CHAPTER ELEVEN

SUMMARY, CONCLUSIONS AND SUGGESTIONS
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A summary of the total investigation giving briefly the genesis of the problem, objectives, hypotheses, design of the study, important conclusions and their implications is presented in this chapter. Efforts have also been made here to offer recommendations and suggestions for modifying some of the educational policies and to conduct further research studies in this area.

11.1. Introduction

The need of the present study was felt mainly because of two considerations. Firstly, it was felt that creative talent in our country was not given a proper deal because of (a) the lack of measures of identification, (b) the lack of proper educational facilities in our poorly-equipped schools, (c) intolerance to novel and non-conforming ideas and behaviour of the creative students, and (d) the generally shared fear of the dominance by the talented, based on the pseudo-democratic sentiments. The second consideration was of theoretical nature, implying a probe into the question,
whether the domain of creativity is really independent of intelligence and scholastic achievement. The other concomitant issues involved along with the second consideration were the study of creativity in the context of sex, residence and students' grade levels especially when they follow divergent streams in curriculum at the higher secondary stage. These two considerations emerged partly due to personal observations and thinking and partly due to a review of others' work recorded in literature, the evidence of which has already been given to generate and rationalize the hypotheses in the main text.

The validity of the first consideration regarding the neglect of creative talent in Indian settings is evident by the observations recorded in the Report of Education Commission (1964-66, p.91). Though convinced by the utility of talent for bringing about rapid progress in the country, Ministry of Education, Government of India, has recently started a scheme "Search for Science Talent" aims and objectives of which are praiseworthy, but the means and modes employed to identify the science talent are not beyond doubts. The problem in India gains another dimension in the light of heavy outflow of 'Brain Drain'. From still another point of view neglect of creative talent is evident when investigator himself found that no serious related research study was undertaken in India. It is in this
context that the first consideration of neglect of creative talent was crystalized in the mind of the investigator.

The second consideration emerged due to the findings of a number of investigators where the correlations between creativity and intelligence, and creativity and achievement have been found to be of lower order. Guilford (1950) in his presidential address to American Psychological Association made an observation of low correlation between creativity and intelligence. Later on, he himself and his associates confirmed the plea through their famous factor analytical studies aiming to validate empirically the 'structure of intellect'. Similar findings of low 'r' were reported by GeitzeIs and Jackson (1962), Torrance (1962), Yamamoto (1964), Copley (1966), and Madaus, Dasey and Allen (1969). In the Review of Educational Research, Taylor and Holland (1962) reported that positive but low correlations (.20 to .40) were found between creativity and intelligence in a large number of investigations and no correlation was found at higher ability level. In 1967, Torrance tabulated all 173 available correlational studies of creativity and intelligence, and reported a median correlation of .20. The value of median correlation coefficient of the 144 studies decreased to .06 when tabulated for nonverbal creativity and intelligence. Researchers like Heer and Stein (1955), Taylor and Holland (1962), Taylor (1964), Yamamoto (1965), Guilford
and Hoefner (1966), Barron (1969), and Dacey, Madaus and Allen (1971) have hypothesized the concept of threshold and triangular scatterplot implying that beyond a particular level of intelligence (may be P95 or IQ 120), any increment in intelligence does not contribute to a corresponding increment in creativity.

In the context of the variables of creativity and achievement a situation of low correlation has been presented by researchers like Getzels and Jackson (1962), Taylor (1958b), Yamamoto (1960), Jackson (1962), Torrance (1962), Taylor and Holland (1962) and Rambo (1964). This situation has implicit bearing that if a particular educational institution or educational system aims to encourage creative talent, there need not be IQ and achievement measures alone, on the bases of which decisions are made.

Studies of Bereiter (1960), Piers and others (1960), Yamamoto (1960), Klausmeier and Wiersma (1964), Razik (1964) and Hill (1966), arrived at diversity of findings related to creativity and sex. To see the environmental effects upon creativity researchers like Thistlethwaite (1958, 1959 a,b), Knapp and Goodrich (1982), and Klausmeier and Wiersma (1964) conducted studies with the result that no clearcut inference could be drawn. In connection with the developmental trends of creativity studies of Bedner and
Parker (1965), Yamamoto (1960b), and Torrance et al. (1960) also provided different types of findings.

