CHAPTER II

REVIEW

OF

THE

RELATED

LITERATURE
INTRODUCTION: Survey of related literature equips the researcher with adequate information regarding the field in general and the problem in particular. It provides the researcher an up-to-date information in the concerned field. It provides some insight regarding strong points and limitations of the previous studies and there by enables the researcher to improve his own investigations. Survey of related literature is considered the most important prerequisite to actual planning and conducting the study, because it gives a researcher up-to-date information about the literature, related to his own problem already partially done by others. The survey of related literature bridges the gap between new and old knowledge and new researcher will not feel that he has jumped from one shore to another but feels that he is doing his systematically and correctly. It is essential to the development of an effective approach to its solution. Old literature, in the problem and derivation of this way helps the researcher in the classification of his problem and in avoiding duplication. Thus survey of related literature, plays an important role in the research process. First of all it helps in identifying and selecting a novel search problem. It provides the rationale or basis for the foundation of hypothesis.

In the present study whatever related literature has been studied. It has no bearing directly or indirectly on the problem under investigation. However the survey of literature is done according to the dimensions considered in the study viz studied conducted on attitudes, science and science attitude. Studies conducted on classroom cognitive behaviour and Classroom-interaction, and studies conducted on School-Scientific-Activities and Science-Environment. This chapter can be supposed to divided into two phases. First phase reflects the studies undertaken abroad. Second phase is concerned with the studies conducted in India.
2.1 Further the following studies conducted in India and abroad has been reviewed to obtain an insight into the problem to be investigated:

-- Norwich Brahm and Duncan Jean (1990) studied—Attitude subjective -norm perceived preventive factors, intentions and learning science, Testing a modified theory of reasoned action. The study revealed that those pupils who reported that they had engaged in learning behaviour in the past had higher behaviours intentions. The most interesting finding in this study concerns the additional variable of perceived preventive factors. The evidence showed that it was possible to design a measure of preventive factors which was internally reliable and stable over a short period. Differences between pupils on this variable were mainly concerned with alternative personal interests and the adverse influence of friends and peers. Perventive-factors also had a negative, but low relationship with attitude to learning and over all past learning behaviour, though only the latter was statistically significant. In the partial correlational analysis, it was found that by controlling for preventive factor and prior learning-behaviour, there was no longer a significant-relationship between attitude to learning science and perceived preventive factors continue to have significant independent relationships to behaviour intention.

-- Bharambe M.D. and Pandit K.L. (1991) studied—Attitudinal change -An experimental study. The objectives of the present study were to verify whether the change in attitudes could be induced experimentally and how the different independent variables interacted with the attitudinal change with respect to the extent, durability and direction of change. The result of this study indicate that the influence of treatments, sex and school atmosphere and their interactions are not reflected on the pretest score and change scores of the attitude towards cleanliness measured by the paper-pencil test. The effect of school atmosphere and sex is not noticeable in the pre-experimental stage where as the influence of school atmosphere was found in the change of attitude towards
cleanliness measured by the observation-cum-performance test. The significant interactions between school atmosphere and sex, and treatment and school atmosphere are observed on the first and second change of attitude towards work both measured by the paper-pencil test and the observation-cum-performance test. The experimental treatments shows their influence on the first change score of attitude towards work measured by the paper-pencil test. The significant interactions among school atmospheres, sex and treatment and between the school atmosphere and sex are explained on the first change, where as the significant interaction between treatment and school atmosphere is found on the second change of attitude towards work measured by the observation cum-performance test. The influence of some of the covarites is referred in the results inspite of controlling, their effects on the dependent variables.

SHARMA ANURADHA, BHARGAVA MAHESH AND SINHA RENUKA KUMARI (1993) STUDIED: Career attitude and competency of intermediate students studying commerce and science-maths. On the basis of results. It was found that both the groups differed significantly at .05 level in respect of attitude C.R. value (2.04) and total competence C.R. value (2.01) variables of career. When competence were studied area ways, it was further revealed that out of five, significant differences were noticed in three areas. Science students showed better attitude and competence in planning and problem solving as compared to commerce students on the other hand commerce students expressed themselves in better self appraisal competence.

QURAISHI, Z.M.(1972) STUDIED - Personality Attitude and Class-room Behaviour of teachers . (I) The objectives of the research were - To study the relationship between four dimensions of teacher behaviour viz , proportion of indirect behaviour -I/D ratio, proportion-I/D ratio, proportion of motivating behaviour of indirect behaviour to controlling behaviour -I/D ratio. Proportion of teacher behaviour to students behavior T/S ratio and teacher behaviour of accepting students idea plus one dimensions of students behaviour (student initiation) with certain personality traits
and attitudes of teachers. (II) To predict the above mentioned five behaviour dimensions on the basis of personality traits and attitudes. (III) To study the effect of personality on proportion of indirect behaviour to direct behaviour. (I/O ratio).

The study revealed the followings - (I) Teachers verbal behaviour in class-room was related in a small measure to their personality and attitudes. (II) The Teachers attitude towards democratic Classroom procedures correlated significantly at (.05 level) with I/D and i/d ratio. The co-efficient of correlation with I/D ratio was .15 and with i/d ratio 0.17. (III) The correlation co-efficient of reflective trait with I/D ratio was .16 (significant at .05 level). (IV) Sociable trait was significantly (at .05 level) related to students initiation. The correlation between the two variables was .15. (V) Reflective trait and attitude towards democratic classroom procedures were found to be the best predictors of I/D ratio, which was prediction of i/d ratio, attitude towards democratic classroom procedures, reflective-trait attitude towards management and sociable trait were found to be the best predictors students initiation. It predicted student initiation to the extent of 2.25 percent. (VI) T/S ratio could not be predicted significantly by any of the fifteen predictor variables. (VII) Direct and indirect teachers did not differ significantly from each other on the seven personality traits, implying that personality does not affect teachers behaviour.

PRAKASH RUP (1968) - The object was to construct and standardised an achievement test in every day science for class VIII in Punjab and also to construct a scale to assess the attitude of students towards learning science. The test comprised four variables, namely. (I) Acquisition of knowledge of scientific principles, facts & terms. (II) Applications of principles and knowledge of science in everyday life situations. (III) Ability to classify materials and substances. (IV) Skill in observation and critical thinking. The difficulty and discriminative values of each item were found out.

The major finding were - (I) Achievement in science and learning of science were positively related. (II) The pupils in urban areas scored more in science than those in rural areas. (III) Science
achievement of pupils from government school was better than that of pupils from non-government schools and (IV) The girls scored higher than the boys in science.

-- **ZACHARIA T. (1977) STUDIED** - Impact of Attitude and interest on achievement of Sec. school pupil’s in social studies. The main objectives of the study were (I) to find out the general nature of pupil’s achievement, attitude and interest in social studies for the total sample. (II) To compare the scores of achievement attitude, interest and intelligence of the different sub-samples, and (III) To find out the effect of attitude and interest on the social studies achievement for the whole sample and sub-samples classified on the basis of intelligence, sex age and socio-economic status.

The major findings of the study were: (I) There was high positive correlation between the secondary school pupils achievement in social studies and their attitude (II) The pupils interest in social studies was closely related to their achievement in the subject at all levels. (III) The pupils intelligence was a major factor in influencing their achievement in social studies. (IV) The pupils attitude and intelligence scores were more or less equally correlated with their achievement in social studies. (V) The pupils intelligence was not a prominent factor in influencing their attitude and interest in social studies.

-- **SHARMA V.P., SHUKLA PRABHAVATI AND SHARMA PUSHPALATA SHARMA (1992) STUDIED** - The shortcoming that have emerged because of modern methods of communications and scientific researches in the field of vocational selection and placement the present paper evaluates the validity of objective criteria recorded in the D.H.T.P survey (1981) and recommended inclusion of significant traits of personality and other relevant psychological dispositions in the recruitments and selection process on the strength of the findings obtained from two of their psychological studies conducted on- (I) General aptitudes and (II) Scientific-Aptitudes of the Tribal pupils of Madhya Pardesh.

