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CHAPTER 3
REVIEW OF RELATED STUDIES

3.1 INTRODUCTION

In any research work the first task of the investigator is to look into the past work done in the area in which he proposes to take the research. The review of related studies implies locating, reading and evaluating report of research as well as the report of casual observation and opinion that are related to the individual's planned research project.

The review of the related study is nothing but a wild look into the past research work done in the specified fields. It provides information related to the type of study and type of design that may be eventually used in conducting research. Research works done in the past serve as solid foundation on which any new investigation firmly rests.

Walter (1963) emphasizes the meaning of related literature as: “The literature in any field forms the foundation upon which all future work will be built.”

The author further observes that if one fails to build this foundation of knowledge provided by the review of the literature, his work is likely to be shallow and naive, and will often duplicate work that has already been done better by someone else. Good, Bar and Scates (1954) points out: “The keys to the vast storehouse of published literature may open doors to sources of significant problems and explanatory hypotheses, and provide helpful orientation for definitions and comparative data for interpretation of results. In order to be truly creative and original, one must read extensively and critically as a stimulus to think.”

3.2 PURPOSES OF THE REVIEW

Every investigator must know what sources are available in the field of research and how many of them are worthy to be used. As on other field, in
the field of education also, the research worker needs up-to-date information regarding the problem, i.e. what has been thought and done in the particular area.

Good, Bar and Scates analyse the purpose of research review as follows:

a. To show whether the evidence already available solves the problem adequately without further investigation and thus to avoid the risk of duplication.

b. To provide idea, theories, explanations or hypotheses valuable in formulating the problem.

c. To suggest methods of research appropriate to the problem.

d. To locate date useful in the interpretation of result.

e. To contributing to the general scholarship of the investigator.

When the investigator makes a careful review of the related studies, he becomes aware of the important and unimportant variables in the concerned area of research. A careful review also helps the investigator in selecting the variables lying within the scope of his interest, in defining and operationalising variables and identifying variables which are conceptually and practically important. Thus, a review of the related studies, on the whole, prepares the investigator to formulate a research problem in which conceptually and practically important variables are selected.

3.3 IMPORTANCE OF THE REVIEW

A review of the related studies helps the investigator in avoiding any duplication of work done earlier. A careful review always aims at interpreting prior studies and indicting their usefulness for the study to be undertaken. Thus prior studies serve as the foundation for the present study. In some cases duplication or replication of prior studies become essential. This is especially true when the investigator wants to test the validity of the earlier studies. In such a situation, too, a careful review helps the investigator in getting
acquainted with the number and nature of the studies related to the study whose validity is being assessed at present.

A careful review of the related studies enables the investigator to collect and synthesise prior studies related to the present study. This, in turn, helps the investigator in building a better perspective for future research. A synthesised collection of prior studies also helps the investigator to identify the significant overlaps and gaps among the prior works.

A review enables the investigator in discovering important variables relevant to the area of the present study. When significant variables are discovered, the relationship among them can be identified. Subsequently, the identified relationship is incorporated into different hypotheses. Thus, for conducting a scientific study, the relationship between the different variables must be explored by reviewing the related studies so that a good context may be built up for subsequent investigation.

A careful consideration of ‘recommendations for further research’ in various research studies guides the investigator regarding the suitability of the problem and assists in delimiting his research problem. Therefore, the investigator has tried to review the literature of the post studies which correlates with achievement and creativity to benefit himself in the above mentions ways.

The review of the related studies is divided into three parts:

1. Studies of Relationship of Creativity with other Variables,
2. Studies of Creative Thinking Development,

3.4 STUDIES ON CREATIVITY

Can creativity be developed or not is a debatable problem, which has always remained a focus of discussion among the researchers working in the area of creativity. Many studies have been done all over the world to answer for the question about the development of creativity and relationship of
Creativity with other variables. Some comprehensive reviews in this regard have been conducted, are worth to note here.

3.4.1 Studies of Relationship of Creativity with Other Variables

The review of the studies done on relationship of Creativity with other Variables are noted hereafter.

Study-1  N. S. Chauhan (1978)

Problem:

Creativity Components as Functions of Personality Factors, Sex and Adolescence among University-going Students

The objectives were, (i) to explore the nature of creativity, (ii) to enhance the concept through specific probes of its components, (iii) to determine adolescent growth of the five components of creativity, and (iv) to determine personality correlates of creativity components.

The sample comprised 240 university-going students. It was selected by employing the multistage random sampling method. The Creativity Test developed by Chauhan and Tiwari was used to measure creativity. Personality was measured with the help of the 16 PF Questionnaire developed by Cattell. The data were analysed with the help of (2X2X3) factorial design analysis of variance of equal cell size.

The findings were: 1. At the age level 17 years, fulsome expression was positively correlated with creativity components. In late adolescence, it promoted creative production (CP), originality, masculine and feminine creative production (CP). At the age level of 21 years, affectothymia continued to promote CP, masculine CP, originality and masculine originality. Effectivity of affectothymia as a correlate of creativity components, with a depression at 19 years continued to grow. 2. Intelligence demoted fluency and flexibility and rise of CP and flexibility on the low level proved them to be negatively correlated with intelligence, but the decline of feminine, flexibility on the low level of intelligence put it as a positive correlate of intelligence. Intelligence was a correlate of creativity but a negative one of fluency,
flexibility, CP and masculine flexibility. It was a positive correlate of feminine flexibility. 3. CP increased consistently and originality increased after the age of 19 years. Fluency at 17 and 21 years was masculine and was feminine at 19 years. Masculine fluency declined up to 19 years, whereas feminine fluency increased up to 19 years. As a reverse of fluency, flexibility of males increased up to 19 years but feminine flexibility declined up to 19 years. Thus the age level of 19 years remained a point of depression for masculine fluency and feminine flexibility. 4. Super-ego at its weaker end acted as a better correlate of adolescent components of creativity. 5. Harria was a positive correlate of feminine CP, feminine fluency and masculine flexibility up to 19 years and of originality after the age of 19 years. Harria was a negative correlate of feminine flexibility up to 19 years Both adequacy and guilt-proneness were correlates of adolescent components of creativity. Conservatism was a positive correlate of adolescent components of creativity up to 19 years. Group-dependence was a positive correlate of feminine CP, feminine fluency, masculine flexibility and originality during late adolescence. It appeared as a negative correlate of masculine fluency and feminine flexibility. Low self-sentiment remained a positive correlate of feminine CP, feminine fluency, originality and masculine flexibility during late adolescence. It appeared as a negative correlate of masculine fluency and feminine flexibility. Adjustment either low or high was a positive correlate of feminine fluency. Adjustment, independent of its level variations, was a positive correlate of originality. Adjustment or less of it was a positive correlate of ISP. Adjustment was a negative correlate of feminine flexibility. Subduedness was a positive correlate of feminine CP, fluency, feminine fluency, originality, flexibility, masculine flexibility and ISP. It remained a negative correlate of fluency up to 19 years and of feminine flexibility as well. 6. Both CP and flexibility were feminine but ISP was masculine, originality and fluency were sexbilateral. Fluency was feminine at 19 years with weak ego, desurgency, conservatism, group dependence, introversion, and with
less of adjustment; at 21 years, with low intelligence, weak super-ego and with guiltproneness. Creativity components were sex sensitive. 7. Feminine fluency and masculine flexibility increased up to 19 years but masculine fluency and feminine flexibility declined after 19 years.

**Study-2**  V. R. Bindal (1984)

**Problem:**

A Study of Creativity in relation to Experimental Attitude and Pupil's Perception of Parents' Attitude towards Creativity

The objectives of the study were, (i) to ascertain the relationship between creativity and experimental attitude, (ii) to determine the relationship between creativity and pupil's perception of parents' attitude towards creativity, (iii) to study the relationship between experimental attitude and creativity, (iv) to find out the relationship between verbal creativity and nonverbal creativity, (v) to compare the performance of scheduled caste/scheduled tribe and non-scheduled cast non-scheduled tribe students on the measures of creativity, experimental attitude and pupil's perception of parents' attitude towards creativity, (vi) to compare the performance of males and females on the measures of creativity experimental attitude and pupil's perception of parents' attitude towards creativity, (vii) to compare the performance of science and arts students on the measures of creativity, experimental attitude and pupil's perception of parents' attitude towards creativity, and (viii) to compare the performance of IX and X grade subjects on the measures of creativity, experimental attitude and pupil's perception of parents' attitude towards creativity.

Four hundred students were randomly selected from 3952 students studying in ten higher secondary schools of Ratlam city. The sample comprised 200 boys and 200 girls of grades IX and X. In each group, 100 students of arts and 100 of science were present. The whole sample also had 100 SC/ST students. Mehdi's Test of Creative Thinking (verbal and nonverbal) in Hindi was used to measure creativity. Its test-retest reliability
coefficient was 0.98 and validity coefficient ranged from 0.32 to 0.40. Experimental attitude was measured with the help of the Pupil Situational Inventory developed by Cheong (1969). The test-retest reliability coefficient was 0.81. The empirical validity with creativity as a correlate was 0.82, with pupil's attitude towards school as a correlate, it was 0.30, and with sociometric status it was found to be 0.29. Pupil's perception of parents' attitude towards creativity (PPPATC) was measured with the help of the Pupil's Perception of Parents' Attitude Towards Creativity Inventory developed by the investigator. The test-retest reliability and split-half reliability coefficients were found to be 0.938 and 0.723 respectively. The concurrent validity was established by finding the correlation between PPPATC and creativity which was 0.564, and between PPPATC and experimental attitude which was 0.734. The data were analysed by using the t-test and product-moment correlation.