In the context of such controversial nature of earlier findings and due to a lack of any work done in India, the investigator undertook the present study stated in the following caption.

11.2. The Present Study

The study specifically reads as "An Exploratory Study of Creativity and Its Relationship with Intelligence and Achievement in School Subjects at Higher Secondary Stage". The study has its delimitation with respect to the operational definitions of key concepts, sample and the analysis, the details of which have been given in the main text. Specifically, the study was advanced to fulfil the following objectives and hypotheses.

11.2.1. Objectives of the Study

The study was conducted keeping in view the following objectives (i) to develop the 'Tests of Creativity' (both in English and Hindi) for measuring verbal and nonverbal factors involved in the process of creative thinking, (ii) to establish the relationship between measures of creativity on the one hand and variables of intelligence (verbal and nonverbal), scholastic achievement, sex, residential background and age as reflected by grade levels
on the other, and (iii) to suggest measures for incorporating the application of research findings in educational setup with a view to make it more meaningful and effective for identifying and developing creative talent.

11.2.2. Hypotheses

The study was advanced on the basis of the hypotheses mentioned below. The formation and testing of the hypotheses is only restricted to higher secondary stage students, to total linear summated scores of creativity (CY-21) and .05 was accepted as the level of confidence for the acceptance or rejection of the hypotheses.

1. The distribution of the scores of creativity based on the Tests of Creativity is normal for the total sample.

2. Low relationship exists between creativity and intelligence.

3. Creativity is a multiple factor construct having both verbal and nonverbal type of factors.

4. There is significant sex difference in creativity.

5. Urban and rural groups of students differ significantly in creativity.

6. Grade to grade (IX through XI grades) differences exist in mean scores on the Tests of Creativity. The hypothesis implies that the developmental trends indicating increase in mean scores from lower to the higher grade are likely to be observed.

7. Low relationship exists between creativity and achievement at higher secondary stage.

8. Double-talented (high creative - high intelligent, CI), single-talented (high creative - low intelligent, CI, or high intelligent - low creative, IC) and no-talented (low creative - low intelligent, CI) groups of higher secondary stage students differ significantly with regard to achievement in school subjects.
9. Creativity like intelligence has significant contribution (beta coefficient) for predicting the criterion of school achievement when studied with the help of multiple regression equation approach.

11.3. Procedure and Techniques

The study was divided into the following three main parts: (a) preparing the Tests of Creativity, (b) testing the hypotheses, and (c) reporting summary and conclusions with their educational implications as well as further suggestions. The descriptive method of research coupled with cross-sectional approach was employed.

11.3.1. Sample

Six samples were drawn at different stages in accordance with their purposes. The methodology of sampling was random, random-clustered or multistage-random-clustered depending upon the size and purpose of the sample. The parental population always happened to be the higher secondary students of the states of Panjab, Haryana and the Union Territory of Chandigarh. The first sample consisting of fifty students was drawn for the purpose of 'selection of the type of test items'. The second sample consisting of thirty students was drawn for 'pooling source material' for test items of the Tests of Creativity. The third sample consisting of 100 students was picked up for the item analysis of the preliminary draft of the
Tests of Creativity. In order to establish 'reliability and validity', the fourth sample of sixty students was drawn. The fifth stage of sampling was meant for 'testing the hypotheses' of the study; for this purpose a sample of 600 students was picked up with the help of multistage random-clustered design of sampling. The sixth sample consisting of thirty students was drawn to see 'the efficiency of the multiple regression equation'.

11.3.2. Tools Used
(a) Questionnaire for Personal Data

A questionnaire was developed to collect personal and demographic data like name, sex, residence, age, grade, school and address.

(b) Things-Done-On-Your-Own-Checklist (CRN)

The tool was an adaptation of Torrance's (1962) checklist. It consisted of fifty items related to the different activities in language, arts, science, social studies, art and other fields. The test-retest reliability for this was found to be .92. The scores on this checklist were primarily used as the external criterion (CRN) to validate the Tests of Creativity.