The investigator have also proposed culture specific - Trait specific -vocation specific (model for vocational selection and placement-process, specially meant for the tribals of the country.
SANSANWAL, D.N. AND SHARMA DEEPIKA (1992) STUDIED—Prediction of scientific creativity through cognitive and affective variables in quest of Bharatiya. The object of study was to study the contribution of intelligence, risk-taking, self-confidence, Scientific-Attitude, tolerance of ambiguity, academic motivation and dependency to scientific creativity of students at secondary stage. The investigation revealed that the joint contribution of self-confidence, risk-taking, intelligence, scientific-attitude, academic motivation, tolerance of ambiguity, contribute differentially in the prediction of scientific-creativity of male, as well as, female students. It points out that the individual differences exist, among male and females. The differential treatment is responsible for developing differential personality of male and female students. In case of female self-confidence, tolerance of ambiguity and intelligence contributed maximum in the prediction of scientific-creativity, whole in case of male the maximum contribution was of risk-taking and Scientific-Attitude. Students with high self-confidence, tolerance of ambiguity intelligence can be more independent.

KUNDU RAMANATH, CHAKRABORTI KR. PRANAB AND GROSH PAROMITA (1994) STUDIED—Search for the non-cognitive predictors of Scientific knowledge and aptitude. The objective of the study was to explore the predictors of scientific knowledge and aptitude (SKA) with special emphasis on the non-cognitive variables. The study was conducted on a purposive sample of 46 students of classes, XI and XII (science) at two English-medium schools of Calcutta, having uniform socio-economic status. It was found that study-habits and neuroticism are negatively and significantly related to SKA at .05 and .01 levels. While self-concept and extra-version are positively and significantly (at .05 level) related to SKA. Cluster analysis revealed that the non-cognitive variables of neuroticism and study habits in one cluster and extroversion and self concept in another cluster are the most effective predictors of SKA.
NAYAR, P.P. (1971) STUDIED - Some predictors of achievements in science at Secondary School Stage. This study attempted to predict achievements in science with the help of following six variables: verbal reasoning ability, numerical ability, comprehension and interpretation, problem solving, critical thinking ability and spatial ability. Factor analysis of the correlation matrix of the above variables was also carried out to study the amount of variance that could be attributed to aptitude for science. The main findings were: (I) The differences between the mean scores of boys and girls on numerical ability, problem solving and critical thinking Appraisal Tests were significant at .01 level, boys being superior. (II) There was, however, no significant difference between the mean performance of rural and urban students on the six experimental and the criterion variables; (III) The correlation coefficient between the scores on critical thinking criterion in case of boys was significant at .05 level; (IV) There were significant differences at .05 level between boys and girls in their correlation in VR and CI, girls being superior in both the cases; (V) The multiple correlation co-efficients were : NA and VR=.6005, NA,VR and CI=.6383 and NA,VR,CI and FB=.6525; (VI) The variances of the four tests for school science were 15.6 percent, (NA) 13.6 percent, (VA) 9.5 percent (CI) and 5.6 percentage (FB). (VII) These four tests had highest validity of any combination of tests chosen from the six test used. (VIII) Three common factors were revealed in this study, which have been named as general factor (g) conceptual facility and Numerical facility and (IX) The study revealed agreement, to a great extent between the findings obtained through multiple correlation and through factor-analysis.

PATEL, P.A. (1978) STUDIED - Comparative study of microteaching under simulated condition and minoteaching under real class room condition upon general teaching competency and attitude towards teaching of students teachers. The important objectives were (I) To find out the general teaching competency of the student teachers who were given the treatment of teaching certain teaching skills through microteachnique under simulated condition. (II) To find out the general teaching competency of the
students-teachers under the real class-room condition. (III) To compare the general teaching competency of students teachers under simulated condition with that of the students teachers under the real Classroom conditions. (IV) To find out the general teaching competency at the retention level of the student-teachers under simulated condition and that of the student-teachers under the real class-room condition and (V) To compare the attitude of the students teachers towards teaching under simulated condition with that of the student-teachers under the real classroom condition.

The major finding of the study was that microteaching, under simulated condition and in the real classroom condition produced the same effect in respect of general teaching competencies, attitude of student-teach towards teachers towards the microteaching treatment.

-- SHAH, B.B., (1981) STUDIED -- An experimental investigation of the effects of selected teaching strategies on the development of creative-thinking and achievement in Science. The objectives of the study were: (I) To find out the effectiveness of four teaching strategies on the development of creative thinking ability and (II) To find out the effectiveness of the four strategies on the achievement in science of standard VII pupils.

The major findings of the study were: (I) There were significant differences between the four selected strategies in developing creative thinking and achievement in science at .01 level. (II) The four strategies of teaching had significantly differential effects on the development of originality and flexibility of standard VII pupils, but not in the case of fluency. (III) Strategy IV (i.e lecturing with discussion, practical work use of audio-visual aids) produced significantly higher mean scores for the achievements of the pupils than all other strategies. (IV) Strategy IV was more effective in developing creative thinking and its components. (V) The effects of strategies were dependent upon the level of intelligence, sex and creativeness of pupils. (VI) Dominance of practical work did not show any significant superiority over lecture with any respect to low intelligence and low creativeness. (VII) The results highlighted the
importance of maximum use of audio-visual aids in classroom teaching for the enhancement of creative-thinking.

SINGH A. (1978) STUDIED - A study of creativity in Science Teachers as measured by Mehndi’s Test of creativity in a relation to self-concept, Attitude towards teaching and classroom verbal interaction teaching. The objectives of the investigation were: (I) To find the relationship between creativity in teachers and self-concept (II) To determine the relationship between creativity in teachers and their attitude towards teaching, (III) To ascertain the relationship between creativity in teachers and their classroom verbal interaction, (IV) To study differences between male and female teachers with regard to their creativity, (V) To study the relationship between teachers classroom verbal interaction and the attitude towards teaching.

The findings of the investigation were: (I) There was positive and significant relationship between the creativity in teachers and their self-concept. (II) There was no significant relationship between the creativity in teachers and their attitude towards teaching. (III) There was positive and significant relationship between the verbal creativity in teachers and indirect/direct (I/D) teaching behaviour. (IV) There was no significant relationship between the verbal creativity in teachers and their indirect/direct teaching behaviour as measured by i/d ratio. (V) There was no significant relationship between the verbal creativity in teachers and confusion in the classroom. (VI) There was a positive and significant relationship between the creativity in teachers and their using students ideas. (VII) There was no significant relationship between the verbal creativity in teachers and their convergent questions and acceptance of students ideas. (VIII) There was a negative and significant relationship between the teachers verbal creativity and the teachers talk in the classroom. (IX) There was a positive and significant relationship between the teachers verbal creativity and the students talk in the classroom. (X) Teachers with high verbal creativity significant talked less, asked more divergent questions and gave more time to students for thinking before responding to their questions than the teachers with low verbal creativity. (XI) Male
and female teachers did not differ significantly in their verbal creativity. (XII) There was a positive and significant relationship between the indirect/direct (I/D) teaching behaviour of teachers and their self-concept. (XIII) There was no significant relationship between indirect/direct (i/d) teaching behaviour teachers and their self-concept. (XIV) There was a positive and significant relationship between teachers self-concept and encouragement of students talk by them. (XV) There was a positive and significant relationship between teachers self-concept and encouragement of students ideas and silence on account of students thinking. (XVI) There was no significant relationship between the indirect/direct (I/D and i/d) teaching behaviour of teachers and their attitude towards teaching.

**ARYA, S.C. (1981) STUDIED-** A study of the growth of Scientific concepts among Elementary School Children. The objective of the investigation were: (I) To develop concept-related criterion tasks on the concept of weight, volume, classification and associative linking to study the growth and development of these concepts. (II) To study the level of growth of conservation of mass and volume with regard to the variables of age and sex. (III) To diagnose the nature of errors the students commit in responding to these tasks and to cluster them in a theoretical frame. (IV) To study changes, cross-sectionally, as they occur in the level of attainment of the scientific concepts with and without regard to sex. (V) To study, cross-sectionally, the nature and growth of classification and associative linking in elementary school children, with and without regard to their sex, and (VI) To diagnose the nature of confusions which the children display in dealing with classificatory problems and to cluster them in a theoretical frame.

The study revealed: (I) A sudden fall in the value of proportion of correct responses occurred from the age 8+ to 9+; however errors indicated no definite points of confusions, but only misconceptions in the development of the concept of conservation of mass. (II) In the second stage, misconception of weight due to flattening or thinking come in, and further in the third stage of dissolving the ball
the concept of conservation of mass shifted from the age cohort 8 + to 10 +. (III) In the case of conservation of volume 25 percent at 6+ to 62.5 percent at 10+ age group conserved the concept but only a small percentage of students could attain the criterion of acceptability. (IV) In associative linking. The frequency of perceptible mode of characterization, enhanced from +7 to 8+ and then showed a fall from 8+ to 9+ and a consistent downward trend there after. (V) The school were found to have a definite impact upon the characterization. (VI) The children found to attain resemblance sorting and consistent sorting by the age 6+ exhaustive sorting and some and all by the age 7+ and multiple class sorting and some 7+ and all by the age membership and conservation of class hierarchy by the age 9+.