The findings were: 1. A significant relationship was found between various components of creativity (verbal fluency, verbal flexibility, verbal originality, total verbal creativity, non-verbal originality, non-verbal elaboration, total non-verbal creativity, and composite creativity) and experimental attitude (for males, females, science subjects, arts subjects, IX graders, X graders, and for the total sample). 2. A significant relationship was found between various components of creativity and pupil's perception of parents' attitude towards creativity (for males, females, science students, arts students, IX graders, X graders, and for the total sample). 3. A significant relationship was found between experimental attitude and pupil's perception of parents' attitude towards creativity (for males, females, science students, arts students, IX graders, X graders, and for the total sample). 4. A significant relationship was found between verbal creativity and non-verbal creativity (for males, females, science students, arts students, IX graders, X graders, and for the total sample). 5. A significant difference was found between the performance of scheduled caste/scheduled tribe, and non-scheduled caste/non-scheduled tribe students on all the components of verbal and non-verbal

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creativity on experimental attitude, and on PPPATC. 6. No significant difference was found between the performance of males and females on nearly all the components of verbal and non-verbal creativity, experimental attitude, and PPPATC, except non-verbal originality, in which males were higher. 7. A significant difference between the performance of science and arts students was found on all the components of verbal and non-verbal creativity, experimental attitude and PPPATC. 8. No significant difference was found between the performance of IX and X graders on verbal originality, total verbal creativity, all the components of non-verbal creativity and PPPATC, whereas a significant and positive difference between the performance of IX and X graders was found on experimental attitude showing the superiority of X graders. A significant but negative difference was found on verbal fluency and verbal flexibility, showing the superiority of IX graders.

The implications are: (1) Teachers can promote creativity by encouraging the experimental attitude in the pupils through hypothesizing and heurism. (2) Through curricular and cocurricular programmes, attempts should be made to provide heuristic and hypothesis-making experience to the arts, SC/ST and IX grade students to enhance their experimental attitude. This experience will make them more flexible and open-minded. 3. Through the adult education programmes, efforts should be made to make parents aware and appreciative of creativity, and its contribution to national development. This will make them receptive and responding to the creative ideas of their children.

**Study-3**  G. S. Gupta (1984)

Problem:

Fundamental Dimensions of Creativity

The findings of the study were: 1. There was a general factor of creativity as in intelligence. 2. Instead of Flu, Flex, Ori and Ela coming out as different common factors, and each of them running through the different tests which were scored for them, it was found that the tests were separate identities
almost as wholes and their Flu, Flex etc. had a different and separate factorial nature depending on their nature and product. 3. The nature of the common creative ability factors of the study were: (i) Factor A-This had loadings of 0.25 or more only in Torrance's dimensions of Flex, Flu and Ela; and Char's dimensions of Flex, Ori and Ela. The ability involved may be called as 'diversifying responses to figural stimuli'. (ii) Factor B- Substantial loadings in Flu and Flex of Torrance's test items only. This ability may be called 'situational evolvement'. (iii) Factor C- 0.25 or more loading in Mehdi's and Pasi's Flu and hex, and in all the dimensions scored in Char's test. This factor may be called 'ideational fluency'. (iv) Factor D-loading of about 0.25 only in Wallach and Kogan's test scores of Flu and Ori, and Mehdi's dimension of Ela in non-verbal items. This factor was termed the capacity for production of associative content. (v) Factor E-substantial loadings in Wallach and Kogan's Ori and in all the dimension; of Char's test. This factor may be called the 'capacity for highly original innovation'.


Problem:

A Study of Some Factors of Environmental 'Press' Facilitating Creativity in Language Arts

The study attempted to investigate two comparatively neglected aspects in creativity research, viz., (i) creative product, and (ii) creative 'press', both related to school education. Specifically, it explored the structure of creativity in language arts and studied its facilitation through the 'press' of environment.

The study was conducted on a sample of 550 eighth grade children, comprising 247 boys and 303 girls from 22 school classrooms selected at random from the schools of Bhopal city. The data were collected with the help of a Creativity Test, Hindi Achievement Test and Environmental Press Scale constructed for the study and Jalota's Mental Ability Test.

The findings of the study were: 1. In the first instance, the structure of creativity in language arts was derived through factor analysis. Basically, it
was found to be composed of imagery and composition. Later, composition
was found to split into poetry and story dimensions. With this split, humour
emerged as an independent cluster spreading equally over imagery, poetry and
story. Studied along with intelligence and language ability, the chain of
variables suggested a split of creativity into primary and secondary processes.
The first part comprised imagery, humour and intelligence followed in
sequence by the second half which included language, story and poetry. 2.
Investigations into facilitation of creativity in language arts was made on the
basis of environmental 'press' to include, (a) global factors, (b) 'press' factors
in the domains of home, school and peers, and (c) the treatment factor. The
analysis from global factors revealed that boys excelled girls on imagery,
humour and intelligence. However, male superiority was found in families,
average on all accounts. This support vanished in disadvantaged environments
whereas in more advantaged environments the situation even reversed in
favour of girls. Another interesting finding was that father's education and
books at home supported creativity among boys but remained insignificant for
girls. 3. The process factors were analysed in each domain separately and, in
all, eight factors were derived to cover cognitive home, aesthetic home, home
independence, school instruction, school enrichment, school openness, peer
activity and peer openness. Canonical correlation analysis revealed a very
significant contribution to creativity of both boys and girls. Peer activity,
cognitive, home and school instruction emerged as the main potent
facilitators. 4. Lastly, facilitation by treatment 'press' was explored in three
classrooms by pre-test post-test design. Covariance analysis demonstrated that
experimental treatment facilitated creativity without having any adverse side
effect on regular classroom achievement.

The study raises hope for schools of the possibility of achieving
creativity goals without hampering routine instruction. Emergence of 'school
instruction' as a significant process factor also supports this hope. The
implications of the factors of 'peer activity' and 'cognitive home' are clear. The
school has to provide a bridge between the home and itself, and to channelize student activity into their peer group.

**Study-5** D. Kundu (1984)

**Problem:**

A Study of Creativity, Ego-Strength and Extraversion-An Empirical Investigation

The objectives of the study were (i) to find out the interrelationship among the three components (originality, flexibility and fluency) of creativity, (ii) to find out the nature of relationship between creativity with respect to sex and curricular streams, (iii) to find out the interrelationship among creativity and its components, ego-strength and personality factors (extraversion, neuroticism and psychoticism) with sex and curricular streams, (iv) to compare individuals having high and low ego strength, high and low extraversion, high and low psychoticism with respect to their creative responses, (v) to compare incidence of creativity among hysterics and dystheemics, (vi) to verify the orthogonality of relationship among the three dimensions of personality (extraversion, neuroticism and psychoticism), (vii) to find out the interaction, if any, among creativity and various correlates of the study, and (viii) to investigate the nature of distribution of components of creativity, ego strength, extraversion, neuroticism and psychoticism.

A sample of 252 subjects was selected from the metropolitan city of Delhi. The subjects in the study comprised XI grade students of arts and natural sciences of age level 15 + years. In order to study the factors which were responsible for creativity, the independent variables were (a) ego-strength, (b) Extraversion, (c) Neuroticism, (d) Psychoticism and the dependent variables (a) originality, flexibility and fluency, (b) creativity as a composite ability. The tools used in the study were (i) the Torrance Test of Creativity, (ii) the Eysenck Personality Inventory.

The findings of the study were: 1. Introverts were more creative than extraverts. 2. Creativity was positively and highly related with ego-strength. 3.
Science students were more creative than arts students. 4. Creativity was negatively and highly related with psychoticism. 5. Individuals high on ego-strength were more creative than those low on ego-strength. 6. The relationship between creativity and extraversion was curvilinear. 7. Dysthemics were more creative than hysterics. 8. The high creatives were consistently high on originality. 9. Introverts showed greater originality than extraverts. 10. Subjects higher on ego-strength had higher scores on originality. 11. Science students had higher scores on originality than arts students. 12. Males had higher scores on originality than females. 13. Introverts had higher scores on flexibility than extraverts. 14. Subjects higher on ego-strength had higher scores on flexibility. 15. Science students had higher scores on flexibility than arts students. 16. Introverts were more fluent than extraverts. 17. Science students were more fluent than arts students. 18. Psychoticism was negatively and highly related with ego-strength. 19. Males evinced greater psychoticism than females. 20. Extraverts were higher on neuroticism than introverts. 21. Arts students were high on extraversion that science students. 22. Science students were higher on ego-strength than arts students.