(c) The Raven's (1960) Standard Progressive Matrices test was used to measure nonverbal intelligence. The administration and scoring were strictly based on the directions given in the manual.
(d) The Jalota's (1964) Group Test of General Mental Ability was used to measure verbal intelligence. The manual of the test provided directions for administration and scoring.

(e) Scholastic achievement was represented by the percentage of the total marks in the Middle Standard Examination which is compulsory and common for all the students of VIII grade.

(f) The Tests of Creativity

The Tests of Creativity, consisting of six subtests, namely, (i) the Seeing Problems Test, (ii) the Unusual Uses Test, (iii) the Consequences Test, (iv) the Test of Inquisitiveness, (iv) the Square Puzzle Test, and (vi) the Blocks Test of Creativity, were locally prepared by the investigator. The tests were developed mostly on the lines of Guilford (1951, 1982) and Torrance (1962). An item analysis of the preliminary draft was done by finding an item's potentiality of eliciting a large number of responses of diverse nature, and item discrimination (t-test) based on two extreme 27 percent groups. As a result of this, the final draft of the six Tests of Creativity was prepared. The tests could be classified on the lines of Torrance (1962) as (a) tests consisting of verbal tasks, namely, the Seeing Problems Test, the Unusual Uses Test, and the Consequences Test; (b) test with verbal tasks using mostly nonverbal stimuli, namely, the Test of Inquisitiveness, and (c) tests
consisting of nonverbal tasks, namely, the Square Puzzle Test and the Blocks Test of Creativity. The Seeing Problems Test, the Unusual Uses Test and the Consequences Test can be administered to a group of about thirty students at a time. The Test of Inquisitiveness and the Square Puzzle Test can be either administered individually or to small groups of six students at a time. The Blocks Test of Creativity can be administered only individually. The scores of different dimensions from the tests can be derived as, seeing problems (SP) from the Seeing Problems Test; unusual uses fluency (UF), unusual uses flexibility (UX), unusual uses originality (UO) and unusual uses creativity (UC) from the Unusual Uses Test; consequences fluency (CF), consequences originality (CO) and consequences creativity (CC) from the Consequences Test; inquisitiveness (INQ) from the Test of Inquisitiveness (INQ); persistency (PER) from the Square Puzzle Test; and blocks fluency (BF), blocks flexibility (BX), blocks originality (BO) and blocks creativity (BC) from the Blocks Test of Creativity. The total score on creativity (CY-21) was obtained by the summation of all the above scores. The details of the scoring procedures being complex and lengthy in space coverage are being avoided here. Nevertheless, for the sake of reader's convenience a brief description in tabular form is given in Table 11.1 below.
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the Test</th>
<th>Variable</th>
<th>Scoring Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Things-Done-On-Your-Own-Checklist</td>
<td>Criterion (CRN)</td>
<td>Total number of ticked responses i.e. activities done</td>
</tr>
<tr>
<td>2.</td>
<td>Seeing Problems Test</td>
<td>Seeing Problems (SP)</td>
<td>Total number of relevant defects and problems</td>
</tr>
<tr>
<td>3.</td>
<td>Consequences Test</td>
<td>Consequences fluency (CF)</td>
<td>Total number of relevant consequences</td>
</tr>
<tr>
<td>4.</td>
<td>Consequences Test</td>
<td>Consequences originality (CO)</td>
<td>Total number of remote consequences</td>
</tr>
<tr>
<td>5.</td>
<td>Consequences Test</td>
<td>Consequences Creativity (CC)</td>
<td>CC = CF + CO</td>
</tr>
<tr>
<td>6.</td>
<td>Unusual Uses Test</td>
<td>Unusual uses fluency (UF)</td>
<td>Total number of the relevant uses</td>
</tr>
<tr>
<td>7.</td>
<td>Unusual Uses Test</td>
<td>Unusual uses flexibility (UX)</td>
<td>Total number of categories of the uses</td>
</tr>
<tr>
<td>8.</td>
<td>Unusual Uses Test</td>
<td>Unusual uses originality (UO)</td>
<td>Sum of weighted scores on five-point scale. A response is given the highest weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>of four when it is least common in the sample and vice versa</td>
</tr>
<tr>
<td>9.</td>
<td>Unusual Uses Test</td>
<td>Unusual uses creativity (UC)</td>
<td>UC = UF + UX + UO</td>
</tr>
<tr>
<td>10.</td>
<td>Test of Inquisitiveness</td>
<td>Inquisitiveness (INQ)</td>
<td>Total number of relevant questions which are mutually exclusive to one another in contents</td>
</tr>
<tr>
<td>11.</td>
<td>Square Puzzle Test</td>
<td>Persistancy (PER)</td>
<td>Total number of completed minutes on the task minus three minutes</td>
</tr>
<tr>
<td>12.</td>
<td>Blocks Test of Creativity</td>
<td>Block fluency (BF)</td>
<td>Total number of relevant designs</td>
</tr>
</tbody>
</table>
13. Blocks Test of Creativity