-- BHUTANI, K., (1972) STUDIED- A study of the effect of some cognitive and personality factors on Attitude change. The objective of the study to assess the effect of cognitive consistency, cognitive complexity and personal rigidity on attitude change. The major findings were: (I) Those with higher cognitive consistency were less prone to attitude change than those with less cognitive consistency. (II) Boys were prone to be more consistent than girls. (III) Samples with higher cognitive complexity were more prone to change than those with less cognitive complexity. (IV) Girls had higher cognitive-complexity than boys. (V) These was no significant difference in change in the attitude of cognitively complex boys and girls. (VI) A rigid sample was less prone to change than a non-rigid. (VII) There was a significant difference between the changed scores of flexible boys and girls in favour of girls. (VIII) Both the rigid boys and the rigid girls were not in favour of mixed marriage. (IX) A sample with an extreme attitude did not easily change as compared to the less extreme one and the neutral one. (X) Samples with radical ideology were more favorable to mixed marriage, but they did not change blindly and girls were found to be more responsive to persuasive communication than boys.

-- SRIVASTAVA, N.N., (1980) STUDIED- A study of the Scientific Attitude and its measurement. The objectives of the study were: (I) To develop an instrument to measure Scientific-Attitude.
To compare science teachers and non-science teachers in respect of Scientific-Attitude, and (III) To compare science students and non-science students in respect of Scientific-Attitude. The main findings of the study were: (I) The amount of scientific knowledge or general exposure to science courses made impact on scientific-attitude positively. (II) Scientific knowledge helped in the formation of scientific attitude. (III) Boys and girls differed in respect of scientific attitude. (4) Male teachers and female teachers did not differ in respect of scientific-attitude.

SHARMA, N.D. (1978) CONDUCTED - An experimental study of teaching Natural Science at the primary level in Central Schools. The study was undertaken: (I) To ascertain the existing position of teaching natural sciences at the primary level in the central schools and (II) To compare the effectiveness of different methods of teaching science at the primary school level. The results of study were: (I) Most of the teachers used traditional methods for teaching natural sciences. Some tended to make natural sciences some tended to make natural sciences teaching at this level activity-oriented. (II) The teachers were not well equipped for teaching science at this level. (III) It was admitted by most of teachers that activity should be the basis of teaching natural sciences at the primary level. (IV) Guided activity was more effective than self -activity in respect of concept formation, development of Scientific-Attitude, acquisition of scientific-knowledge, training in scientific skill and development of Scientific-Attitude.

SHARMA, Y.K. (1982) STUDIED- Growth and development of Science Education in Bihar. The objectives of the study was to analyse the aims, curriculum, text book and techniques materials and equipment, teacher training programes, supervisions and inspection, and agencies for the improvement of science education in Bihar. At the time of the study the state Government was making attempts to reorganize the educational structure on the 10+2+3 pattern. As a result, curriculum, text books, methods, teachers education programme and process of evaluation were being revised. It was
emphasized that while science education had largely expanded during the last decade, the administrative bodies and methods had remained more or less unchanged. Thus, there was need for modernizing and strengthening administration in the field of science education. There was also an urgent need for exploring the possibilities of using modern approaches and devices which were being adopted in advanced countries for the teaching of science, so as to maximize the performance of teachers and students in teaching and learning science.

- **DANI , D.N. , (1984) STUDIED** - Scientific-Attitude and cognitive styles of higher Sec. School students. The major objective of study were (I) To measure the scientific-attitude of higher secondary students. (II) To find out the cognitive styles of the higher secondary students. (III) To compare the scientific attitude and cognitive styles of boys and girls, village, town and city pupils science, arts and commerce students. (IV) To compare the Scientific-Attitude and cognitive styles of early-adolescent middle-adolescent and late-adolescent students, and (V) To investigate the relationship between Scientific-Attitude and cognitive styles of higher secondary students.

Some of the major findings were:- (I) About 80 percent of the students had a positive Scientific-Attitude (II) Boys and girls did not differ in scientific attitude scores. (III) The scientific attitude of the science students was higher than that of the art and commerce students. (IV) The rural students were found to have a low level of Scientific-Attitude as compared to urban students. (V) The scientific attitude decreased significantly with increase in age. (VI) About 71 percent of the students were clearly field-dependents. (VII) Boys and girls did not differ in their cognitive-styles. (VIII) Science students possessed higher field-independence ability than the arts and commerce students. City students possessed higher field-independence ability than the town and village students. (IX) The early-adolescent were found to be more field-independent than the middle and late adolescents. (X) Rajasthan students were more field dependent than American students. The field-dependent-independent ability was related to the Scientific-Attitude in general
and cognitive aspect of the Scientific-Attitude in particular. (XI)
The cognitive-styles scores could be predicted from the Scientific-Attitude with an efficiency of 4 to 5 percent.

SINGH, S.S. (1969) STUDIED: Influence of intellectual development on the Aggressive Attitude. The findings of study were: (I) The relationship between general mental ability and hostility score was found to be negatively significant at all the grade levels except at grade X (2) The general mental ability showed a significant increasing trend from one class-level to the next higher class level, whereas the mean hostility scores showed a decreasing trend. (III) The comparative study of two extreme upper and lower hostility groups in respect of their mean scores indicated that both of these groups did not differ at any level. This reflected the independent nature of the traits of general mental ability and hostility. (IV) Among the obtained relationship between the hostility score and personality traits it was observed that hostility had a positive-relationship with anxiety, annoyance and neuroticism, a negative relationship with historicism and social desirability tendency; whereas hostility had no significant relationship with depression-dislikes, likes and extraversion-introversion. (V) The comparative study of the two extreme groups-upper and lower in hostility at all the three educational levels revealed that the upper hostility group consistently and significantly scored higher as compared to the lower hostility group on anxiety, annoyance and neuroticism variables of personality, on the other hand, the lower hostility group showed a trend to score significantly higher or hystericism and social desirability tendency. (VI) Persons of high hostility and intelligence were not found to be consistently discriminative on the various traits at the three educational levels. The only factor that tended to distinguish between these two extreme groups was social desirability, which was negatively related with hostility and also with intelligence at grade X and graduate levels.

GOLWALBAR, S. (1986) STUDIED: A study of Scientific-Attitude, Creativity and achievement of tribal students of Rajasthan. The main objectives of the research were (I) To study
the scientific attitude of tribal students studying science in secondary schools located in tribal area. (II) To compare this with the scientific attitude of non-tribal students of the same schools, studying science in secondary classes. (III) To compare the creativity of tribal and non-tribal students and (IV) To compare the achievements of tribal and non-tribal students in science in subjects. The main findings were: (I) When comparison of tribals and non-tribals on ten components of scientific attitude was made, non-tribals were found to be superior to tribals on three components of Scientific-Attitude. (II) There was no significant difference between the mean scores of tribals and non-tribals in seven components. On no factor did the tribals fare better than the non-tribals. The over all mean score on the scientific attitude scale for non-tribals was higher than for tribals. (III) There was a significant difference between the mean creativity scores of tribals and non-tribals. The non-tribals had a higher level of creativity than the Friable. Factor-wise comparison of the two groups on the basis of a verbal-test of creativity showed that for the fluency component, the mean fluency score of non-tribals was higher than that of tribals. Non-tribals had more fluency than the tribals. The two groups did not differ significantly on the flexibility component. The mean originality scores of non-tribals was higher than that of tribals. (IV) The non-tribals students had a higher scholastic achievement in science subjects than the tribal students.

RAINAJ, K. (1986) STUDIES - Psycho-social correlates of scientific creativity among high school students. The objectives of the study were (I) To find out the relationship between scientific creativity and achievement in science for boys and girls (II) To find out the relationship between scientific creativity and achievement in science for students of different types of schools (government, private and missionary). (III) To find out the difference between correlation coefficient of intelligence with different dimensions of scientific-creativity for boys and girls groups. (IV) To study the effect of sex and type of school on scientific-creativity among high school students. (V) To study the effect of socio-economic status (SE.S), sex, problem-solving ability and achievement in science on
scientific-creativity of students of different schools. (VI) To study the effect of sex, birth order and type of family or scientific-creativity of students of different schools and (VII) To study the mean difference in scientific-creativity among high school students with high, middles and low problem solving ability.