Study-6 C. K. Bhogayata (1986)

Problem:

A Study of the Relationship amongst Creativity, Self-concept and Locus of Control, Ph.D. Edu., Sau. U.

The main objectives of the study were, (i) to compare the creativity, self-concept and locus of control of boys and girls, (ii) to compare the creativity, self-concept and locus of control of urban and rural students, (iii) to find out the magnitudes and directions of the correlations of self-concept and locus of control with fluency, originality and creativity, (iv) to find out the magnitudes and directions of the multiple correlations of self-concept and locus of control with fluency, originality and creativity, (v) to study the predictability of fluency, originality and creativity, (v) to study the predictability of fluency,
originality and creativity of the students from their self-concept and locus of control, (vi) to compare the fluency, originality and creativity of the students with a high and low self-concept, (vii) to compare the fluency, originality and creativity of the students with internal and external locus of control, and (viii) to study the interactive effect of self-concept and locus of control on creativity. Thirty-one operational hypotheses were formulated for the study.

The sample comprised 1,014 students with 671 boys and 343 girls, and 685 urban and 329 rural students. It was selected by employing the stratified random cluster technique from population of about 10,000 students studying in Std. X of Gujarati-medium secondary schools in Bhavnagar district. The three tools used to collect data for the study were the Creative Expression Test (CET) constructed and standardized by Janakaray Dave, the Self-Concept Inventory (SCI) constructed and standardized by Jayantilal Shah, and a Gujarati adaptation of Rotter's Internal-External Locus of Control Scale (RIELCS) prepared by the investigator. The reliability and validity indices of the CET, SCI and RIELCS ranged from 0.812 to 0.942 and from 0.470 to 0.883, respectively. The technique of a back translation was employed to examine the Gujarati adaptation of the RIELCS for any possible culture bias. The descriptive statistics such as mean, medium, standard deviation, zero-order correlation and multiple correlation and inferential statistics such as multiple-regression equation, z-ratio, t-ratio and ANOVA were employed to analyse the data.

The major findings were: 1. Boys were more creative than girls, but they did not differ in their self-concept and locus of control. 2. Urban students had a higher self-concept than rural students, but urban and rural students did not differ in their creativity and locus of control. 3. The zero-order correlations of self-concept and locus of control with fluency, originality and creativity were 0.248, 0.219, 0.253, 0.239, 0.241 and 0.240 respectively. The correlation between self-concept and locus of control was 0.345. All the correlations were linear, positive and significant at 0.01 level. 4. The multiple
correlations of self-concept and locus of control with fluency, originality and creativity were 0.297, 0.282 and 0.301, respectively. These multiple correlations were positive and significant at 0.01 level. 5. The fluency, originality and creativity of the students were predictable from their self-concept and locus of control. 6. The students with a higher self-concept were more fluent, original and creative than the students with a lower self-concept. 7. The students with internal locus of control were more fluent, original and creative than the students with external locus of control. 8. The main effects of self-concept and locus of control on creativity were significant, but their interactive effect on it was not significant.

**Study-7** N. N. Desai (1987)

**Problem:**

An Investigation into the Creative Thinking Ability of Students of Higher Secondary of Gujarat State in the Context of some Psycho-socio Factors

The objectives of the study were, (i) to prepare a reliable and valid creative thinking ability test, (ii) to study the trend of creative thinking ability of pupils of higher secondary schools, (iii) to study the trends of creative thinking ability of pupils of different sexes, (iv) to study the trends of creative thinking ability of pupils of science and common streams, (v) to study the creative thinking ability of pupils of different socioeconomic levels, and (vi) to study creative thinking ability in relation to scholastic achievement, anxiety and reasoning ability.

A verbal and non-verbal creative thinking ability test was constructed to measure fluency, flexibility and originality (by verbal test) and fluency, flexibility and elaboration by a non-verbal test. The test was standardized over a sample of 608 students which included students from rural and urban area, both girls and boys. The reli- ability of the test was established by test-retest, split-half, Rulon Formula and Flanagan Formula. It ranged from 0.82 to 0.90. The concurrent and congruent validity were established. The SES scale by
B.V. Patel and I.A. Vora, the Anxiety Scale by Nijhawan, the Non-verbal Reasoning Test by the investigator, the percentage marks obtained by the students at the SSC Examination were used for the study. For studying neuroticism and other personality variables the investigator used a self-prepared questionnaire. The 2 X 2 factorial design was adopted and analysis of variance technique was used for testing the hypotheses.

The major findings were: 1. There was no difference in creative thinking ability of urban and rural higher secondary students. 2. There were no sex differences with regard to creative thinking ability of higher secondary students. 3. There was no difference between the means of science and common stream students. 4. There was no significant difference between the means of high SES and low SES students. 5. The mean difference between two groups, namely, the high anxiety and low anxiety group, was highly significant and was in favour of the low anxiety group. 6. The students with the radical personality trait were more creative. 7. The students with a low neuroticism level were more creative. 8. The students with high emotional stability were better in creative thinking than students with a low emotional stability. 9. The students with good reasoning ability were better in creative thinking than students with poor reasoning ability. 10. The students with higher scholastic achievement were found better in creative thinking than students with low scholastic achievement.

3.4.2 Studies of Creative Thinking Development

The review of the studies done on Creative Thinking Development are noted hereafter.

**Study-8** R. M. Olton and R. S. Crutchfield (1970)

Problem:

"Developing the skills of Productive Thinking"

The Productive Thinking programme developed by R. M. Olton and R. S. Crutchfield, University of California, to improve creative-problem-solving skills in cragmont school of Unified District. In order to improve creative
thinking in classroom, investigator initiated this study devoted to productive thinking skills development. This study suggests that some important cognitive abilities can be developed through the elaboration of the most complex process of productive thinking in children.

Objectives:

(i) To improve creative-problem-solving skills in the schools.
(ii) To make most students more systematic and more imaginative problem solvers.
(iii) To enhance the students’ attitude related to creative thinking such as open-mindedness and appreciation for novel ideas.
(iv) To improve their perception of themselves as capable thinkers.
(v) To close a pronounced gap between productive thinking potential and productive thinking performance of school pupils.

Sample and Statistical Techniques:

A total of 280 students, comprising five-fifth-grade and have five-fifth grade classes. The mean IQ of the group was 115, with a range of IQ from 80 to 150.

$X_2$, t-test, composite score and non-parametric median test were the techniques to analysis data.

Tools:

(i) Standardized Achievement Battery.
(ii) Pre-test battery of Productive Thinking Problems.
(iii) The eight week Instructional PTP:
   (a) A set of sixteen basic programmed lessons. An individual booklet consisted of deductive type mastery-cartoon text-formulate the lessons.
   (b) A set of supplementary exercises intended to strengthen the skills taught in PTP lessons.
(iv) Teacher’s guide
(v) Post-tests Battery
(vi) Follow-Test Battery

(vii) Objective Questionnaire consisted of twenty statements similar to children attitude.

(viii) Carefully interwoven material-intended to inflame students’ attitude toward thinking.

Experiment:

The basic lessons and supplementary exercises were used in a carefully coordinated instructional schedule occupying approximately one hour per day for four days of each school week. The fifth day was used for individual make ups. Basic lessons and supplementary exercises used over a period of eight weeks. Typically, a basic lesson was given one day, followed on the next day by a brief class discussion and by a set of supplementary exercises related to those prior lessons. Two basic lessons and two sessions of supplementary exercises plus discussion were covered each week; thus the total instructional programme occupied approximately thirty two hours. The intent was to give the students the material under practical conditions approaching those of regular, large-scale use, yet without providing any special teacher training in productive thinking. Accordingly, the only preparation for the teacher was that supplied by a Teacher’s Guide, which gave background information on a pedagogical aims and methods of the PCP and suggestions for administering the materials and conducting class discussions.

Findings:

(A) Composite performance of instructional and control groups on PT Test Batteries.

The findings are as follows:

(i) Performances of the instructional and control groups were identical on the pre-test battery, indicating that they were well matched in productive thinking proficiency, before instructional began. Indeed, the small difference that did exist favours the control group.
(ii) After the instructional programme has been completed, a clear and substantial superiority in thinking was shown by the subjects who had received instructions.

(iii) On the follow up battery, performance of the instructional group continued to surpass that of the control group by a significant margin. Thus the gain in thinking skills evident more than six months after instruction had ended.

The positive effect of training was not limited to only a few of the instructed subject but was evident across the board regardless of whether a student was initially low or high in thinking proficiency.

(B) IQ and the Effect of Instruction:
Following two findings were noteworthy:

(i) Students at high and average intelligence levels demonstrated significant instructional benefits, and confirm similar results in earlier studies with the programme of the Convington and Gutchfield, 1965 and Olton, 1967.

(ii) The performance of the high IQ group surpassed that of average IQ groups, both trained and untrained. Thus there is a positive relationship between IQ and performance on productive thinking task.

