2.0.0 Introduction

The review of the past studies of research on relevant areas enables the investigator to get a proper insight into his own problem and prepare a design to attack the problem on hand effectively. Besides this, it also helps him to select appropriate tools, a proper size of the sample, and a suitable sampling design.

The reviews of some of the past studies given in this chapter give a brief sketch of major findings in the different areas of creativity. They are of immense value to the investigator in deciding his strategy to deal with the problems of the present investigation.

In the field of research on creativity new studies are being added on different aspects viz., (1) Press, (2) Person, (3) Products and (4) Process of creativity.
During the last three decades researches have been done on a variety of problems, particularly in the following areas:

1. Sociology of Creativity,
2. Physiology and Psychology of Creativity,
3. Teaching of Creativity.

Creativity is a continuous process starting from one's childhood and covering his entire life. Let's consider the creativity level of different stages of human mind based on some experiments.

2.1.0 Measurement of Creativity

2.1.1 (I) Methods of Measuring Creativity in Early Childhood Period

Many authors and research workers have assessed the creativity of a person at different levels. McCarty (1924)\(^1\) used drawing skill for this. Andorson (1927)\(^2\)

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used responses to ink-blots and concrete observations. Rebot (1926) explored imagination and reasons for the period from childhood to adulthood. Andrews (1930) made careful analysis of development of imagination at different age-levels. According to him imagination starts declining before reason dies.

2.1.2 (II) Method of Measuring Creativity During the Childhood Period

To measure the creativity of the pupils at this stage is important. Colvin (1902) used compositions to measure the sense of humour, imaginative power, feeling and perception.


5. S.S. Colvin. Invention Versus Form in English Composition: An Inductive Study; Pedagogical Seminary, 1902, 9, 393-421.
Simpson (1922)\(^6\) used fifty sets of four small round dots representing the four corners of squares as the stimuli for drawing fluency, flexibility and originality.

Meyer (1906), Meams (1931), Vernon (1948), Barron (1960), Wiltt (1959), Torrance (1962), Weidman (1961) and Ligon (1957) have also studied this period of childhood and puberty.

2.1.3 (III) Methods of Measuring Creativity at Adolescent Period

The available studies of this age group on creativity are mainly of 'Group-tests' having verbal responses thereon. Colvin (1962)\(^7\) has this kind of tests.

Gatzels and Jackson (1958)\(^8\) prepared such tests based on word-association, uses of things, hidden shapes and tables.

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McGuire, Hindman, King and Gennings (1961)\(^9\) prepared and adopted the Guilford tests including the three main features of the test viz., unusual uses, consequences and seeing problems.

The period of adolescence is typical and specific one and that's why creativity can be more or less affected during the period. Most of the studies pertaining to this period tell that there is a decline in imaginative power in seventh and eighth grades. Thereafter it has steady growth in the adolescence period.

Colvin's and Mayer's (1962)\(^10\) shows peek in this skill during sixth grade and decline in the seventh and eighth grades. Mearns (1958)\(^11\) reported that creativity declined in the sixth grade then it rose in the upper classes when the subjects were in adolescent period.

2.1.4 (IV) Methods of Measuring Creativity in Adulthood Period

As the studies mainly adopted were on small children and adolescents, there is paucity of experiments on adults.

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Yet from the available experiments it is found that in twelfth grade there is a little increase (as against the decrease in adolescence) during this period in the creative thinking of an adult.

Lehman (1953)\textsuperscript{12} believed that creativity grows in thirties and declines slowly thereafter. The quality of production is found decreasing as the age advances.

The above stage-wise experiments show that there is increase and decline in creative writing and creative thinking. There is an increase upto a fixed level and during adolescence period there is a decrease in it. But once again in upper standards there is a considerable increase which, in turn, decreases in the period of adulthood. We can summarize from this that we can't predict definitely the rise and fall of creative thinking ability of a typical population unless we have a systematic experiment of research on it.

In India researches in this field are still in their infancy. The following studies which focus some light on the present study have been undertaken in India.

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2.2.0 Study : I : An Exploratory Study of Creativity and its relationship with Intelligence and Achievement in school subjects at Higher Secondary Stage

The aims were : (i) to develop a battery of tests of creativity for measuring verbal and non-verbal factors involved in creativity, and (ii) to explore the relationship between creativity on the one hand and variables of intelligence, scholastic achievement, sex, residential background and age on the other.