Blocks flexibility (BX)

Total number of categories of the designs

14. Blocks Test of Creativity

Blocks originality (BO)

Sum of the weighted scores on five-point scale. A design is given the maximum weight of four when it is least common in the sample and vice versa.

15. Blocks Test of Creativity

Blocks creativity (BC)

BC = BF + BX + BO

<table>
<thead>
<tr>
<th>Total Creativity (CY-21)</th>
<th>Scores of CRN+INQ+PER+SP+ GC+UG+BC = (CY-21)</th>
</tr>
</thead>
</table>

The test-retest reliability coefficients, with a gap of a fortnight between the two administration ranged between .68 to .97 with the median value of .83, whereas split-half reliability coefficients worked out for the tests of Seeing Problems, Unusual Uses, and Consequences were .83, .51 and .80 respectively. The coefficients of convergent validity of the Tests of Creativity against the criterion measures of 'Things-Done-On-Your-Own' checklist ranged from .43 to .95 with the median value of .60. The coefficients of discriminant validity against the criteria of nonverbal intelligence, verbal intelligence and scholastic achievement ranged from .05 to .31 with the median value of .27, .01 to .33 with the median value of .27, and .07 to .35 with the median value of .30 respectively. Validity coefficients being higher in case of convergent validity and lower in case of discriminant
validity were very encouraging. Factorial validity was represented by factor loadings of the tests, ranging from .305 to .747 on the 'Verbal Creativity' factor, and a loading of .445 on the 'Nonverbal Creativity' factor. On the basis of these reliability and validity studies, the Tests of Creativity could be termed as effective tools from the reliability and validity point of view. For other details of the Tests of Creativity reference may be made to Appendix 'D'.

11.3.3. Statistical Techniques Used

The study involved different types of statistical techniques the use of which has been explained at the places wherever these were mentioned.

11.4. Conclusions (Testing the Hypotheses)

With the help of these tools and of the school records, data were collected, scored, coded and analysed to test the nine hypotheses involved in the study. The scores relating to the twenty different variables representing the subdimensions of creativity, total creativity (CY-21), nonverbal and verbal intelligence, achievement and age were converted into original and percentage frequency distributions and percentage frequency polygons. The other statistics like $M$, $Mdn$, $SD$, $Sk$, $Ku$, $SE_{sk}$ and $SE_{ku}$ were worked out for general description of the variables as well.
as for the use of some of these statistics for other purposes. This type of analysis was done separately for the groups of urban girls, rural girls, urban boys, rural boys, students of grades IX, X and XI and the total sample. Most of the calculations were done by employing raw score formulas because desk calculator and later on services of IBM computer 1620 were available on the university campus.

In order to test the first hypothesis, original and percentage frequency distributions, percentage frequency polygons, measures of central tendency and dispersion, skewness and kurtosis with their standard errors of measurement were worked out for the total sample. Moreover, chi-square test for normal distribution was applied. The results led to the acceptance of the hypothesis at .01 level of confidence. The acceptance of the hypothesis strengthens the operational definition of creativity which describes it as an attribute differentially distributed among people. The viewpoint of Good and Markel (1959) that creativity is a quality composed of broad continuum upon which all members of the population may be placed in different degrees is also supported by the present findings.