The findings of the study were: (I) Achievement in science was significantly related with scientific-creativity. (II) The problem-solving ability was significantly related to three components of scientific-creativity, viz., fluency, flexibility and originality. (III) All the three components of scientific creativity were positively related with intelligence. (IV) Boys and girls differed on the intelligence and fluency components of scientific creativity and girls had higher scores on these than the boys. (V) Missionary school students were more creative than those of private and government schools and students of private schools were more creative than their counterparts studying in the government schools. (VI) Students who had high problem-solving ability in science were more creative in science than their peers with middle and low problem-solving ability. (VII) The mean scientific-creativity score of high achievers in science was more than that of middle and low achievers. Further the middle achievers in science was more than that of middle and low achievers. Further the middle achievers were more creative than low achievers in science. (VIII) Socio-economic status of the students did not affect their scientific-creativity. (IX) First born students were more creative in science than the second and third -borns in the family. (X) The type of family, single or joint did not have any relationship with the scientific creativity of the students. (XI) Sex as a single main variable did not show significant variations in scientific-creativity of students. (XII) The girls form missionary schools had the highest mean scientific-creativity scores, where as boys from government schools had the least creativity scores. (XIII) Students belonging to middle SES and having high achievement scores were highest in scientific-creativity and students belonging to low SES and having low achievement scores were lowest on scientific-creativity. (XIV) Boys of low SES and possessing high problem solving ability had highest creativity where
as girls of middle SES and low problem-solving ability were least creative. (XV) Girls of single families were most creative in science, where as girls of joint families were least-creative. (XVI) The students belonging to middle SES with middle problem-solving ability scored the highest, where as students coming from the low SES group and having middle-problem solving ability scored the least on scientific-creativity.

BHATTACHARYA, P., (1979) CONDUCTED- A critical study of science Education in Assam and Meghalay's schools. The investigation was an endeavor to determine the position as to where Assam and Meghalaya stood in science education and also to find how they could go forward more effectively and more vigorously. The major findings of the study were: (I) Assam and Meghalaya respectively had 70.65 percent and 86.85 percent of teachers eligible to teach science in secondary classes. (II) The average teaching experience of science teachers in Assam and Meghalaya stood at 6.04 and 8.57 years respectively. (III) All the teachers qualified to teach science taught other subjects as well. (IV) The economic conditions of science teachers was poor. Most of the teachers had, besides salary, other sources of income. Private tuition was most common source. (V) About 54 Assam percent and 46 percent of the teachers of Assam and Meghalaya were prepared to give up teaching for other better jobs. The headmasters job was also not very attractive. (VI) The Bongali, Assamese, tribal and other teachers did not differ in teacher effectiveness male and female teachers did not differ significantly in teacher effectiveness. The trainees and trained teachers and the married and unmarried teachers ranbed about the same in teacher effectiveness but the untrained did very badly. (VII) On flanders tool the married teachers became the obvious choice. (VIII) Science was more popular among the non-tribals in the pre-university courses. The wastage of tribals and non-tribals in science education differed significantly. The tribals students attitude towards science education was influenced by their general aspiration level and also affected their enrollment in science. (IX) Science education in the schools and colleges in Assam and Meghalaya had defects Assam and
Meghalaya together had laboratories in 79.96 percent schools. The position of Meghalaya was better. (X) The number of books in the school library varied from 200 to 2500 and the average came to 1240 books. The schools had hardly any freedom for purchasing books. Most of the schools did not subscribe to science journals. None of the schools had a trained librarian.

GHOSH, S., (1986) STUDIED. A critical study of Scientific Attitude and Aptitude of the students and determination of some determinations of Scientific Aptitude. The main purposes of the study were: (I) To ascertain the aptitude of the students in science with the help of a specially developed scientific-aptitude test, (II) To appraise the extent of Scientific-Attitude of the students with the help of a specially developed attitude test, (III) To find out the extent of academic motivation of the students with the help of a standardized test and SES of the parents of the students with the help of an SES questionnaire, (IV) To find out sex-wise and strata-wise differences, if any, in the scientific aptitude and scientific attitude of the students. (V) To determine relationships between the scientific-aptitude and variables such as a Scientific-Attitude and academic motivation of the students and (VI) To develop a regression equation of the scientific-aptitude on the independent variables identified by the researcher.

Some of the major findings were: (I) Urban students did not show better performance in the scientific-aptitude test than rural students (II) Boys did not possess more scientific-aptitude than girls. (III) Boys did not possess better scientific-attitude than girls. (IV) There was a positive relationship between scientific-aptitude and Scientific-Attitude; scientific-aptitude and academic motivation; and Scientific-Attitude and academic motivation. Scores in the scientific-aptitude test could be predicted from scores in Scientific-Attitude, academic motivation, and socio-economic status of parents through multiple regression equation. (VI) Students having high Scientific-Attitude were superior to those having low scientific-attitude with respect to their scientific-aptitude. (VII) Urban students belonging to the high SES group had more scientific-aptitude, than urban students belonging to the low SES group.
(VIII) Rural students belonging to the high SES group did not show better scientific-attitude than rural students belonging to the low SES group.

**MENON, S.B., (1986) STUDIED:** The study of a system of science inquiry. The major objectives of study were: (I) To arrive at the norms of the development of the process skill of scientific inquiry among students of secondary and higher secondary classes of the English medium schools which followed the curriculum system framed by the Gujrat Secondary and Higher secondary Education Board. (II) To study the overall impact of the curriculum system on the development of the process skills of scientific inquiry, (III) To examine the science textbooks for standards VIII to XII for their suitability to develop skills of scientific inquiry and (IV) to examine the instruction and evaluation, practices in relation to scientific inquiry.

The major findings of the study were: (I) The overall proficiency in the process skills steadily increased as students went up from standard to standard. (II) There was a sudden transition in the overall development of process skills between standards X and XI (around the age of 16 years). (III) The skill of identifying variables had been developed by the time students reached standard VIII. (IV) The skill of interpreting observational data was developed around 15 years of age. (V) The skill of controlling the variables did not develop among the students in the system at 17 years of age. (VI) Children of the schools affiliated to the CBSE were found better in the development of the process skills. (VII) Text books were the only curricular material through which the curriculum guidelines percolated up to practicing schools, and questions mostly tested the product aspects and not the process aspects.

**RAMESH, (1984) STUDIED:** Development of objective based science curriculum and to study its efficiency in the Acquisition of Process and skills among High school science students. The objectives of the study were to find out: (I) whether the objective-based curriculum was superior to the conventional curriculum of science at high school level in terms of achievement, (II) Whether intelligence contributed to achievement (III) Whether the
objective-based curriculum was superior to the conventional curriculum of science at high school level in terms of acquisition of process skills, (IV) whether intelligence contributed significantly to the acquisition of process skills among high school science students, (V) whether personality traits (extroversion and introversion) contributed to the acquisition of process skills among high school science students, (VI) whether there was a significant effect of the interaction between types of curriculum and intelligence on achievement and acquisition of process skills, (VII) whether the effect of the interaction between intelligence and personality traits was significant (VIII) whether personality of the learner interacted with the mode of curriculum and (IX) whether there was significant interaction between the learner’s characteristics (personality and intelligence) and the design of the curriculum.

The findings of the study were: (I) The objective based curriculum and conventional curriculum in chemistry were equally effective so far as achievement in science was concerned. However, students taught through the objective-based curriculum scored significantly higher on comprehension than those taught through the conventional curriculum. (II) The high ability group performed better than the average and low ability groups. (III) The high ability group following the objective-based curriculum achieved higher mean scores than the group following the conventional curriculum. (IV) For average and below average ability students, the conventional curriculum was equally suitable. (V) The extroversion and introversion traits were not responsible for any variance in achievement. The personality of the learner did not account for differential achievement. (VI) The mean scores of the group taught through the objective-based curriculum was more effective with respect to acquisition of process skills than the traditional curriculum group. (VII) The above average intelligence group had higher mean scores on the process skills test than average and below average intelligence groups. (VIII) The personality of the students, namely extroversion and introversion did not affect the acquisition of process skills.
SAXENA, A.K. (1985) STUDIED- Attitude towards Physics and cognitive Preference styles among Different groups of science students. The main objectives of the study were: (I) To develop a Physics cognitive preference Styles Test (PCPST) and Attitude towards Physics scale (ATPS). (II) To assess cognitive preference styles of different groups of science students of both sex studying in classes X and XI of central schools and schools of Rajasthan. (III) To assess the students attitudes to physics (IV) To study the relationship between attitudes and cognitive preference styles and (V) To study the main and interaction effects of 'class', 'sex', and type of school on attitudes and cognitive preference style.