Multi-stage random clustered design of sampling was employed to pick-up the sample from the population of students of grade IX, X and XI of the Panjab, Haryana and Union territory of Chandigarh. Different tools, viz., questionnaire for personal data, The Things-Done-of-your-own check list, the Ravan's Standard Progressive Matrices, The Jalota's Group Test of General Mental Ability, school records for scholastic achievement and the Passi's Test of creativity, were used to collect data.

The different sub-tests included in the battery are : (i) the seeing problems test, (ii) the unusual uses test,

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(iii) the test of Inquisitiveness, (v) the square puzzle test, and (vi) the block test of creativity.

The split-half coefficients for three verbal tests had a median 'r' of .80. Test-retest reliability coefficients for the six tests of creativity ranged between .68 and .77. Factorial validity of the tests against factors, viz., verbal and non-verbal creativity ranged from .305 to .745. Percentile norms for all the six tests were established.

The major findings were as follows:

i. Creativity scores were normally distributed among higher secondary students.

ii. Intelligence and creativity are two different constructs. Also creativity is a multi-factor construct having verbal and non-verbal factors.

iii. Residence, grade and intelligence contributed significant variance for the criterion variable of creativity.

iv. Girls were superior to boys in non-verbal creativity and boys were superior to girls in verbal creativity.

v. The significant developmental trends of creativity scores along grade were observed from grade IX through XI.

vi. Urban students were found to be significantly better than rural students.
vii. Scholastic achievement was found to be significantly influenced by the major effects of sex, residence, grade, creativity and intelligence.

viii. The double-talented, single talented and non-talented groups were found to have significantly different mean achievement scores - differences in favour of talented groups.

2.2.1 Study : II : A Factor Analytic Study of Divergent Thinking in relation to certain Personality Dimensions of Higher Secondary School Adolescents

The study intended : (i) to develop a battery of tests of divergent thinking for adolescent boys and girls, (ii) to explore the patterns of growth of divergent thinking ability during adolescence, (iii) to select the test of divergent thinking and eliminate those that did not measure this ability as a distinct and cohesive cognition domain, (iv) to study the factors of divergent thinking ability in the adolescent boys and girls at the age 11+, (v) to study the personality concomitants of divergent thinking factors, and (vi) to study the dependence of personality dimensions, taken separately, on the factors of divergent thinking.

A sample of 540 students was selected for the study.

The following tools were administered to the above sample.

(i) the Banasthali Vidyapeeth Soci-Economic status scale,  
(ii) The Jalota's Group test of Intelligence, (iii) The word  
Fleuncy Test, (iv) The Controlled Association Test, (v) The  
Number Rules Test, (vi) The Sentence Construction Test, (vii)  
The Word Grouping Test, (viii) The Multiple Grouping Test,  
(ix) The similarities Test, (x) The remote Consequences Test,  
(xi) The Plot Title Test, (xii) The Picture Drawing Test,  
(xiii) The Circle Test, (xiv) The A.D. Scale (Dependence-Anatomy),  
(xv) The E-scale (Conformity-non-conformity),  
(xvi) The ES-Scale (Strong weak Ego), and (xvii) The D-Scale  
(Closed Openness of Mind).

The findings of the study revealed the following facts:

(i) autonomy, non-conformity and openness of mind were  
functionally related to the abilities of divergent thinking;  
(ii) the effect of divergent thinking on ego strength was  
little; (iii) autonomy, non-conformity and openness of mind  
could be developed along with the divergent thinking abilities  
by appropriate plans of school education and (iv) autonomy,  
non-conformity and openness of mind could help in understanding  
the divergent thinking of adolescents by regarding them as  
potentially creative persons and differentiating them from  
non-potential creative persons.
The present study was an attempt for developing a battery of tests for identifying creative talent at the primary and middle school stages. The battery consisted of two tests, namely, the verbal test of creative thinking and non-verbal test of creative thinking.

The verbal test included four sub-tests, namely consequences test, unusual test, similarity test and product improvement test. Three types of activities were used for non-verbal test of creative thinking, namely, picture construction activity, incomplete figures activity, and triangle, and ellipses activity.

The final forms of the tests were administered to a sample of 300 urban and 175 rural pupils studying in class VII and VIII. The percentile in classes VII and VIII were established for verbal test of creative thinking.