To test the second hypothesis, product-moment correlations between creativity (CY-21) on the one hand and nonverbal intelligence and verbal intelligence on the other, were worked out for the total sample which came out
to be .266 and .335 (significant at .01 level) respectively. The coefficients were not very high. The hypothesis was, therefore, accepted as such. This hypothesis was extended to more homogeneous subgroups formed on the bases of demographic and organismic variables, and the coefficients of correlation in these groups ranged from .041 to .304 for creativity and nonverbal intelligence, and from -.130 to .448 for creativity and verbal intelligence. In general, 'r' values were low even in subgroups as well. These findings of low correlations between the measure of creativity and intelligence are being supported by earlier findings of Meer and Stein (1955), Andrews (1962), Getzels and Jackson (1962), Ripple and May (1962), Torrance (1962), Altenhaus (1964), Richards, Cline and Needham (1964), Wodtke (1964), Cropney (1965) and Madaus (1967). Review of research literature by Torrance (1967) is a very comprehensive evidence covering 178 correlation coefficients between creativity and intelligence. This review reported a median 'r' of .20 which is a low correlation.

Though many researchers have suggested a threshold stage for creativity, perhaps no one so far forwarded any evidence for curvilinear relationship between intelligence and creativity. In this study, therefore, efforts were made to see further whether curvilinear relationship exists between creativity and intelligence. For this, the F-test
of linearity was employed and eta coefficients were worked out. The regressions of creativity scores on nonverbal and verbal intelligence demonstrated that the respective eta coefficients of .314 and .375 were significantly higher than the corresponding product-moment correlations of .266 and .335. The results thus indirectly indicated the existence of a threshold stage of intelligence beyond which any increment in intelligence would not contribute to a corresponding increase in creativity. Similar viewpoints have been presented by Mear and Stein (1953), Barron (1961), Yamamoto (1965), Guilford and Hoepfner (1966), Dacey, Madaus and Allen (1969) and Dacey and Madaus (1971).

To sum up, it is concluded that there exists a low correlation between the measures of creativity and intelligence. There also exists curvilinearity in this relationship, though the relationship remains low. The significant eta coefficients suggest the existence of some threshold stage.

The third hypothesis was tested by the factor analytical approach. The variables relating to creativity, intelligence, achievement and age were treated for correlations, principal-axes factor analysis, and varimax rotation. The six factors derived were named as 'Verbal Creativity', 'Nonverbal Creativity', 'General Scholastic Aptitude', 'Age' (due to marker variable of age), 'Persistency' and 'Special Creative
Activities'. Studies of Ward (1967), Anderson (1964), Wallach and Kogan (1965), Cropley (1966), and Daoey, Madaus and Allen (1969) presented similar findings representing creativity as a multiple group factor construct which is relatively independent from intelligence.

These findings help to conclude that creativity is a multiple factor construct. The operational definition of creativity formulated in this study has, therefore, been further strengthened by the acceptance of this hypothesis.

The hypotheses serially numbered 4, 5, 6 and 2 relating to the effects of demographic and organismic variables namely sex, residence, grade and intelligence upon creativity (CY-21) were studied through four-way analysis of variance design. The F-ratio for sex was not significant, whereas residence, grade and intelligence were contributing significant variance in the criterion variable of creativity. The only interactional effect of sex x residence x grade x intelligence was significant at .01 level indicating the superiority in creativity of a particular group than any other group formed due to the combination of these four variables.

To pinpoint the direction and significance of difference in creativity for the groups formed on the bases of sex, residence and grade, t-test was employed. In addition to this, similar t-test treatment was repeated for the subscores
of creativity as well as for intelligence. As a result of the findings, it was observed that although the sex difference in total creativity scores was not significant yet significant sex differences for verbal and nonverbal creativity were observed when treated separately; girls were superior to boys in nonverbal creativity, and boys were superior to girls in verbal creativity. These significant sex differences in the opposite direction balanced each other in the total creativity score yielding not significant sex differences. The hypothesis that there exists sex difference in total creativity is not accepted but the analysis of the subscores of the creativity revealed significant sex differences. The findings of Yamamoto (1960), Klausmeier et al. (1962), Razik (1964), Klausmeier and Wiersma (1964), Neufeld (1964) and Hill (1966) have reported significant sex differences in the dimensions of creative thinking. The nature of sex differences in the present study is very interesting since girls are superior to boys in nonverbal creativity and vice versa. This finding is contrary to a hypothesis generally available in literature that boys are superior to girls in nonverbal domains and vice versa.