(C) Change in Attitude:
The greatest shift occurred between the pre-test and follow-up test, nine months later of the instructional students, 68 percent showed an increase in their favourability index over this period as compared with 42 percent of the control group students. The variance in individual scores was very high and obtained differences were only marginally significant. The majority of the subjects felt that they had improved in thinking skills, had come to enjoy using their minds more than before and were favouring inclined toward further instruction in productive thinking.
Conclusion:

Instructional programme did not achieve its effects by changing the basic cognitive capacity of the students. Important genius in thinking ability might be achieved by providing appropriate instruction in the use of cognitive capacities that are naturally present at each successive stage of development.  

Study-9  G. S. Jarial (1971)

Problem:

An Experiment with a programme for Creativity Development.

Objectives:

1) To study the effect of experiment on verbal creativity.
2) To study the effect of experiment on the various components of non-verbal creativity of the students.

Sample:

The group undergoing treatment in verbal form of programme consists of eighty students who were divided into two comparative groups; namely experimental and control, on the basis of IQ scores and the scores of components of verbal creativity.

Tools and Techniques:

1) IQ test,
2) Creativity test and
3) Experimental Creative Development Programme.

Execution of the ECDP:

The students of the experimental group have given treatment in verbal instructional material whereas no treatment was given to the subjects of control group. The subjects of experimental group who consisted of eighty were divided into two comparable groups on the basis of components of non-verbal creativity. One of these groups was named as experimental group and the other was named as experimental group and the other was termed as the control group. Like the verbal treatment group, here too the students of
experimental group were given treatment in non-verbal instructional materials, whereas, no such treatment was given to the students of control group. The treatment given to the subjects of both experimental groups continuous for fifty days initializing one period per day of thirty five minutes duration. On one set of alternative days the subjects were administered the lessons from the instructional materials and the other set of alternate days discussion around the already completed lesson was done. The TTCT, Form, Form A (verbal and figural) were administered to the students of the respective groups at present stage and their parallel tests (TTCT Form B) were administered to the similar subjects at post-test stage.

Findings:

There was a significant effectiveness of the programme in developing different components of verbal creativity and various components of non-verbal creativity of subjects.

Discussion:

The development of the various components of verbal creativity, as a result of training in the programme was observed to be independent of the effect of sex, socio-economic status and initial creative levels.

The development of the different components of non-verbal creativity was not influenced by the variations in SES of the students. The sex and initial creativity levels did not seem to effect the different components of student’s non verbal creativity, except elaboration, with respect to which the female subjects and the subjects of initially low creativity levels gained signed significantly higher than male students and the students of initially high creativity levels respectively.

Study-10 Ashok Nirpharake (1974)

Problem:

"An Experimental Study of some methods of Training Creativity."

Hypotheses:

The following hypotheses were formulated for this experimental study.
(i) There will be no significant difference in the effect of verbal creativity on the students of rural and urban background.

(ii) There will be no significant difference on male and female students.

Result:

Rejection of null hypotheses i.e. both have done better significantly in post-test.

Experimental Sample:

Dr. Ashok conducted different experiments for the development of creativity on different samples. This project lasted for five years of Thana prabodini, Pune. The experiments were done on the students ranging from Std. V to X and on boys and girls subjects of the total population.

Importance of Experiments and Activities:

These experiments were directly related to creativity through school subjects. To ensure that creativity or creative thinking is a wide range of experiences, attempts were being made to introduce principles of creative thinking in every subjects.

Activities:

For this experiment, following activities were used:

(A) Lectures by Resource Persons
   (i) Recognizing creative students,
   (ii) Blocks to creative thinking,
   (iii) Guiding Creative Talents,
   (iv) The Creative Teachers.

(B) Exercises of the Techniques of Stimulating Creativity.
   (i) Brain Storming
   (ii) Check list.

(C) Practicals proceeded by short tasks by the resource persons and followed by discussion:

It can surely be concluded from the given freedom to experiment, it is possible....

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(i) For interested teachers to practice principles of enhancing creativity through their daily teaching, to construct innovative exercise in divergent production in almost any subjects and to make the project method a fruitful practices.

(ii) For teacher innovator to conduct training in creative thinking for school children.

Rejections of null hypotheses were made in both the cases of hypotheses, rural and urban subjects with respect to their significant difference from T1 and T2 save.

Brain storming, check list and other techniques of stimulating creativity, developed during this experiment, and would be useful for the present investigation undertaken by investigator.

**Study-11** D. J. Treffinger (1974)

**Problem:**

Improving children’s Creative Problem-Solving: The Purdue Creativity Project

In this study Purdue Creative Thinking programme (PCTP, Feldhusen, Treffinger and Bahlke, 1970) and the Productive Thinking Programme CPTP, Covington, Crutchfield Davies and others (1972) were used with the sample of elementary school children.

**Objectives:**
The specific objectives of the study were:

(i) To evaluate the effectiveness of the PTP and the PCTP under conditions of self instructional use by pupils compared with utilization which incorporated active teacher participation.

(ii) To compare the effectiveness of the PCTP, in relation to each other as well as to uninstructed controlled groups. Under two distributions of instructions: Massed (Completion of instruction in four weeks) and distributed (completion of instruction in eight weeks.).
(iii) To compare the effectiveness, in each of the conditions specified above, in classes taught by teachers who were themselves high and low in divergent thinking ability.

(iv) To assess the effectiveness of the programme under the conditions specified in objectives one through three, with respect to several criteria of creative thinking and problem solving.

Sample:

Seven hundred ninety three pupils and their teachers participated in the project. The subject come from 36 fifth grade classrooms in two public systems, one in northern and one in central Indiana.

Procedures:

The Torrance Tests of Creative Thinking (TTCT) were administered to all to determine their level of divergent thinking ability. On the basis of their composite fluency, flexibility and originality scores the teachers were assigned either to a high group (above the Median) or a low group (below the Median) two classes in each group were then randomly assigned to experimental arrangements (PCTP or PTP, 4 weeks or 8 weeks Discussion or Non-discussion).

The teacher in discussion group were asked to participate actively with their pupils in the creatively instruction, and to initiate activities which would provide applications of the instruction to other classroom lessons. They were also given suggestion for bulletin boards, games role playing, other activities which would relate the instructional programme’s content to other school situations.

In non-discussion groups the teachers were asked to distribute the creativity material, answer pupils routine questions and supervise their classrooms, but not to discuss specifically the content of the programmes or otherwise it make any special attempts to encourage creative thinking among their pupils. Four controlled groups received no special instructions nor were these groups stratified by level of teacher’s divergent thinking ability.
Therefore a factorial design (2x2x2x2) with single control group statistical procedures followed.

Tools:

The following tools were administered to all pupils in experimental and controlled classes.

(i) Torrance Test of Creative Thinking:

All the pupils were given five sub-tests from B of the TTCT as a pre-test and five comparable sub-test from Form A as post-tests. Three sub-tests involved verbal content and two involved figural content.

(ii) The old Black House Problem:

The Old Black House, a programmed problem solving task was developed at the Berkeley Creativity Project and has been used in other studies of effectiveness of the productive Thinking Programme (PTP). The children were given as a post-test, a brief story involving a derived by using criteria developed by the authors of the test.

(iii) Real Life Problems:

Two real life problems entitled “Fighting on the play ground” and “Life of School” was presented as post-test to all the pupils. Both tests were scored for the number of solutions generated.

(iv) Other Problems:

Finally all pupils were also given to verbal problem-solving tasks and the first was a multi students anagram task called ‘Antelopies’. Each problem was scored for the number of solutions produced.

Findings:

The findings of this study were:

(i) Both the Purdue Creative Thinking Programme (PCTP) and the Productive Thinking Programme (PTP) have been shown the effect significant enhancement of fifth grade children’s divergent thinking ability (particularly verbal abilities).
(ii) Both the programmes have been shown to be associated with superior performance by fifth grade pupils, in comparison with controls, on several criteria of Creative Problem Solving.

(iii) When the programmes were utilized in as short a period of time a four weeks, superior performance seemed to be associated more frequently with non-discussion and with teachers rated low divergent thinking.

(iv) The PTP, originally designed as a self instructional programme, appeared to be less influenced by variations in the rate of presentation of teacher participation and teacher's level of divergent thinking. For the PCTP, however, there were some evidences that as the rate of presentation became slower, the role of discussion and the positive effects of high divergent thinking ability in the teacher increased.

**Study-12**

J. P. Feldhisen and Fred Widlak (1975)

Problem:

Creativity Training in Elementary Schools in Brazil.

This study was done by John Feldhusen and Fred Widlak at the University of Bazitiz. In this study fourteen out of twenty six stories of the Purdue Creative Thinking Programme (PCTP) and corresponding exercise were used with a sample of children in Brazil. The choice of 14 dramatized stories was based on their relationship to the programme of history and social studies in Brazilian schools. The programmes were translated into Portugese by the first author.