The findings of the study were (i) the items in each activity correlated high with the total activity scores and 

indicated that the items in each activity were internally consistent, (ii) there was a significant high degree of relationship between the activities of the non-verbal test of creative thinking and the total creativity score. The correlation ranged from 0.634 to 0.941 for urban and 0.312 to 0.850 for the rural sample; (iii) the inter-correlations among the three activities were found to range from 0.303 to 0.477, (iv) the test-retest reliability coefficients for elaboration, originality and total creativity score were found to be 0.932, 0.947, and 0.946 respectively, (v) the validity coefficients against the teacher ratings for elaboration, originality, and total creativity score were found to be 0.346, 0.329 and 0.385 respectively, (vi) the correlations between four test activities namely, consequences test, unusual uses test, new relationship test, and product improvement test and total creativity score for urban and rural students were 0.180, 0.362, 0.806 and 0.761 and 0.646, 0.741, 0.695 and 0.541 respectively, (vii) the test-retest reliability coefficients for the verbal test of creative thinking were found to be 0.945, 0.921, 0.960 and 0.959 for fluency, flexibility, originality and total creativity score respectively, (viii) the reliability of the total creativity score was found to be 0.959 for verbal test of creative thinking, (ix) the validity coefficients for fluency, flexibility, originality and total creativity score were found to be 0.40, 0.32, 0.34 and 0.39 respectively which were significant beyond 0.01 level.
2.2.4 Study: IV: Construction and Standardization of a Test to Identify creative children in the age range of 14 to 16 years

The study was undertaken to develop and standardize a test of creativity for children in the age group of 14 to 16 years.

The test consisted of five sub-tests, viz., (i) Sentence Completion Test, (ii) Uses test, (iii) Creative Writing Test, (iv) Consequency Test, and (v) Problem Solving Test.

Item analysis was done after administering the test to a sample of 350 subjects. The sample for the preparation of norms consisted of 1,000 students from the different schools of Delhi. For the present test decile norms, and standard score norms were established.

The reliability of the test by using test–retest method was found to be 0.75 (N=100). The present test gave a correlation coefficient of 0.72 with the Torrance Test of Creative Thinking; 0.13 (N=70) with a teacher's rating scale, and 0.26 (N=50) with the Raven's Standard Progressive Matrices. The test also correlated high with the Shanker's on the Spot Painting and Writing Test.

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The objectives of the study were: (i) to evolve a test which differentiates between creative and non-creative children; (ii) to study analytically the nature of factors contributing to the phenomenon of creativity described by the test.

The sample consisted of 426 standard IX children of six secondary schools of Gujarat and Mysore State. The test was constructed to identify creative children by means of testing the following factors: (i) fluency, (ii) flexibility, (iii) originality, and (iv) elaboration.

Split-half reliability based on separately timed parts of the test corrected to full length by Spearman-Brown formula was found to be 0.86. The reliability by using K.R. Formula was found to be 0.71. Validity coefficients were found to be between 0.18 and 0.44 on different criteria.

Some of the findings of the study were as follows: (i) creative individuals were relatively more fluent and gave a wide variety of responses; (ii) creative individuals

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preferred indirect literary expressions to direct ordinary expression; (iii) the non-creative showed less or no elaboration; and (iv) creative children in general showed above average performance on the two symbolic abilities.

2.2.6 Study : VI : A Study of Some Correlates of Creativity in Indian Students

The aim of the study was to compare quantitatively significant differences between high creative and low creative groups of students on certain measures of cognitive abilities, personality, manifest anxiety, academic achievement and socio-economic status. It was hypothesized that high and low creative groups would differ from each other with regard to certain cognitive abilities, personality characteristics, socio-economic status and sex.

Along with a battery of test for measuring cognitive abilities and personality characteristics, the Minnesota Tests of Creative Thinking and the Kuppuswamy's Socio-economic status scale were used to collect the data. The other tools like the Jalota's Group Test of General Mental Ability, the Edwards Personal Preference Schedule, and the Taylor's Manifest Anxiety Scale were also used. The Minnesota Tests of

Creative Thinking were administered to a sample of 500 students of Classes VII, IX and X of seventeen schools from three educational zones of Rajasthan to select high and low creative groups. These groups consisted of ninety and eighty-five students with about equal number of boys and girls. F-test, t-test and correlational technique were used for the analysis of data.