The fifth hypothesis of urban-rural difference in creativity has been accepted since the urban group of students achieved significantly higher scores on the Tests of Creativity. These results are similar to the findings
of Knapp and Goodrich (1952), Thistlethwaite (1958, 1959a, 1959b), and Klausmeier and Weirama (1964). The higher creativity scores of the urban students may be due to the fact that the rural environment presents monotony of activities and occupations as well as dearth of new information and knowledge. Tyler (1969) also tried to explain this phenomenon when he remarked that inferiority of creative talent among rural people may be due to selective migration of more intelligent and creative people from rural to urban residential settings. Anyhow, the hypothesis of urban-rural difference in creativity is accepted. What is the genesis of this difference is still an open question capable to generate new research investigations.

In order to test the hypothesis of developmental trends of creativity, the mean scores of creativity (CY-21) were compared for the students of grades IX and X; IX and XI; and X and XI. The hypothesis of increasing trend of creativity was accepted at the higher secondary stage. The similar extended analysis for the subscores also indicated the developmental trends. In this context, reference may be made to the studies of Lally and LaBrant (1951), Lehman (1953), Wilt (1959), Barkan (1960), Yamanoto (1960), Torrance (1962) and Bedner and Parker (1965). The developmental tendencies may be attributed to (i) increase in maturity and experience, (ii) presence of weeding out and screening process of less
capable students at the lower grade level, and (iii) stimulating effect of school environment. These findings and the probable explanatory hunches may be explored in other independent research projects.

In the context of eighth and nineth hypotheses aiming to study a different criterion variable of achievement in relation to sex, residence, grade, intelligence and creativity, firstly, a four-way factorial design of analysis of variance was employed twice since higher order design was not applicable due to sample difficulties. It was observed that the major effects of residence, grade, creativity and intelligence and the interactional effects of sex x residence x grade were significant for the criterion variable of achievement. Secondly, the t-test approach was further followed to locate the direction and significance of differences due to these five variables. The results show that sex, residence, and grades contribute significantly towards achievement. The comparisons of the mean achievement of four-groups of double, single and no-talented students and those of nine-groups formed on the basis of high, middle and low levels of creativity and of verbal intelligence demonstrated that the two variables of creativity and intelligence independently contributed towards scholastic achievement. It was found that the two single-talented groups — high creative-low intelligent (Ci), and
high intelligent - low creative (Ic) although differed significantly in creativity and intelligence, yet these groups were having comparable mean achievement scores. The results of nine-groups design of HC-HI, HC-MI, HG-LI, MC-HI, MC-MI, MC-LI, LC-HI, LC-MI, and LC-LI (H, M and L stand for high, middle and low, and C and I stand for creative and intelligent respectively) indicate that intelligence and creativity both contribute independently for achievement. There is an indication that intelligence contributes greater variance in achievement as compared to that of creativity. To conclude, the hypothesis that double-talented group of students has higher mean achievement than the other groups, is accepted. This conclusion is supported by earlier findings of Yamamoto (1960), Getzels and Jackson (1962), Torrance (1962), Altenhaus (1964) and Rambo (1964).

The third approach to study the criterion variable of achievement in the context of seventh and ninth hypotheses, consisted of simple correlation, multiple correlation and multiple regression equation. The correlation between creativity and achievement for the total sample was observed to be .385 which is considered to be low. Similar correlation-coefficients for other subgroups formed on the bases of demographic and organismic variables ranged from .08 to .514 with a median coefficient of .360. This leads to the acceptance of the seventh hypothesis relating to
low correlation between creativity and achievement. The multiple correlation between nonverbal intelligence, verbal intelligence, and creativity on the one hand and achievement on the other was .554 which meant that these variables could explain only about 30 percent of the total variance in achievement. Howsoever low was this contribution of variance towards achievement, it might be noted that intelligence and creativity contributed significant variance separately in achievement as was indicated by significant beta coefficients. The hypothesis that creativity and intelligence contribute independently towards scholastic achievement was, therefore, accepted.