Sample:

A total of 578 fourth and fifth grade children from twenty four classes in both private and public elementary schools in Brazil participated in the study. There twelve fourth grade and twelve fifth grade classes with eight classes assigned to each of two treatment conditions (Programmes with reinforcement of pupils' performance on the creativity exercises and programmes without reinforcement of pupils' performances on the creativity exercises.) and eight classes assigned to the control group conditions.
Procedure:

Before instruction began two verbal sub-tests (unusual and product improvement) and two figural sub-tests (circle and picture completion) of the Torrance (TTCT) were administered as pre-test to all pupils in both the experimental and controlled groups. The tests were translated into Portuguese. The instructional material was then administered to the experimental groups by the teacher once a week. For the fourteen consecutive weeks the teacher read the instruction and the story to children where tape players were not available. The pupils then worked on the printed exercises. In one experimental condition (programme with reinforcement) the exercise completed by the children were evaluated by the experimenter. She wrote encouraging comments on their paper intended to reinforce fluency and elaboration (e.g. very good) good, good but try harder, the harder etc., and then gave back to children. Pupils in other experimental condition received no creativity training. At the end of twenty eight weeks TTCT form A was administered as post-test to all pupils of the project.

A 3 x 2 x 2(Treatment x Sex x Grade) analysis of covariance was used to analyse pupils performance on each of the twelve creativity measures. Previous research indicated that the creativity sub-tests were task specific and should be analysed separately. The co-variants for the divergent thinking measures were the respective TTCT pre-test measures. Post-hoc individual comparisons between adjusted means were made for significant effects using the Newman-Keuls procedures. Further analyses of co-variance were carried out to analyse the effect of treatment using the class as the sampling units.

Findings:

Using individual subject as the sampling unit, a consistent finding across all dependent variable was that no interaction effect reached statistical significance. The main effect of the treatment was significant for all the three creativity dimensions of Fluency, Flexibility and Originality for lines and unusual uses sub-tests. Here the treatment effect was also significant for
figural fluency on the lines and picture completion sub-test; and for verbal originality on the unusual uses sub-test. The significant classes within treatment effect indicate differences among the classes in the effectiveness of the programme.

**Study-13**  
Jean Piaget (1978)

**Problem:**

"A Critical Experiment Study to know the Effect of Brain Storming Technique in Relation to Group Brain Storming and Individual Session."

**Objectives:**

(i) To study the effect of individual Brain Storming session.
(ii) To study the effect of Group Brain Storming Technique to solve problem creatively.
(iii) Comparative study of individual and group brain storming session in terms of the quality and originality of ideas produced.

**Sample:**

A group of five members was selected for the study.

**Tools and Techniques:**

Investigator set up a test by giving following puzzle box to a group of friends.

He asked them to arrange four match sticks as shown and place a piece of "dirt" in the "shawl". By moving only two match sticks, subject should get the dirt out of the shawl.

Box solving problem in groups and in individual session technique was used for this study.

**Findings and Conclusion:**

The comparisons of individuals and groups in terms of the quality and originality of ideas produced showed that individuals working alone score higher than the groups.

Perhaps the answer to whether groups or individual are better solvers, in that it depends on the kind of problem and, of course, on the group.
Brain Storming and Role-Play Techniques.

Problem:

"An Analytical Study of some scholastic Conditions and practices as contributory Factors to Creative Ability''.

This study was undertaken by M. N. Deshmukh for a Ph. D. work. It aims at including desirable changes which must be brought about in day-to-day teaching practices to create conducive climate in the classroom.

It was undertaken with the following specific objectives in view:

(i) To find out the effect to which the theoretically postulated creative teaching practices are being used in the present classroom.

(ii) To find out the potential of theoretically postulated creative teaching in Indian classroom in term of gains in creative ability.

(iii) To study the creative effect of the original teaching practices viz., Traditional Role-Play and Brain Storming on the development of Creative ability and scholastic achievement.

(iv) To study the differential gain in creative ability of the pupils having varying levels of intelligence and individual creative ability.

(v) To study the influence of sex difference on creative ability of the pupils.

(vi) To study the relationship between intelligence and creative ability.

(vii) To suggest measures for in-cooperating applications of the findings of this study in the educational system to make it more meaningful and effective and lively.

Tools:

To collect the data, the following tools were used.

(i) Classroom creativity observation schedule (ccos) by Denny-1969.


(iii) Socio-Economic Status Scale (SESS) by Kuppuswamy.

(iv) Torrance Test of Creative Thinking.
Sample:

For the experiment one school was selected from twenty schools. It was Vidarbha Buniyadi High School, Om Nagar, Nagpur. This school was open for all type, moderate size school. It was therefore considered as a representative one and selected for the experiment.

Procedure:

After the pre-testing, the experiment started on the second week of January and continued for six weeks. Thirty three lessons including three practiced lessons were taken; five lessons a week for each of the experimental group.

The data on classroom creativity were collected by tool (i) and analysed in terms of relative frequencies of occurrence of and non-occurrence of the behaviour and percentages. To compare the three treatments in terms of their effectiveness in developing creativity and improving scholastic achievement of the students. The three groups were matched statistically for the comparisons. Therefore Multi Factor Analysis of covariance (ANCOVA) having controlled and experimental groups was employed to test the hypotheses related to comparison between groups on post-test scores for various creativity and scholastic achievement variables. The students were again divided onto three groups accordingly to different levels of intelligence and initial creative ability. To find out whether these groups differ significantly on the variables of gain in creative ability, Analysis of covariance (ANOVA) technique was employed.

Conclusions:

When the two approaches, i.e. Role-playing and Brain storming were compared, Brain storming was found more effective than role-playing in
establishing better pupil rapport, in explicit encouragement to unusual responses and creative thinking and more interesting to students.

The ANCOVA result indicated significantly higher to scholastic achievement in Marathi language for the students taught through brain storming and role-playing than the traditionally taught students when the initial differences in achievement were adjusted.

The results of this study indicated significant sex difference in creativity among class VIII graders. In general, girls were found more creative than boys.

It is, therefore, concluded that creativity and intelligence are moderately positively related at the lower level of IQ and that there are sex difference in this relationship, i.e. girls high on IQ tend to be more creative than boys. It also can be inferred that the children high on verbal ability will tend to be more creative than those possessing less of it.

**Study-15** Feldhusen (1981)

**Problem:**

Development of Purdue Creative Thinking Programme.

This PCPT first prepared by Bahike and Feldhusen in Purdue University in 1970 and was finally revised in 1981.

**Tools:**

a) Audi-taped Programme:

The PCPT consists of twenty eight audio-taped programmes on eight pages. A set of three to four printed exercises for each programmes. The taped programme consists of two parts (i) three to four minutes presentation designed to teach principles or ideas to improve creative thinking and (ii) eight to ten minutes story about a famous American pioneer.

b) Exercises for Practice:

The exercises for each programme consist of printed directions. Problem or questions which are designed to practice in fluency, flexibility, originality and elaboration in thinking subject matter and teaching strategy.
c) The content:

The content of the audio-tapes focused on social studies. It teaches writing and listening skills related to the language art.

Administration of PCPT:

It is designed to be administrated on a group setting or individual learning. In developing some goal to provide direction for efforts were formulated as under:

1. Focus on famous people and events that represent methods of creative teaching.
2. Present information as a vehicle and stimulus for creative thinking.
3. Teach creative thinking and problem solving.
4. Involve students in creative verbal activities.
5. Use auditory rather than visual and stimuli to encourage imagination.
6. Undertake a substantive programme of research and formative and summative evaluation.

Presentation of the PCTP:

A typical format is to present one programme each week and to devote about forty five minutes to the tape and activities. After a brief introduction by the teacher, children can discuss what they know about the person featured in the PCTP item. This motivates the children to listen carefully. The type is played for fifteen minutes. Activity sheets are then distributed and discussed to know whether children understand the instructions. Some exercises sheets namely verbal fluency, flexibility and originality; and the other are to strengthen by nonverbal exercises. Figural activities stress elaboration with three factors.

Results and Evaluation:

There are at least fifteen published reports summarizing research and evaluation on PCTP.

One of the major studies showed that children who had experienced the programme scored higher than controlled ones on verbal and figural
originality, verbal fluency, and non-verbal elaboration and language skills. A subsequent project showed increasing fluency and originality especially at fourth grade level for children who had been through programme.

Activities were the most important and effective. It become evident that children make greater gains when teacher retrain from extensive discussions of the stories.

It determined by scientists carried out further researches that the teachers' role can facilitate greater creative growth when programmes are used over longer rather than massed pence of time.

PCTP is useful for a teacher to learn a great deal about creative teaching from the introduction to the tape.

The result of the present study suggests that this cognitive development is an important area for further research.

**Study-16**  S. B. Bhaskar (1981)

**Effectiveness of Verbal Creativity Instructional Material**

**Problem:**

A study of the Effectiveness of Verbal Creativity Instructional Material at school stage.

**Hypotheses:**

1. There will be no significant difference in the effect of verbal creativity materials on the students of different creative potentials.

2. There will be no significant difference in the effect of verbal creativity on the students of different SES.

**Tools:**

(i) Passi Creativity Test

(ii) Verbal Creative Instructional Material.

**Sample:**

The sample comprised of fifty is Std. VI of fifteen schools of Banglore district. The fifteen schools, five in each of three educational districts were selected.
Experimental Design:

Single group pre-test Experimental design was selected.