The findings were: (I) The cognitive preference style of the entire sample was found to be R->P->A->Q with maximum preference for 'Recall' and minimum preference for 'Questioning'. (II) The science students of different groups differed only in their 'principles' and 'applications' preferences for the second and third ranks only. (III) 'Class' and 'Type' of school had no effect on choices of preferences. However, male and female students were found to have R->A->P->Q and R->P->A->Q preference styles respectively. (IV) The science students of all the eight groups were found to possess a favorable attitude towards physics. (V) The correlation coefficients between attitude towards physics scores and respective R,P,A and Q scores were found to be 0.58, 0.102, -0.25 and 0.005 respectively.

RAMJEE LAL AND RAGHAVENDRA, S.SINGH (1984) STUDIED - Cognitive complexity, attitude similarity and interpersonal judgement. The effect of perceivers characteristics and his relationship with the perceived on interpersonal judgment, cognitive complexity of the perceiver and similarly between perceivers and target persons attitude were studied in relation to accuracy in perceivers judgment of the targets attitude.

The subjects were dichotomized into a high and a low cognitively complex group on the basis of the scores on the Rep test. Attitude similarly between the two members of each group was ascertained on the basis of the difference between their actual attitude scores. High attitude similarity and low attitude similarity subjects could be
delineated on the basis of these scores. Accuracy in judgment was inferred from the extent of differences between an individual's actual attitude score and his attitude score according to his partner's judgment. Two levels of cognitive complexity as well as of attitude similarity were used in a 2X2 factorial design and the data were analyzed by two-way analysis of variance procedure. The results revealed that neither cognitive complexity alone nor its interaction with attitude similarity affects judgmental accuracy. Similarity between perceiver and perceived person's attitude was found to be the only effective factor with high attitude similarity resulting in more accurate judgments both in high and low cognitively complex subjects. The results contradict some earlier findings. In particular they are dissonant with Leitner's view that more complex judges predict differences more accurately than similarities between themselves and others.

**DUBEY B.B. (1989) STUDIED** - Relationship between classroom verbal behaviour of Teachers and Pupil Attitude. The present study attempts to see the relationship between classroom verbal behaviour of teacher and pupils attitude employing 1000 students of class Xth of different Colleges and 100 teachers. Only such class Xth students, Who studied elementary mathematics were selected for the study and their teachers only were randomly chosen. To measure classroom-verbal behaviour and pupil attitude Flander's-Interaction category system and attitude and Habit-test-Mathur were applied. The results indicate positive relationship between classroom verbal behaviour of teacher and pupil's attitude. Classroom teacher behaviour decreases the favorable attitude of the pupil towards Education. The classroom verbal behaviour of teachers improved. Positive attitude of mental conflict. It is an index that teachers classroom behaviour affected more mental conflict than others. Classroom verbal behaviour provides favorable improvement in self confidence of pupil's.

**BHATNAGAR PALLAVI AND RASTOGI MUKTA RANI (1984) STUDIED** - Effect of area of specialization Sex and cognitive style on self disclosure. The present study explored the influence of area of specialization and cognitive style on the self-
disclosure of males and females, using a 2x2 factorial design. Out of a sample of 120 ss; 60 male and 60 female post graduates of science (Physics and chemistry) and Arts (History and sociology), 72 subjects (36 extreme field dependents and 36 extreme field independents on R.F.T) were administered the Journal’s self Disclosure Questionaire (J.S.D.Q). The analysis of the data through ANOVA Model III reveals the obvious dominance of females specializing in Sociology and History and field dependents in terms of greater self disclosure when compared to their counterparts in Physics and Chemistry, males and field independents. Further all the three sources of variations (Area of specialization) (A), Sex(B), and cognitive style (C) and their interactions were found to be statistically significant.

PANDEY ASHOK KUMAR AND PANDEY ANIL KUMAT (1985) STUDIED- A study on cognitive style of Uraban and Rural college students. Two independent variables sex and urbanism were used to investigate differences in the cognitive style, field dependence-independence. It was found that both sex and urbanism were important predictors of field dependence-independence, but interaction effect was predictor of cognitive style. Thus field dependence -independence depended on the sex and the urbanism, of the subjects. The results of this study clearly indicate that differences in field dependence-independence existed between male and female subjects. It was also found that Urban-Rural variables is the predictor of field-independence. It was found that male subjects were more field independent than female subjects. The results also suggest that urban males and female were more independent than their rural counterparts. Witkin(1974) and Stewart(1978) found that occurrence of sex difference depended on culture. In Indian context, Pandey (1970) reported the same findings . The results of the present study indicated that interaction between sex and urbanization is not significant . It is clear that cognitive style does not depend upon interaction of sex and urbanization. It was found that female were more dependent than male in both groups, namely urban and rural. Thus, there are apparently several factors which can determine cognitive style in various social and economic environments. The results suggest that the impact of these factors
are more clearly observed for males in urban and rural settings. Therefore, future studies of the field-dependence-independence cognitive style must distinguish carefully between the sexes as socio-cultural differences before generalizing their results.

-- **SEN ANIMA, SEN A.K. & CHANDHA N.K. (1992)** STUDIED - Experimenter effect in relation to measurement of some cognitive Abilities. The present study supported to find the experimenter effect, if any, between the two experimenters. The data were collected by two experimenters of comparable background and experience in a counterbalance fashion which yielded a scope of analyzing experimenter effect on different types of Psychological Measures on 78 mental retardates from a sheltered workshop at OakLand, California, U.S.A. The data involved administration of R P M test determination of RTS (both simple and complex) and Memory Span (both FDS and BDS). No experimenter effect was found between the two groups. It could be suggested that though experimenter effect can not be altogether eliminated, but it can be controlled by way of automatic recording of subject responses.

-- **VERMA B.P. & SINHA A.N. (1990)** STUDIED - Cognitive Ability, Academic Achievements and study habits of socially advantaged and disadvantaged adolescent students. The present study aimed at finding out whether there are significant differences among the adolescent students of higher, backward and scheduled cast students with regard to their cognitive ability academic achievement and study habits. It was found that socially advantaged students were far superior in cognitive ability academic achievement and study habits than socially disadvantaged students. Cognitive ability of adolescent students is definitely affected by social disadvantage. Three social groups of the students exhibited marked differences in academic achievement on account of the data of present study it may be concluded that social advantage or disadvantage in terms of castes have significant effect upon scholastic achievement. Higher caste students are superior to backward and scheduled caste students in scholastic achievements. Even backward caste student have higher achievement than the scheduled caste students, but there is no significant difference in the study habits of the students belonging to backward and scheduled
caste students. Thus results reveal that study habits of adolescent students are also affected by social disadvantage.

HUSSAIN HAMID (1991) STUDIED - The relationship achievement in school subjects. The main focus of the present study was on establishing the association between cognitive behaviour and academic achievement of students of senior secondary classes. The study revealed significant difference in cognitive behaviours of male and female students. The cognitive-behaviour and the achievement in physics was not found related. However a relationship was formed between Cognitive-Behaviour and performance in mathematics. male and Female groups of students do not differ in achievement scores of physics. Male and female students do not differ in achievement in mathematics.

GANIHAR NOORJAHAN N.(1991) STUDIED - The relationship between cognitive style and personality variables of Sec. School Students. The study was undertaken to investigate the relationship between the cognitive style and personality of students. the study was confined to high school students, field-independent and field dependent cognitive styles and personality variables measured by Cattell’s H.S.P.Q. There exists a significant difference between field -dependent and field-independent groups-on personality factors A,B,C,D,E,G,Q3 and Q1. The field-dependent students were found to be reserved, less intelligent, affected by feelings excitable, assertive, having weaker super-ego, uncontrolled and tensed. The field-independent students were found to be warm hearted, more intelligent, emotionally stable, undemonstrative. Obedient having stronger super-ego and were controlled and relaxed. No significant differences were found between the field-dependent and field-independent groups on the personality factor F,H,I,J,O and Q2. Principal component analysis revealed that there is a definite difference between the field-dependent and field-independent groups on the factor structure as far as the personality variables were concerned.