The study revealed the following: (i) The high creative sub-groups scored significantly higher the low creative sub-groups on all the four dimensions of creativity on the Minnesota Tests of Creative Thinking. (ii) A comparison of the high creative males with the low creative males elicited significant differences between group IQ means. Mean performance of the high creative females and the low creative females also revealed significant difference between group IQ scores. A positive but not significant 'r' of .102 was recorded between the scores of the Jalota's Group Test of General Mental Ability and the Minnesota Tests of Creative Thinking. In the case of the low creative, r was -.123 which was not significant. (iii) The high creative students scored significantly higher than the low creative with respect to academic achievement. (iv) The high creative subjects exhibited greater achievement, autonomy dominance, change and endurance than the low creative subjects. (v) The high creative females were higher in change and endurance than the high creative males, but the latter were higher in
The high creative females were significantly higher than the low creative females on achievement, autonomy, dominance, change and endurance, but the latter were characterised by difference order, affiliation, succorance and heterosecuality traits. (vii) The high creative males showed greater achievement, autonomy, dominance, change, endurance and aggression than the low creative males. (viii) The low creative males exhibited greater difference and heterosecuality. (ix) The low creative females scored significantly higher than the low creative males on achievement, dominance, change and endurance. (x) The low creative group manifested significantly great anxiety than the high creative group. (xi) A comparison of the high creative males with the low creative males elicited significant differences. (xii) In both the cases it was the low creative who manifested great anxiety.

2.2.7 Study VII: A Study of Creativity and Some Personality Traits of the Intellectually Gifted High School Students

The study was conducted to fulfil the following objectives: (i) to locate intellectually gifted children from

secondary schools, (ii) to study sex differences in creativity and personality traits of the gifted children, (iii) to study differences in creativity and personality traits of the gifted children with respect to their age, (iv) to study the creative ability of these gifted students by relating creativity with intelligence, achievement and personality traits.

A sample of 3503 were randomly drawn from standards VII to XII of twelve secondary schools of Gujarat State with age ranging from 12 to 19 years. The Torrance's Creativity Test, the Cattell's 16-Personality test and Desai-Bhatt Group test of Intelligence were administered to the pupils.

Following were important findings of the study: (i) giftedness was the most effective contributor to all types of creativity scores; (ii) age was an important correlate of creativity at fifteen year age-level; (iii) none of the main effects of I.Q., age and sex upon personality factor A (Cyclothymia Versus Schizothymia) was significant, (iv) giftedness was a significantly contributing factor to personality factor B. (General Intelligence Versus Mental Defect) in all cases, (v) giftedness was contributing to emotional maturity in case of boys, (vi) giftedness, sex and age did not contribute significantly to surgency, (vii) there was low positive significant correlation between intelligence and types of creativity scores, (viii) almost all creativity scores had low positive correlation with achievement scores.
in all school subjects except English, (ix) there was no significant correlation between different creativity scores and different personality traits except in factor B (General Intelligence Versus Mental Defect), factor G, (Character or super Ego strength versus Lack of Rigid Internal Standards), factor I (Premesis Versus Harrias), factor L (Protension Versus Relaxed security), factor $Q_1$ (Radicalism Versus Conservatism of Tempament), factor $Q_3$ (High Selt Sentiment Formation Versus Poor self sentiment Formation), and factor $Q_4$ (High Ergic Tension Versus Low Ergic Tension).

The investigator feels indebted to all these predecessor investigators. The review of their studies shows that they have investigated different aspects of the relationship of creativity with various personality aspects, intelligence and achievement. The studies pertain to the population of different age-groups. However, the age-group of primary school stage does not appear much in all the studies under review. So the investigator decided to have a population of that age-group in the context of its different psycho-socio correlates.

Thus the review of the studies described in this chapter have proved to be of immense use to the investigator in developing the strategy to deal with the problem of the present investigation. These studies have commulatively
provided him help in planning his study. The present investigation is undertaken in two phases. One is to construct and standardize the test of creative thinking ability and the other is to use the tool to study the psycho-socio factors related with creativity of the pupils of primary school stage i.e. of the age group 11 to 13.

The review of various studies has thus provided here unique and significant clues in attacking his problem, which is his chief gain from the said effort. As a result the investigator has developed a tool of his own and developed his own strategy of work.