Procedure:

PCT comprises six tests, three verbal, two non-verbals and one with non-verbal stimuli but verbal responses. Four of the tests, three verbal tests and one with non-verbal stimuli with verbal responses were selected as the instructional material that would be developed only in verbal form. The four tests viz., (i) seeing problem tests, (ii) unusual uses tests, (iii) Consequences tests; and (iv) test of inquisitiveness were translated into local language Kannada.

As the children of Std. VI would not be fluent and fast in writing as their counterpart in secondary, higher secondary schools. The time per test was increased to one and half minutes. The tests with increased time duration were administered by the investigator in all the schools.

Subjects were provided the cyclostyled copies of verbal creativity instructional material with enough space was for subjects to work out. The investigator read the first half of story and motivated the subjects. The subjects have to solve the puzzles, riddle etc. Only after they solved all the puzzles, the second half was read to them.

Findings:

Out of three levels of creative potential high, middle and low null hypotheses were rejected in case of middle and low creative potential groups and not in each of high creative potential group.

Study-17 P. K. Gupta (1985)

Problem:

Development and Evaluation of Creativity Training Programme for Sixth Grade Children

The objectives were (i) to develop a creativity training programme (CTP) for VI grade children, (ii) to study the effect of the creativity training programme upon the development of verbal fluency, verbal flexibility, verbal
originality, composite verbal creativity, non-verbal originality, non-verbal elaboration, and composite non-verbal creativity of VI grade children, separately, (iii) to study the interaction effect of CTP and level of intelligence on the development of verbal fluency, verbal flexibility, verbal originality, composite verbal creativity, nonverbal originality, non-verbal elaboration, and composite non-verbal creativity of VI grade children separately, (iv) to study the effect of CTP and sex on the development of verbal fluency, verbal flexibility, verbal originality, composite verbal creativity, non-verbal originality, non-verbal elaboration, and composite nonverbal creativity of VI grade children separately, (v) to study the interaction effect of level of intelligence and sex with CTP on verbal fluency, verbal flexibility, verbal originality, composite verbal creativity, non-verbal originality, non-verbal elaboration, and composite nonverbal creativity of VI grade children separately, and (vi) to find out the reactions of the students towards the creativity training programme. The hypotheses were: (1) There is no significant difference in the mean gain scores of the verbal fluency, verbal flexibility, verbal originality, composite verbal creativity, non-verbal originality, non-verbal elaboration, and composite nonverbal creativity, separately between the students of the treatment group who are given training through CTP and the students of the non-treatment group who did not get such training. (2) There is no significant interaction of the level of intelligence with CTP on the development of verbal fluency, verbal flexibility, verbal originality, composite verbal creativity, non-verbal originality, non-verbal elaboration, and non-verbal composite creativity. (3) There is no significant interaction of sex with CTP on the development of verbal fluency, verbal flexibility, verbal originality, composite verbal creativity, non-verbal originality, non-verbal elaboration, and composite non-verbal creativity. (4) There is no significant interaction of the level of intelligence and sex with CTP on the development of verbal fluency, verbal flexibility, verbal
originality, composite verbal creativity, non-verbal originality, non-verbal elaboration and composite non-verbal creativity.

The sample comprised 357 students (188 girls and 169 boys) from government schools. The 2 X 3 X 2 factorial design was employed. The independent variables were: treatment conditions (training through CTP, and no training), intelligence (high, average and low), and sex (male and female). Jalota's Group Test of General Mental Ability was used to measure intelligence. Baqer Mehdi's Verbal and Non-verbal Tests of Creative Thinking were used to measure verbal and non-verbal creativity. A Creative Training Programme (CTP) was developed by the investigator. A CTP questionnaire was used to find out the opinion of the students concerning the creativity training programme. The data were processed with the help of analysis of variance, Hartley's Test and t-test.

The findings were: 1. The creativity training programme was successful in developing creative thinking abilities, both verbal and non-verbal among students. 2. As far as the interaction of the level of intelligence with CTP on the development of various components of verbal and non-verbal creativity and composite verbal and nonverbal creativity was concerned, the findings of the study did not indicate any significant interaction between intelligence level and CTP except for verbal originality. 3. The CTP was equally effective for both male and female students. 4. No significant interaction was found among the level of intelligence, sex and CTP for any of the components of creativity. 5. The majority of students felt that they had improved their creative thinking skills.

**Study-18** B. S. Nanadanpawar (1986)

Problem:

Development of Linguistic Creativity among the Students-An Experimental Study

The hypothesis which formed the basis of the study were: (1) Teaching through a creative method improves Marathi language proficiency of students.
Teaching through a creative method develops linguistic creativity among students. Teaching through a creative method develops such abilities as are involved in linguistic creativity as vocabulary, sentence construction, poem composition, story writing and imagination among the students.

The sample for the study consisted of ninth class students offering Marathi as mother-tongue. Two equivalent groups of students were formed on the basis of a test in Marathi. Experimental and control treatments were randomly assigned to these two groups. A suitable adaptation of a test of literary creativity in Marathi developed by M.B. Kundley was administered to the ten groups as a pre-test. The experimental group was taught Marathi through a creative method developed by the researcher and the control group was taught through a traditional method for a whole session. The two groups were post-tested on the different items of the same test. t-test was employed for comparison of the two groups on the gain scores.

It was found that the experimental group scored significantly higher than the control group in (i) language proficiency, (ii) overall creativity, and (iii) all the abilities involved in linguistic creativity.


Problem:

"An Investigation into the Effectiveness of Purdue Creative Thinking Programme on the Creative Abilities of Elementary School Children."

This study was done by J. Z. Patel at Sardar Patel University.

The PCTP consists of thirty two programmes on the life of great people and events in American History. Out of these, the investigator translated eighteen programmes into Gujarati with necessary modifications. Further he developed other similar programmes based on Indian History. The series of twenty five international people and events is essentially oriented to social studies. Since it is a biographical series, it also relates very closely to school curriculum. Each programme consists of one creative activity work-sheet. It also contains three or four similar exercises.
Sample:
A total of 315 fifth grade students from eight classes of the schools of three talukas of Kheda district participated in this study. Out of eight classes, four classes were treated as experimental classes and four classes were treated as controlled classes.

Procedure:
The Creative Ability Test developed as a part of this programme by J. Z. Patel was administered to all students of eight classes with a view to forming equal groups. Then the CTP was administered in the experimental group followed by discussion. Once a week for first three weeks and then twice a week for the rest eleven weeks. At the end of 14 weeks, CAT was again administered as a post test to all students under study. General Ability Test (J. Z. Patel) was administered to obtain IQ of each child.

Statistical Analysis:
Two equal groups were formed on the basis of the creativity test (pre-test) scores. A 2x2x2 (treatment x IQ x sex) functional design was used and the analysis of variance (ANOVA) was used to analysis the pupils performance on creativity and its components measure- Fluency, Flexibility and Originality.

Results and Discussion:
The main effect of treatment, the training of creative by CTP, was significant for the creativity and its two component measures: Fluency and Originality.

The main effect of IQ was significant but that of sex was not significant.

Thus it could be said that creativity training could be profitably imparted to the children in the developing country like India.

It may be observed from the above review that there is a general paucity of studies pertaining to the development of creativity. Apart from the
fact that only a limited number of attempts have been made to explore this important area of research and only a few procedures to develop creative have been tried so far, their finding and, also not conclusive. Hence, in the existing state of affairs, it is not possible to form a final opinion regarding the adaptability or usability of a particular creativity developing procedure in the Indian culture. But it may be said at the outset that, like other culture it is very much possible to develop students’ deliberately designed creativity developing programmes.

**Study-20**  M. J. Amin (1988)

**Problem:**

To Study the Effectiveness of Creative Thinking Programmes on the Creativity Level of the School Children in relation to the Programme Correlates

The objective of the study was to develop a creative thinking programme (CTP) for enhancing the level of creativity in children with special reference to time duration for implementing the programme, teacher variability, discussion pattern in a group and programme correlates. The hypotheses examined were: (1) A creative thinking programme increases the level of creativity of students. (2) A creative thinking programme increases the creativity components scores for fluency, flexibility and originality of the students.

An experimental factorial design (2 X 2 X 2) with a single control group was employed. The independent variables were varied at two levels. In each of the eight cells, 20 subjects were randomly chosen. The control group comprised 40 subjects. Thus, in all, a sample of 200 subjects of class V was employed. The Creative Ability Test standardized by J.Z. Patel was used to measure creativity and its components. The experimental treatment, namely, the creative thinking programme developed by J.Z. Patel, was used to enhance creative ability. Analysis of variance and t-test were applied for data analysis.
Some of the major findings were: 1. The main effect of the treatment—the training of creativity by the creative thinking programme—was significant for creativity and its component measures: fluency and originality. 2. The main effects of the two factors, time duration and group discussion, were found significant on creativity and fluency thinking ability. Thus, when the programmes were utilized for as long a period as 12 weeks, enhancement of creativity seemed to be superior, irrespective of discussion and programme instructors. 3. After the completion of every creative thinking programme, group discussion seemed to be worthwhile in terms of ideas produced. 4. The main effect of programme instructor was not significant.