11.5. Educational Implications and Suggestions

Before any educational implications or suggestions based on these results are reported, it would be relevant to consider some of the questions and problems fundamental to any recommendation regarding creative talent. The questions as posed by Trowbridge (1966) are: (a) Can creative talent be measured in advance?, (b) Is it capable of modification to a desired direction and extent?, (c) Are the efforts put in to increase the creative talent sufficiently rewarding?, and (d) Are researchers aware of the socio-psychological methods and techniques which would surely contribute to increase in creative thinking? The research studies in creativity have not attained sufficient
maturity to the extent that categorical answers to these questions may be given. Taylor and Barron (1963, p. 373) in their editorial comments said, "We are perhaps more in the dark about the environmental conditions which facilitate creativity than we are about any other aspect of the problem". There are many other instances where difficulties have been observed, experienced and reported by researchers in the context of such fundamental questions. Nevertheless, the investigator subscribes to the viewpoint of Taylor and Barron (1963, p. 373) who remarked "Like creative effort itself, research on creativity must be able to live with imperfections, inevitable incompleteness, a poignant sense of unrealized intention, a need finally to recognize that in many ways it has fallen short. But if the effort has been a lively one and if intentions continue, then there is a happy compensation: we shall perhaps be able to do better in future". Before making any specific recommendation, the investigator further submits that the generalizations based on this study are dependent upon the efficiency of the sample and tools used and are applicable to similar population. Moreover, greater confidence can be placed upon conclusions when applied to groups rather than to individuals. Nevertheless, keeping in view the available resources of money and personnel, and attitudes of the administrators, the investigator would recommend formulation and execution of new policies based on the findings of this study. Assuming
that either answers to the above four questions are partially available or some inevitable incompleteness and imperfections are tolerable, the following few suggestions having educational implications are made:

1. Along with the other psychological variables, creativity should be given due recognition for identifying the talented students. In Indian conditions, the Tests of Creativity should be used after establishing regional and national norms. Being aware of the fact that creativity is a multidimensional construct measurable with other different types of tools and techniques, it is suggested that efforts may also be made to supplement the present Tests of Creativity with other tools as well, especially so, if the implications of a project are intensive and extensive in nature. In connection with the identification of talent, it is important to have a systematic and continuous evaluation process because ideas have already been floated by different researchers that the construct of creativity is relatively unstable, especially at the stage of adolescence. Not only that many tools and many measurements/observations at different points of time-scale are important, but also the identification of creative students requires the help of many different personnel who should make many observations and evaluations in many different fields. Thus, the stage of identification is not equal to the performance on one set of tools, at one time.
and in one field observed by one person, rather it involves all pluralities.

2. Once the creative students and their potential fields are located, parents, teachers, counsellors and all those who have concern for the student and the nation, have to think of ways and means to encourage and foster creativity. Restricting to educational situation in the school, the investigator would recommend, in general, that the aims, curriculum, methods of teaching, promotions and rewards should be remodelled, since it is assumed that the needs of the high creatives are not the same as those of noncreative students. It has been observed that creative students do not learn, behave, express and flourish the same way as others do. Based on this plea, the investigator would recommend that educational policies to preserve and promote creative talent may be reframed keeping in view differential promotions, special classes and schools, enriched and diversified curriculum, subgrouping within a class, individualised instructions and discussions for which the counsellors will have to play special roles.

