	I	V	N	Z	B	I	E	K	I
L	E	W	W	U	D	I	T	I	N	P	G
D	L	T	T	B	M	A	N	S	T	M	N
R	A	D	I	O	T	S	X	E	G	Q	E
O	X	M	C	I	N	H	J	P	E	S	M
S	P	K	V	D	Y	D	F	E	N	R	A
S	M	A	D	A	M	E	C	U	R	I	E
O	R	H	R	Z	P	M	K	B	A	C	T
G	V	X	T	I	N	O	C	R	A	M	S

**PROBLEM SOLVING ABILITY TEST : SCORING KEY**

1.	d	7.	a	13.	c
2.	b	8.	d	14.	b
3.	c	9.	b	15.	d
4.	a	10.	a	16.	c
5.	b	11.	c	17.	b
6.	c	12.	c	18.	c

19.

- (i) OPIUM
- (ii) HEROIN
- (iii) CORRUPTION
- (iv) MANDRAX
- (v) LIQUOR
- (vi) GAMBLING
- (vii) SMUGGLING
- (viii) SUICIDE
- (ix) RAPE
- (x) THEFT

20.

- |              |                |
|--------------|----------------|
| JAMES WATT   | - STEAM ENGINE |
| MARCONI      | - RADIO        |
| RONALD ROSS  | - QUININE      |
| MADAME CURIE | - RADIUM       |
| ROENTGEN     | - X-RAY        |
| NEWTON       | - GRAVITATION  |

APPENDIX IV

NORTH-EASTERN HILL UNIVERSITY  
DEPARTMENT OF EDUCATION  
SHILLONG

BIOGRAPHICAL INVENTORY

1. Name \_\_\_\_\_
2. Age \_\_\_\_\_
3. Sex \_\_\_\_\_
4. Class (Indicate Arts/Sc/Com) \_\_\_\_\_
5. College \_\_\_\_\_
6. Village \_\_\_\_\_
7. Father's/Guardian's Educational Qualification \_\_\_\_\_
8. Mother's Educational Qualifications \_\_\_\_\_
9. Father's/Guardian's Occupation \_\_\_\_\_
10. Mother's Occupation \_\_\_\_\_
11. Family monthly income from all source Rs. \_\_\_\_\_
12. Please tick whether you are :
  - (a) first born ( )
  - (b) middle born ( )
  - (c) last born ( )
  - (d) only child ( )
13. State your division in the Matric Exam (HSLC/CBSE) \_\_\_\_\_  
Please indicate percentage of marks obtained in Matric \_\_\_\_\_
14. Please tick if you are an active member/participants in the following :

(a) S.U. ( )	(g) Rovers and Rangers ( )
(b) Y.A.C. ( )	(h) Science club ( )
(c) N.C.C. ( )	(i) Commerce Students Union ( )
(d) E.U. ( )	(j) Any other ( )
(e) N.S.S. ( )	
(f) S.S.U. ( )	

15. Please tick if you are an active member/participants in any social/cultural/literary organisation of the following :

- |                        |     |                         |     |
|------------------------|-----|-------------------------|-----|
| (a) Y.M.A.             | ( ) | (h) Y.H.A.I.            | ( ) |
| (b) KTP/TKP/PYD/YC etc | ( ) | (i) YMCA/YWCA           | ( ) |
| (c) M.Z.P.             | ( ) | (j) Any cultural club   | ( ) |
| (d) VDP/JAC            | ( ) | (k) Any Choir (zaipawl) | ( ) |
| (e) M.H.I.P.           | ( ) | (l) Any other           | ( ) |
| (f) M.Z.I.             | ( ) |                         |     |
| (g) Any Sports Assn.   | ( ) |                         |     |
| (eg. MFA/MBA etc)      |     |                         |     |

16. Please tick in the following if you have made any contributions/Article in magazines/News papers/bulletins/books/journals etc.

- |              |     |                       |     |
|--------------|-----|-----------------------|-----|
| (a) Poetry   | ( ) | (i) Letter to editors | ( ) |
| (b) Stories  | ( ) | (j) Jokes             | ( ) |
| (c) Songs    | ( ) | (k) Cartoons          | ( ) |
| (d) Drama    | ( ) | (l) Quiz              | ( ) |
| (e) Essays   | ( ) | (m) Puzzle/Riddle     | ( ) |
| (f) Sermons  | ( ) | (n) General Knowledge | ( ) |
| (g) Reports  | ( ) | (o) Any other         | ( ) |
| (h) Features | ( ) |                       |     |

17. Please tick your talent in the following activities :

- |                   |     |                                 |     |
|-------------------|-----|---------------------------------|-----|
| (a) Knitting      | ( ) | (j) Weaving/Craft work          | ( ) |
| (b) Gardening     | ( ) | (k) Tailoring/Fashion Designing | ( ) |
| (c) Modelling     | ( ) | (l) Painting/Sketching          | ( ) |
| (d) Carpentry     | ( ) | (m) Flower arrangement          | ( ) |
| (e) Cooking       | ( ) | (n) Hair dressing/Beautician    | ( ) |
| (f) Acting        | ( ) | (o) Extempore speech            | ( ) |
| (g) Debate        | ( ) | (p) Commentator/Compering       | ( ) |
| (h) Music/Singing | ( ) | (q) Mechanics (electrical,      | ( ) |
| (i) Cultural      | ( ) | automobiles, etc)               | ( ) |
| Dances            | ( ) | (r) Any other                   | ( ) |

State whether you have received any training or have received any award/prizes in the above.

### BRIEF BIO-DATA

**Name** : Mrs. H. Malsawmi

**Date of Birth** : 13th July, 1960

**Fathers Name** : H. Vanthuama

**Address** : C/o R. Lalhmangaiha  
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**Educational Qualification** : M.A. (Education) in 1982  
M.A. (Psychology) in 1985

**Occupation** : Senior Lecturer, Department of Education,  
Government Aizawl College, Mizoram

**Papers Published** : "A Study of the Vocational Preference of  
High School Students in Aizawl",  
Published in India Psychological  
Magazine, Bodh Gaya, October, 1984.

**Seminar Presented** : The Consequences of Rapid Population  
Growth at the Family and National Level,  
Organised by Population Education Club,  
Aizawl, Sponsored by Centre for Adult  
and Continuing Education, Shillong,  
1991.

**Refresher Courses Attended** : 1) Three weeks UGC sponsored refresher  
course in Education, organised by  
Pachhunga University College, Aizawl,  
1993.

2) Three weeks UGC sponsored refresher  
course in Education, organised by  
Education Department, NEHU, Shillong,  
1994.