The educational implications are: (1) National education policy should put special stress on the development of creativity in primary school children. (2) The programme to enhance creative thinking can be implemented within school hours, during the regular timetable. (3) Creativity can be introduced through co-curricular activities, social sciences and general sciences. (4) Involvement of the students in creative thinking would provide highly motivating opportunities to achieve many good and appropriate responses to the stimulus.

**Study-21**  B. B. Shah (1991)

**Problem:**

An experimental Investigation of the Effect of Selected Teaching Strategies on the Development of Creative Thinking and Achievement in Science.

**Objectives:**

The objectives of the study were:

(i) To find out the effectiveness of the strategies $S_{t1}$, $S_{t2}$, $S_{t3}$ and $S_{t4}$ on the development of creative thinking ability of standard VII pupils.

(ii) It was found that the four strategies of teaching had significantly differential effects on the development of originality and flexibility
but the F ratio for the effect of strategies was found to be not significant in the case of fluency.

(iii) The St4 produced significantly high mean scores for achievement of the pupils than all other strategies. St3 and St2 produced significantly higher means scores than St1 and there was no evidence of significant difference between St3 and St2.

(iv) The St4 was more effective in developing creative thinking and its components as compared to all other strategies.

(v) It is observed that the effects of strategies were dependent upon the level of intelligence, sex and creativeness of pupils.

(vi) St3 i.e. dominancy of practical work did not show any significant superiority over lecture with respect to low intelligence and low creativeness girls.

3.4.3 Studies of Effectiveness of Synectics Model

The review of the studies done on Synectics Model of Teaching are noted hereafter.


Problem:


This study guides teachers to develop language ability among students rather than simply using language as an information giving system. Creative language ability is most desired in languages, especially in Hindi, and the Synectics Method of teaching used in this study helps in improving creative potential in the languages. The study centers round the effects of the Synectics Method of teaching for developing language creativity among students.

Objective: To find out the effects of the Synectics Method of teaching on the improvement of fluency, flexibility, originality and elaboration factors and their summated scores with respect to (a) plot building, (b) dialogue
writing, (c) poetic diction, (d) descriptive style, (e) vocabulary test, and (f) total language creativity.

Methodology: For the present study, Class IX students of Arya Girls High School, Shabad Markanda (Haryana), were administered the intelligence test and SES scale. On the basis of the scores on these scales, initially a group of 216 students were categorized as high, middle and low intelligence and socio-economic status. The study employed two types of tools, i.e. teaching and measuring tools. The teaching tools included Lesson Plan Formats, Lesson Plans, Lesson Plan Guide and Worksheets. The measuring tools included Language Creativity Test developed by Malhotra And Sucheta Kulshreshta's Socio-economic Status Scale (Urban). As per the objectives, a four-way factorial (2x3x3x2) ANOVA and t-ratio were employed.

Major Findings: (1) The students who were exposed to the Synectics Method of teaching showed significant improvement on all the four factors, viz. fluency, flexibility, originality and elaboration as well as on their total scores of the plot building aspect of language creativity. With levels of intelligence, the students showed more improvement in all the four factors, i.e. fluency, flexibility, originality, elaboration as well as on their counterparts. The levels of socio-economic status did not show any such difference. However, after the treatment, students of low SES showed higher improvement than their counterparts. (2) The Synectics Method of teaching affected the improvement of the students on all the four factors, viz. fluency, flexibility, originality and elaboration as well as on dialogue writing aspect of language creativity. However, the improvement was not attribute to levels of intelligence and socio-economic status as the F ratio was not significant. (3) The students after the treatment of the Synectics Method of teaching showed improvement on the poetic diction aspect of language creativity. They also showed improvement in all the four factors, i.e. fluency, flexibility, originality and elaboration. The levels of intelligence did not affect the improvement on all the four factors (e.g. fluency) but it did affect factors like...
flexibility, originality and elaboration as well as their total scores. High-intelligent students showed more improvement on these factors than their counterparts. Levels of socio-economic status did not show any difference. (4) The treatment affected improvement on all the four factors, viz. fluency, flexibility, originality and elaboration, as well as on their total scores of the descriptive-style aspect of language creativity. The Synectics Method of teaching significantly differed in its effectiveness from that of conventional method. High-intelligent students showed more improvement on all the four factors, viz. fluency, flexibility, originality and elaboration, as well as on their total creativity scores than their counterparts. The levels of socio-economic status did not affect the scores of the students. Further, the students of low socio-economic status showed more improvement after the treatment than their counterparts. (5) The groups of students who were exposed to the Synectics Method of teaching showed significant improvement on all the four factors, viz. fluency, flexibility, originality and elaboration, as well as on their total scores of vocabulary test aspect of language creativity. The levels of intelligence also affected the improvement in the case of the total score. Levels of socio-economic status did not show such difference. (6) The treatment affected improvement in the students on language creativity scores. After the treatment, the students who were exposed to the Synectics method of teaching showed significant improvement on fluency, flexibility, originality and elaboration and total scores of language creativity. Besides the treatment, levels of intelligence also affected the improvement. High intelligent students showed more improvement on fluency, flexibility, originality, elaboration and total scores of language creativity than their counterparts. Levels of SES also showed a contribution in improving language creativity amongst students. After the treatment, the students of high SES showed the highest improvement on the factor of fluency.
Problem:

Impact of Synectics Model of Teaching in life science to develop creativity among pupils

Invention and creativity are essential for progress of society and making the life more meaningful. So there is need to orient students in creative thinking. Young people face tremendous challenges for the future which include reduction of natural resources and enhancing problems to everyday life. So investigation on how effectively to stimulate student’s inventiveness of creativity is important and a worthwhile research endeavour before the society. Most of the research works on creativity was carried out in USA. Isaksen etal(1993) opined creativity is a multifaceted phenomenon that results in production of new and useful ideas. It is the research of interactions among several components of creativity such as person, process, product and press(Trefinger etal,1993). Studies on mind in relation to creative thinking were conducted by several workers(Suddendorf and Fletcher-Flin,1997). Works on creativity especially on nurturing and promoting creative thinking in class room setting is at nascent stage in India. Therefore much remains to be explored and accomplished in this emerging field. There are large number of methods for developing creative thinking such as brainstorming, brain calming, mind control, synectics, scenario writing, meditation, creative dreaming, sociodrama, psychodrama, destructuring-restructuring, imagery, analogy, awareness, development, gestalt therapy etc. Some of these have been tried out by different researchers in the field of education. Synectics is an interesting new approach to the development of creativity in school children designed by William J.J. Gordon and his associates. Through the metaphoric activity of the synectics model creativity becomes a conscious process. Metaphors establish a relationship of likeness, the comparison of one object or idea with another object or idea by using one in place of other. Through these
substitutions the creative process occurs connecting the familiar with the unfamiliar or creating a new idea from familiar ideas. Metaphor introduces conceptual distance between the student and the object or the subject matter and prompts original thoughts. There are two strategies of teaching based on Synectics model. One of it is “Creating something new” which is designed to make the familiar strange, helping students to see old problems, ideas or products in a new and more creative light. The other strategy is “Making the strange familiar” which is intended to make new, unfamiliar ideas more meaningful. The role of teacher is to guard against premature analyses and closure. Here, the investigator had adopted the first strategy as she had tried to help students to create something new. It had stimulated the students to see and feel the original idea in a variety of fresh ways.

Hypotheses:

(1) There is significant difference between effects of Synectics model and traditional method of teaching life science in development of creative thinking ability of students.

(2) The Gain score in creativity of the experimental group taught Life Science by Synectics model was significantly higher than the control group taught by traditional method.

(3) The training in creativity by teaching through synectics model produce significantly higher achievement in science.

(4) The experimental group taught through synectics model obtains significantly higher post test scholastic achievement score than the control group.

Methods and Procedures:

Sample:

It constituted 120 students of class-IX of two schools of which 64 were girls and 54 were boys. These two schools are Oriya medium high schools situated in Banpur town of Khurda district of Orissa. Among them, one
school (School-I) had facility for coeducation and the other (School-II) was a girls high school.

Tools:

Jalota's Group Test of General Mental Ability was used to measure intelligence. Mehdi's Verbal Test of Creative Thinking was administered to find out total creativity scores.

A life science achievement test prepared by the investigator with content validity and coefficient reliability of 0.74 was used to measure achievement scores.

Procedure:

The students were divided into two groups in each school. The Experimental group and the Control group had equal number of students. The groups were constituted by considering the previous science achievement scores and their intelligence. There was no significant difference in intelligence and achievement score of such groups. The investigator administered Jalota's General Mental Ability test to obtain intelligence score of students. She had also used science achievement score of students in half yearly examination for the purpose. Then she taught life science through synectics model for 20 weeks to the experimental group of both the schools while same topics were taught by concerned science teacher by traditional method. At the end of experiment, Baquer Mehdi's Verbal Test of Creative Thinking was administered as post test to both the groups to obtain creativity scores. The investigator also administered Life science achievement test prepared by herself to both the groups. Total marks secured by students in science and other subjects in the subsequent annual examination were considered for testing significance in science achievement and scholastic achievement.