3. In this direction six different roles which school guidance workers should play in helping highly creative children maintain and develop their creativity are suggested on the lines of Torrance (1962). The six roles are (a) providing the highly creative individual a "refuge", 
(b) being his "sponsor" or "patron", (c) helping him understand his divergence, (d) letting him communicate his ideas, (e) seeing that his creative talent is recognized, and (f) helping parents and others understand him. These suggested roles of counsellors and the modified attitudes of teachers should focus upon the general problems faced by the creative students. The problems (see Torrance 1962) of creative students are: coping with the sanctions of society against divergency, the alienation of one's friends through the expression of a talent, pressures to be a well-rounded personality, divergence from sex-role norms, desires to learn on one's own attempts at tasks which are too difficult, searching for a purpose, having different values, being motivated by different rewards and searching for one's uniqueness.

If these typical problems are not solved through the changed educational system and the changed attitudes and roles of teachers and counsellors, there is every likelihood of a creative student becoming a problem student for the school and being a misfit in the society. In order to save and develop talent, not only the school programmes need modifications, but teachers training colleges, recruiting processes and agencies promoting teachers and administrators have also to be overhauled with a view to stimulate the potentialities of teachers who would be further helpful to the creative students. To argue further,
it is not sufficient to bring changes in different aspects related to students, teachers, counsellors and administrators. More important is the fact that the functional roles in terms of interactions and group dynamics (that is relationship with students on the one hand and different persons and programmes on the other) should be the ultimate target of change to bring improvement for desired goals.

Some of the above recommendations were made on the bases of the important findings that creativity is a multifactor construct having low relationship with intelligence and achievement. These findings implied that most of earlier efforts aiming to identify creative students on the basis of high intelligence scores and or high achievement scores were wasteful. To substantiate this plea it was found in the present study that 77 creative students out of 120 (64 percent or about two third) would be ignored if top 20 percent students selected on the basis of intelligence were termed as creative.

The other specific suggestions made further are based on the results of demographic variables and creativity.

4. The findings that girls were superior to boys in nonverbal creativity and that boys were superior to girls in verbal creativity have refuted the earlier beliefs of the superiority of boys over girls in nonverbal fields and vice versa. This finding implies that choice of curriculum,
occupations and other activities should not be governed by traditional beliefs, rather students should be assisted according to their capacities of creative thinking.

5. Urban students happened to be superior in creativity and if it can be attributed to better environmental conditions in urban schools, it becomes obligatory on the part of the planners and administrators to enrich the rural schools which cater to a large proportion of our student population.

6. With increasing grade level creativity also increases; if it is due to the extended school experience, it is essential to change our educational policy with a view to encourage all those who could be kept in schools till maximum creative level is attained.

11.6. Suggestions for Further Research Studies

1) For the purpose of cross-validating the present Tests of Creativity and the findings of the study, a more comprehensive institutional and cooperative project having a team of workers should be undertaken employing a broad-based and bigger sample at different age levels.

11) Another project which can possibly be undertaken in Indian conditions especially in Panjab University for local standardized tools are available, may be to compare the self-concepts of high and low creative groups of students, followed by case studies.
iii) A section of the so-called indisciplined and maladjusted students is creative; this hypothesis seems to have validity and can be tested since standardized tools in the Department of Education, Panjab University, Chandigarh, are available.

iv) Factorial studies to explore the construct of creativity may be conducted on groups varying on the variables of age, sex, residence, personality types, socio-economic status, caste, religion and even heredity (in terms of identical twins and siblings).

v) Certain experimental projects should be undertaken to pinpoint the effects on creativity of environmental conditions, guidance activities and teaching programmes which are thought to be useful for encouraging creative talent.

vi) Developmental trends of physical conditions, personality characteristics, emotions, needs, aspirations and interests of the creative students may be studied through cross-sectional and longitudinal approaches and may be compared with those of non-creative students.

This evidently is not a complete list of research projects possible in this field. The investigator has suggested the above mentioned projects because these can be the direct outcomes of the present investigation. At
the same time, the investigator is aware of the immense possibilities of carrying out many more research projects having both theoretical and applied implications. To suggest many more research projects and to give the experimental designs will be out of scope for this work. Besides this, priorities of undertaking any research project are always situational to the individuals and the institutions which are interested in undertaking research activities. In the end the investigator simply wants to communicate that to study this domain is important and rewarding and there is immense need of dedicated, serious and continuous efforts on the part of researchers.