YADAV R.S. (1989) STUDIED- Flanders interaction Analysis System v/s RCEASIA. A critical appraisal and systematization proposed model of interaction Analysis, GUSIA- CACMHL. The
present study reviews critically the FIACS & RCEASIA systems developed by Flanders and Vasishtha respectively. The present article reflects upon the proposed system of analysis of the verbal behaviour of teachers as regards the reliability, validity and effective teaching-learning strategies. The present researcher is of the firm opinion that the proposed system of interaction analysis categories 20X20 will present a cogent argument to study the class-room verbal behaviour of the teacher-pupil in order to create conducive academic environment further leading to the concept of democratization of class-room teaching-learning. This is likely to have profound influence upon the strengthening of the meaningful and effective teaching-learning process. The theory is recommended to the prospective researchers, curriculum designers, administrators and policy makers with the hope that they will at least, pay sincere attention while formulating the syllabus and implementing the policy-matters as regards teaching-learning strategies and their effective use in Indian Context.

VERMA B.P. (1991) STUDIED - Relationship of cognitive and Anxiety to Academic performance. More specifically the study aimed at: (I) To compare high and low achieving male and adolescents with respect to level of worry and emotionality components of text anxiety. (II) To compare high and low achieving female adolescents with respect to level of worry and emotionality components of text anxiety. (III) To compare high and low achieving adolescents with respect to level of worry and emotionality components of test and anxiety. The major findings were: (I) high and low achieving male and adolescents appeared to be equally worried in testing situation. Though an inspection of the means of worry in respect of the two groups suggested that low achieving male adolescents were slightly more worried in comparison to high achieving male adolescents the obvious difference in favour of low achieving male adolescents could be attributed to chance factor. Further high and low achieving male adolescents did not differ significantly on emotionally. No significant difference existed between means of worry for high and low achieving female adolescents. The high and low achieving
RATHAUR GOVIND SINGH (1991) STUDIED A comparative study of class clowns and Non-class clowns on some cognitive and Personality variables. The objectives of present study were:- (I) To develop a sociometric device to know about class clowns and non class clowns. (II) To know if class clowns are different from non-class clown in cognitive variables viz abstract reasoning mechanical reasoning, numerical ability, Space relations, verbal reasoning, language usage (grammar and spelling) and clerical speed and accuracy. (III) To know if class clowns differ from non-class clowns on various personality characteristics. (IV) to know the difference in reference to sex the main findings drawn from the present study are summarized as under- (I) Class clowns students are significantly higher than non-class clown students in abstract reasoning, verbal reasoning language usage and clerical speed and accuracy. (II) Male class clown students are significantly higher than male non-class clown students in verbal reasoning, language usage and clerical speed and accuracy. (III) Female class clown students are higher than female non-class clown students with regard to abstract reasoning, numerical ability, space relations verbal reasoning, language usage and clerical speed and accuracy. (IV) Male class clown students are significantly higher than female class clown students in mechanical reasoning, numerical ability, space relations and female class clown students are significantly higher than male class clown students in abstract reasoning, verbal reasoning, language usage and clerical speed and accuracy. (V) Class clown students significantly differ from non-class clown students on personality factors C,F,G and H. (VI) Male class clown students are significantly different from male non-class clown students on personality factors G,H,O,Q3 and Q4. (VII) Female class clown students on personality factors F,G,H. I and Q3. (VIII) Male class clown students are different from female class clown students on personality factors A,B,F,G,I,Q2,Q3 and Q4.
DUBEY, B.B. (1979) STUDIED - Relaionship between pupil characteristics and classroom behaviour of teacher. The aims of the study were: (I) To present a detailed process of interaction analysis and its applications in the mathematics class of high school. (II) To interpret the pupils characteristics and class room behaviour of the teacher which were inherent in them (III) To alert the prospective teacher to the importance of understanding the adjustment problems of pupils and teachers to help him gain insight concerning the nature of teaching and learning process and to aid him achieve competence in the evaluation of class room instruction and (IV) To inculcate among teacher trainees appreciation of responsibilities inherent in the role of teacher.

The findings of the study were: (I) the class room verbal behaviour of the teacher had positive relation with pupil characteristics. (II) The teacher class room verbal behaviour and the interest of the pupil had positive relation factor. (III) the classroom verbal behaviour of teachers had no positive relation with the attitude of pupils. (IV) The classroom verbal behaviour of teachers had positive relation with the achievement of pupils.

KHAJURIA D.P., (1981) STUDIED - The typical patterns of classroom verbal behaviour exhibited by successful Teachers of Language and Science. The objectives of study were: (I) To identify successful teachers and (II) To find out their typical patterns of verbal behaviour.

The main findings of the study were: (I) The science teachers exhibited patterns of asking questions, giving directions, soliciting initiated pupils talk, sustained teacher initiated pupils talk, flexibility and teacher talk according to normative expectations. (II) For the language teachers the patterns of higher proportion of students talk to teacher talk, the flexibility, content cross and total teacher talk were found to be normative expectations (III) Science teachers resorted more to asking questions and lecturing than the language teachers.

TRIPATHI B.K., (1978) STUDIED - A study of relationship between personality patterns and social acceptance, classroom behaviour and Academic achievement. The main objectives of
study were: (I) To find out the relationship of anxiety with social acceptance, academic achievement and disruptive classroom behaviour. (II) To find out the relationship of adjustment with social acceptance, academic achievement and disruptive classroom behaviour, (III) To find out the relationship of extroversion with social acceptance, academic achievement and disruptive classroom behaviour, (IV) To find out the relationship of neuroticism with social acceptance, academic achievement and disruptive classroom behaviour. (V) To find out the relationship of the three criterion variables (social acceptance, academic achievement and disruptive classroom behaviour) with personality variables, intelligence and socio-economic status variables for determining these respective contributions to the variation in the dependent variables and (VI) To find out the multiple correlation coefficients of each of the three criterion variables with six independent variables to estimate the extent of the contribution of the six independent variables towards the prediction of criterion variables.

The findings of the study were: (I) Anxiety social acceptance and disruptive classroom behaviour variables had high co-efficient of variation of 52.26, 82.37 and 105.85 percent, respectively. (II) Intelligence was positively correlated with socio-economic status and negatively with neuroticism but negative with anxiety and neuroticism in a significant manner. Anxiety had positive correlation with adjustment. Adjustment was correlated positively and significantly with extroversion, but negatively with neuroticism. Social acceptance had significant positive correlation with academic achievement and a negative correlation with disruptive classroom behaviour. Academic achievement and disruptive classroom behaviour yielded a significant negative correlation. (III) Social acceptance had a significant positive correlation with intelligence, socio-economic status and adjustment. (IV) A negative correlation existed between social acceptance and disruptive classroom behaviour. Academic achievement had a high positive correlation with socio-economic status. Academic achievement had a negative though significant relationship with anxiety. (V) Students had the highest variability among themselves for disruptive classroom behaviour in comparison with social acceptance and academic
achievement. Disruptive classroom behaviour had significant positive correlation with anxiety and neurotic and a negative though significant correlation with intelligence and adjustment. (VI) Personality variables, either taken together or taken with one or both concomitant variables, contributed significantly towards the prediction of each of three certain variables.

PADMINI, T. (1980) STUDIED — Foresting cognitive development in first standard pupils. The main objectives of the study was to develop and try out, experimentally a programme for fostering cognitive development in first standard pupils. The additional objectives of study aimed at relating (I) The initial level of cognitive development status to socio-economic status and pre-school education of the pupils, (II) The gains in cognitive development status to the factors of age, sex, pre-school education, socio-economic status, institutional variation and intelligence of experimental group pupils, and (III) The final level of cognitive development status to the academic achievement of both experimental and control group pupils.

The finding of the study were: (I) The experimental group was significantly better than the control group on cognitive development status at the end of the experiment. (II) Sex differences were not significant in respect of gains in cognitive development status. (III) The age level of the experimental group pupils within the range studied did not significantly affect the experimental treatment. (IV) Cognitive development status was positively related to socio-economic status but not related to preschool education. (V) Differences in cognitive development status gains of the experimental group in relation to intelligence were significant. (VI) variation in institutions did not affect gains in cognitive development status. (VII) Significant relationship existed between the cognitive development status and the academic achievement.

SANDEEP, P. (1979) STUDIED — Classroom interaction and cognitive development in Primary School Children. The major objectives of the instigation were (I) to ascertain the level of
cognitive development in primary school children. (II) To ascertain how schools differed in the classroom interaction strategies and (III) To know the influence of classroom interaction on the cognitive development of children.