Statistical Analysis:

The significance of difference in pre test and post test correlated mean scores were tested by t-test to find out effect of training on creativity and
achievement scores The t-value between gain scores was found out using pooled variance.

Results:

Comparison of Synectics model with traditional method of Teaching

The effect of training on creativity to develop creative thinking ability of students was studied through first hypothesis. As creativity is a measure of fluency, flexibility, originality, so post test score of all such components were compared between two groups for convenience of discussion. It was found that the t values between post test and pre test scores of fluency, flexibility, originality and creativity were not significant in control group. The t value between post test fluency scores in experimental group were 2.307 and 2.295 in girls as well as 2.131 in boys which were significant at 0.05 level of significance. The corresponding t values of flexibility scores were 2.433, 2.407 and 2.108 which are also significant (P<0.05). The t values with respect to originality were 2.441, 2.365 and 2.297 which are also significant (P<0.05).

It was observed that t values between post test and pre test creativity scores were 2.076 and 2.421 in girls which was significant at 0.005 level of significance and that of boys was 2.295 which was also significant (P<0.01). It indicated post test scores of fluency, flexibility, originality and creativity were significantly different from pre test scores in experimental group. So it can be concluded that there is significant difference between effects of Synectics model and traditional method of teaching life science in development of creative thinking ability of students. Thus the first hypothesis is accepted.

Gain in Creativity of Synectics Model:

Gain in fluency, flexibility, originality and creativity scores were compared between experimental group and the control group to test the second hypothesis. The t value of gain in fluency scores between two groups were 3.579 and 6.336 in girls and 5.612 in boys which are significant at 0.01 level of significance. The respective t values of gain in flexibility were 4.309, 8.698 and 8.828 which are also significant (P<0.01). The corresponding t value
in gain of originality were 5.783, 6.225 and 12.172 which are also significant (P< 0.01). The t value of gain in total creativity scores were 7.058 and 9.102 in girls and 10.623 in boys which are significant at 0.01 level of significance. So it can be concluded that the Gain score in creativity of the experimental group taught Life Science by Synectics model was significantly higher than the control group taught by traditional method and thus the second hypothesis is accepted.

Impact of Training on Science Achievement:

The investigator administered achievement test in life science immediately after completion of experiment and its post test scores were obtained. Then marks secured in subsequent annual examination in science were considered. Such two categories of scores were analysed to test the fourth hypothesis. It was observed that the t value of investigator made science achievement scores were 3.944 and 5.279 in girls and 3.386 in boys which are significant at 0.01 level of significance. The corresponding t value in annual examination science achievement were 5.138, 5.228 and 5.224 which were also significant (P<0.01). It indicates that the training in creativity by teaching through synectics model produce significantly higher achievement in science. Hence the fourth hypothesis is accepted.

Impact of Training on Scholastic Achievement:

It was found that the t value of scholastic achievement scores of experimental and control groups were 2.849 and 4.028 in girls which are significant (P<0.01). However such t value in boys was 2.192 which was significant at 0.05 level of significance. So it can be concluded that the experimental group taught through synectics model obtains significantly higher post test scholastic achievement score than the control group. So the fourth hypothesis is accepted.
Effectiveness of Synectics Model of Teaching in enhancing creativity, academic achievement and achievement motivation of learners

The growth and development of human civilization since the prehistoric era till today is the result of explosion of knowledge and innovations in different fields. All such innovations are directly or indirectly related to human ingenuity and creative potentialities. As such, the creative individuals are the treasure of any nation. Creativity as a psychological construct is more or less present in each and every human being which is to be unfolded and nourished through a well planned and purposive system of education. Creativity is not only concerned with the creation of novel products but it is very much concerned with innovation of original solutions to problems at hand. As such, creative potentialities of the individuals need be developed among all the individuals through appropriate means for the greater benefit of the society. Education as we know is the most effective means for development of the innate abilities of the individuals, appropriate educational programmes need be evolved in the form of teaching techniques for the development of creative ability of the children. It may be mentioned here that the present day classroom transaction system provides little opportunity for creative work. The materials presented to the pupils are very much polished and finished products providing very little scope to think critically and divergently. Therefore, the teachers need be trained in appropriate creative teaching techniques to develop the same among the children. The synectics model of teaching is one such approach specifically meant for enhancing creativity. The term synectics refers to putting irrelevant things together. Such task is generally accomplished by use of metaphorical exercises the keys to development of conceptual distance and ultimately contributing towards development of creative potential. This model of teaching generally consists
of two approaches such as Making Familiar Strange (MFS) and Making Strange Familiar (MSF). On the MSF approach a number of research evidences are found in India and abroad as developing creative talent but a few research evidences are there on MFS approach especially in Indian context in developing creative talent of the learners. Therefore, to support its credibility in favour of enhancing creative ability an attempt has been made through the present investigation to study the effectiveness of the synectics model, model of teaching in enhancing the creative thinking abilities of the children along with their academic achievement and achievement motivation as the present day educational system gives emphasis on integrated development of the children.

Objectives:

The study was undertaken with the following objectives;

(i) To study the effectiveness of the Making Familiar Strange (MFS) approach of synectics model of teaching on development of learners' creative thinking ability,

(ii) To study the impact of MFS approach of synectics model of teaching on development of learners achievement in the subject general science and

(iii) To study the impacts of MFS approach of synectics model of teaching on achievement motivation of the learners.

Hypotheses:

The following hypotheses were formulated and tested in the process of investigation through appropriate techniques;

(1) The Making Familiar Strange (MFS) approach of synectics model of teaching has no significant impact on the creative thinking ability of the learners.

(2) The MFS approach of synectics model of teaching has no significant impact on learners’ achievement in General Science.

(3) The MFS approach of teaching has no significant impact on learners’ achievement motivation.
Methodology:

The investigator of the present study followed the non-equivalent control group design of quasi-experimental type. For the purpose of experimentation two primary schools of Bhubaneswar city having almost similar facility were randomly selected out of four apparently similar type of schools with regard to their management, infrastructural facility; teacher and student strength. All the 35 subjects of the experimental group and 36 subjects of the control group were subjected to the teaching of 18 lessons on General science. The experimental group was taught by the investigator himself by following the MFS approach of Synectics model of teaching whereas the control group was taught by their regular class teacher by following the traditional method of teaching. Further, for the purpose of the assessing creative ability, academic achievement and achievement motivation the investigator had used the verbal and non-verbal test of creativity as developed and standardized by Baqer Mehdi (1985); comprehensive achievement test on General science and achievement motivation inventory as developed and standardized by the investigator himself. The subjects of both the groups were pre and post tested on all the dependent variables such as; creativity, academic achievement and achievement motivation. The pretest scores of both the control and experimental groups were found almost equivalent when tested for their normality of distribution. As such, all the hypotheses were tested by means as applying the ‘t’ test statistical technique.

Major Findings:

The major findings of the study are presented briefly in the following: The Making Familiar Strange (MFS) approach of synectics model of teaching was found to be effective in enhancing the creative thinking ability of the learners. The MFS approach of synectics model of teaching did not prove to be effective in enhancing the achievement motivation of the learners. The MFS approach of synectics model of teaching did not put any significant impact upon the achievement of the learners in the subject General science.
Conclusion:

Creativity as one of the important psychological construct is found among the entire individual in different degrees. It is not only essential for individual development rather has substantial contribution towards the growth and development of civilization from various angles. Therefore, attempts through appropriate teaching strategies like synectics model of teaching should be taken for enhancing such ability among the learners. It may also be suggested that steps may be taken to apply this approach with necessary modification for developing the academic achievement of the learners in different curricular areas and achievement motivation of the learners. However, the results of the present study do not encourage the use of the MFS approach in teaching with the objectives of enhancing academic achievement and achievement motivation.

3.5 RATIONAL OF THE PRESENT STUDY

The review work in the foregoing sections provided the several points for developing language creative writing ability in a classroom which are viewed as under:

That the groups or individuals are better problem-solver depends on the kinds of problem and on the groups. Models of teaching are useful to enhance creative writing ability to the children through appropriate techniques of creativity development.

Creativity is considered to be one of the highest attainments of human intellect. It has a broader connotation than is commonly understood. Creative expression is a form of learned behaviour which can be developed by application of appropriate teaching practices and by manipulating environmental conditions in the classrooms. It is found that creativity can be achieved within a shorter time with the programmes of creative thinking and creative teaching in any school subject.

There are several blocks which hinder and some specific factors which enhance the creative thinking ability. Deliberate attempts and systematic
strategies can develop the cognitive areas and is an important for the further research to improve the creative thinking ability of the children.

The main objective of education in a democratic society like India is to develop the mental abilities of the students. The school programmes should be prepared in this direction. They should try for the development creative abilities of the students. This requires boosting of creativity in individuals from the school life.

The review of all the related studies helped the investigator select the sample, variables, their nature and levels, a research method and designed pertaining to the problem in hand.

Research study in the hand of investigator would prove its worth in enhancing the creativity levels of the children in the classroom set up and outside the classroom environment.