Following were the major findings: (I) Various activities and orientations associated with perceptual activities and spatial orientations associated with perceptual activities and spatial orientation were independent of each other (II) Children at lower ages were familiar with topological space operation and with increase in age acquired the next operations Projective and Euclidean. (III) Age was related to increase in perceptual activity of reorganization, while younger children were more figure-oriented, older children were ground-oriented. (IV) Children's achievements in perceptual activities and cognitive operations were found to be based on their respective background like sex, religion, caste, income, parents' education, occupation and leisure activity. (V) Schools differed in their classroom interaction which affected adversely the attainment of perceptual and cognitive skills.

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SHARMA, B.K., (1979) STUDIED - An Exploratory study of certain Aspects of classroom behaviour of science teachers in the macro and micro teaching situation using interaction analysis. The objective was to study a reliable category system for first-hand systematic observation classroom instruction in science. The major findings of study were: (I) Teachers talk was six times more than students talk. (II) Very little time was spent on praising and developing students ideas. (III) There was no short question-answer pattern discernible in their teaching which was found in product type learning. (IV) Students got few opportunities to add to their own ideas or to initiate discussion on their own initiative. (V) The highest frequencies were covered by the calls (5.5) in which the teachers lecture was 42.31 percent the second highest frequencies were occupied by the cell (10.10), i.e. silence or/and confusion which was 19.39 percent. (VI) The teacher dominated in the class two much as shown by the structuring of the teaching (51.41 percent of the total tallies) (VII) Over 6.5 percent of the total time was
spent in confusion, when no meaningful activity prevailed. (VIII) Over 5.5 percent of the time was spent on structuring the material/charts/maps/diagrams and showed models/demonstrative experiments. (IX) The percentage of structuring the learning came to 10.8 percent of the total tallies. This value indicated that the involvement of the students was quite low in the development of a lesson. (X) The nature of influence patterns of teachers was very much direct. (XI) Sex and grade did not play an important part in shaping the teachers influence. (XII) The communication was relatively faster than in classes conducted by female science teachers than in classes conducted by male science teachers, where as in the case of female science teachers, where as in the case of female science teachers, it had significant values with respect to friendliness and masculinity only. (XIII) Structuring the learning had a significant positive relationship with some personality components like general activities, restraint ascendance, emotional stability, objectivity, thought fullness and personal relations. (XIV) Structuring classroom control had only three significant negative coefficients of correlation with ascendance emotional stability and objectivity. In the case of male teachers the structuring of classroom control had no relationship with any trait of personality. In the case of female teachers this element was correlated with restraint, ascendance, emotional. (XV) In the case of male science teachers structuring the silent activities correlated negatively with friendliness and positive with personal relations. In the case of female teachers this element was correlated with restraint ascendance and thoughtfulness in an egative direction, but masculinity had a positive relationship with this element. (XVI) In the case of male science teachers, structuring the silent activities correlated negatively with friendliness and positively with personal relations. In the case of female teachers this element was correlated with restraint, ascendance and thoughtfulness in a negative direction, but masculinity had a positive relationship with this element. (XVII) As regards the structuring of teaching the pupil-teachers had 50.22 percent and 44.89 percent in their first and fourth reteach sessions of the microteaching cycle. (XVIII) For
structuring the learning the pupil teachers had 14.88 percent in first teach session and 20.03 percent in their fourth reteach session. (XIX) The pupil teachers spent 3.25 percent time in first teach session and 7.74 percent time in their fourth reteach session towards the structure of the material. (XX) The science teachers subjected to a feedback from S.T.B.I had significantly enhanced tendently of analizing students responses through showing models and demonstrating experiments followed by relevant questions. There was also significant gain in their tendency of provided opportunity to the students to think. (XXI) the STBI feedback was further observed to generate significant, loss in lecturing by the teacher, the teachers pauses and the note taking tendency of students. (XXII) six factors were extracted through the use of factor analysis, which covered 52.27 percent of the total variance.

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__SINGH, R.D., (1979) STUDIED__ - Simulated social skill Training and Modification of teachers classroom behaviour. The study aimed at assessing the usability of simulated social skill Training (SSST) in teacher training programme as well as its effectiveness in improving the classroom teaching behaviour. The specific objectives were: (I) To collect classroom behavioural data to decide whether the student-teachers who were given the treatment of training in a few selected social skills under SSST organization differed significantly in their organization differed significantly in their classroom behaviour from those under going training in the traditional manner and (II) To inquire into the relative effect of SSST upon the attitude of student teachers. The findings of the study were: (I) The class room behaviour of students-teachers in desirable directions could modified through SSST. (II) The SSST technique was more effective than the traditional method in modifying the classroom behaviour of teachers. (III) The SSST technique was else more effective than the traditional method in developing favourable attitude among student-teachers towards teaching profession.

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__TAREEN, J.A.K., (1980) STUDIED__ - The effect of orientation to and feedback through interaction analysis on the cognitives
interaction pattern, Teaching competence and certain Perceptions of student-teachers. The main objectives of the study were: (I) To find out whether the students-teachers who received interaction feedback treatment differed from those who received only conventional guidance in respect of each of the six interaction variables that together represented the pattern of cognitive interactions overall teaching competence and each of the three teacher perceptions (II) To find out the differences among different subject groups in respect of gains in the six cognitive interaction variables. (III) To find out the relationship between interaction variables gains, and overall teaching competence gains, and (IV) To find out the relationship between six interaction variable gains and three teachers perceptions.

The findings of the study were: (I) Orientation and feedback had a highly significant effect not only on the pattern on cognitive interaction but on overall teaching competence. (II) Progressive changes were observed in the experimental group. (III) The two groups differed significantly in the pattern of cognitive-interactions in the quantum of loss/gain in the time units at different levels the control group being lower than experimental. (IV) The gains of the experimental groups in teaching competence were higher than those of the control group. (V) There was no significant difference between the two groups in respect of IGP, IRP and SP. (VI) Subject of instruction caused no significant differences. (VII) Changes in both the groups showed movement in the desired direction towards the ideal pattern as conceived in SAI.

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RAJAMONY, N. (1981) STUDIED - A comparison of feedbacks through Flanders interaction analysis Category system Analysis of classroom transactions and Videotapes in the modification of Technical Teachers behaviour in Microteaching sessions. The study was conducted with a view to identifying effective modes of feedback for improving teaching skills for questioning, dealing with answers, reinforcement and stimulus variation in technical teachers and their overall teaching performance. The three modes of feedback through Flanders
Interaction analysis category system (FIACS), feed-back through analysis of class room Transaction (ACTS) and feedback through Videotape (VT).

The major findings of study were: (I) Feed back through FIACS resulted in significant improvement of technical teacher behaviour in microteaching sessions with regard to (a) the skill of asking more clearly stated and more purposeful questions and securing greater involvement of students, (b) The skill of dealing properly with students answers, (c) The skill of positively reinforcing the students answers. (d) The skill of stimulus variation, and (e) The improvement of overall teaching performance. (II) Feed back through ACTS resulted in a significant improvement of the technical teacher behaviour in microteaching sessions with regard to (a) The skill of asking more appropriate more precise, more purposeful, more clearly stated and more divergent question and securing greater involvement of more students, (b) The skill of dealing more properly with students answers, (c) The skill of reinforcing students answers through non-verbal positive reinforces. (d) The skill of getting more attention of students through stimulus variation and (e) The overall improvement of teaching performance in regular classroom teaching. (III) Feed back through VT resulted in a significant improvement of the teachers classroom behaviour with regards to (a) The skill of asking appropriate, precise clearly stated, purposeful and divergent questions and securing greater involvement of students (b) The skill of dealing more properly with students answers (c) The skill of reinforcing the students answers through positive verbal and non-verbal reinforces. (d) The skill of getting students attention through stimulus variation and (e) the improvement of overall teaching performance in regular classroom lessons. (IV) For the overall improvement of the skill of questioning there was no significant difference in the effectiveness through the three modes of feed back. (V) There were no significant differences between the three kinds of feed back with regards to improving the skill of dealing with students answers. (VI) There was significant difference between the three modes of feed-back with respect to positive verbal and positive non-verbal reinforcement, F I A C S
being the most effective and ACTS the least effective for positive verbal reinforcement, and VT being the most positive non-verbal reinforcement. (VII) Feedback through VT was the most effective in improving the skill of stimulus variation and that through F I A C S the least effective. (VIII) Feedback through VT was the most effective amongst the three modes of feedback in the overall improvement of teaching performance and that through F I A C S the least effective.

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**SINGH, R.P. (1984)** STUDIED - A study of learning environment of achieving classes of Rajasthan Schools. The major objective the inquiry were: (I) To identify and analyse the classroom climate of rural and urban schools. (II) To study the relationship between the classroom climate and general classroom behaviour. (III) To compare the classroom climates of classes having male and female teachers. (IV) To study the relationship between students perception of teachers classroom behaviour and socio-emotional tone of the class and (V) To compare the socio-emotional climates of high and low achieving classes.

The major findings were: (I) Pupils academic achievement was related to the types of management. Private schools, Particularly mission schools had high achieving students. (II) socio-economic status of students had a significant relationship with academic achievement. pupils of low socio-economic status did not achieve high. (III) Female teachers had a greater impact in the creation of a motivating classroom learning environment. (IV) Classroom climate significantly affected pupils academic achievement. (V) Though rural schools had amore conducive learning environment most poor achieving schools were rural schools. (VI) Classroom climate affected pupils classroom behaviour.

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**KAZMI, Q.S. (1986)** STUDIED - A study of personality profiles and cognitive factors of academic failures among science and arts students at various levels. The objective of the investigation was to study the relationship between the personality characteristics
cognitive factors, sex difference and academic failure among science, intermediate and undergraduate levels.

The major findings of study were: (I) The relationship between different personality factors of Bernreuter's Personality Inventory intelligence, conformity, achievement motivation, study habits and memory span and academic failure was not significant. (II) Failures differed in their personality characteristics and cognitive makeup. (III) Sex differences did not interact with any personality characteristics for academic failure. (IV) Failures did not have any significant interaction effects of sex difference and cognitive factors on their academic achievement. (V) The permanently characteristics and cognitive factors interacted on the failures' academic achievement.

GUPTA, A.K. (1977) STUDIED - A study of institutional climate and classroom Teaching Behaviour in relation to creativity. The main objectives of the study were (I) To explore the relationship between institutional climate and the creativity of pupils. (II) To explore the relationship between teachers' classroom verbal behaviour and creativity to pupils. (III) To study the significant patterns of the needs of pupils and that of the 'press' in their institutions. (IV) To analyse significant patterns of ninth class science teachers' class room behaviour. (V) To study the effect of intelligence and socio-economic status on creativity and (VI) To study the interaction between school climate teachers' class room verbal behaviour and creativity of pupils.

The major findings were: (I) The mean level of verbal creativity was found to be significantly higher in the need-fulfilling type of institutional climate as compared to that in need fullfilling and laissez faire institutions. (II) Pupils studying in the laissez faire institutions had significantly higher mean non-verbal creativity level than their counterparts in the need-fulfilling types of institutions. (III) There were no significant differences between the pupils studying in institutions with different types of institutions climates with respect to their scores on composite creativity. (IV)
Institutional climate and verbal creativity were found to be significantly related. (V) There was a significant relationship between verbal creativity and teaching verbal behaviour even though the extent of relationship was low. (VI) Both verbal and non-verbal creativity as measured by MIER tests, was found to be independent of intelligence and socio-economic status. (VII) Pupils with average and low levels of verbal creativity were likely to improve upon their creative levels in schools with a laissez faire type of institutional climate under teachers with democratic classroom verbal behaviour, where as pupils with high verbal creativity were found to improve in laissez faire schools under authoritarian teachers. (VIII) In the case of non-verbal creativity on the other hand, pupils belonging to all levels of creativity were found to have significantly higher creativity levels in the schools with a need unfulfilling type of institutional climate under teachers where classroom verbal behaviour was democratic in nature. (IX) Verbal and non-verbal creatively required different sets of conditions for their development in terms of teaching style of teachers and institutional climates. (X) The perceived need patterns and perceived press patterns of the need fulfilling and need unfulfilling types of institutions were found to differ significantly. (XI) The needs of the pupils of need-fulfilling types of institutions could be mainly described in terms of needs related to self expression and satisfaction through intellectual, artistic, manipulative and co-curricular avenues, where as the need of the pupils in needs unfulfilling types of institutions could be described as being directed towards higher need achievement and a higher level of aspiration. The needs of the pupils were mostly related to the intellectual field only. Artistic, creative and manipulative areas were generally not perceived as possible channels of need satisfaction by pupils studying in schools with a need unfulfilling institutional climate. (XII) Science teachers showed a marked preference for narrow, factual types of questioning as against elaborate questioning. Classroom interaction was limited to the question response pattern, pupil initiation was almost absent and pupils ideas were not appreciated. (XIII) The teachers-talk of democratic teachers was
found to be more indirect as compared to that of the authoritarian
teachers, pupils-talk was maximum in the classroom of untrained
teachers. (XIV) Pupils-talk was significantly higher in the classroom
of authoritarian teachers than in the classes of their counter parts
with democratic teaching.

**KHALWANIA, N.S.(1986) STUDIED** - Effectiveness of concept
based science curriculum in developing cognitive structures and
acquisition of process skills among high school students. The
objectives of the study were (I) To develop a concept based science
curriculum to teach a few important science concepts, (II) To study
its efficiency as compared to a conventional curriculum in terms of
development of cognitive structures and acquisition of process skills
(III) To study the interaction of the curriculum with the level of
intelligence, (IV) To study the effect of socio economic status of the
learner on the development of cognitive structures, and (V) To study
the relationship of self concept of the learner with his cognitive
structure. The findings of the study were: (I) The concept based
curriculum was more effective than the conventional curriculum in
terms of acquisition of process skills as well as in developing better
cognitive structures. (II) Students having high self concept did not
differ in process skill scores from students having low self-concept
(III) levels of intelligence did not affect mean scores in the process
skill test. (IV) Intelligence acted as a redundant variable as far as
development of cognitive structure was concerned. (V) The high
socio-economic status group and the low socio-economic group did
equally well in the acquisition of process skills in science. (VI)
Levels of self-concept did not affect the development of cognitive
structures. (VII) Curriculum types did not interact significantly with
levels of intelligence, levels of self concept and levels of socio-
economic status. (VIII) The low socio-economic group following
the concept based curriculum scored significantly higher in process
skills than the high self-concept and high socio-economic groups
using the conventional curriculum. (IX) Low ability students having
low socio-economic status when taught the concept based
curriculum performed better on the cognitive structure test than high
ability and high socio-economic group students. (X) Students
having high self-concept and high socio-economic status when taught the concept based curriculum scored higher on the process skill test than students having high self concept and high socio-economic status but taught through the conventional curriculum. 

(XI) students with high self concept and low socio-economic status differed significantly from students with high self concept but low socio-economic status under the two types of curriculum used in the study.

- **EXEMMAL. J. (1980) STUDIED** - Construcion of certain models for teaching school Botany using environmental and Ethnic resources and testing the efficiency of such models. The major objectives of study were: (I) To construct models for teaching botany using environmental and ethnic resources. (II) To test the efficacy of teaching models by comparing the achievements in botany of the treatment groups. (III) To examine the effect of environmental approach on the attitude of pupils towards teaching and learning. (IV) To compare the effectiveness of the environmental approach and the formal approach in realizing certain select a educational outcomes

The major findings of the study were: (I) The environmental approach was significantly superior to the formal approach in terms of immediate post-teaching and delayed memory scores. (II) Significant difference existed between the rural and the urban students in their immediate post-teaching achievement when the groups were exposed to the environmental teaching (III) Pupils belonging to low SES groups were significantly superior to those belonging to the high SES groups in their achievement when taught through the environmental approach. (IV) Pupils belonging to rural areas were significantly superior to urban students in their achievements. (V) The age of the teacher was not related to the patterns of his influence. (VI) Teachers teaching chemistry had more pupils talk, high I/D ratio, more questions and rapid transition in the class than in the case of teachers teaching biology and physics. (VII) The type of the school had no definite relationship with the patterns of influence of teachers.
SAXENA, A.B. (1983) STUDIED - A some selected aspects of school learning er characteristics. The major objectives of th
explore those learning environment variables on the development of selected student chara
the influence of these variables on the namely, General mental ability (GMA), Sch achieve

Major findings of the study were : (I) The co of cocurricular activities provided (CCAP) provided (E.FP), Coherence, environment satisfaction, Competitiveness and speed coi .01 level with student characteristics of GM efficient being 0.203, 0.208, 0.112, 0.216 and 0.113 respectively. (II) The first canoni indicated that the student characteristic of efficient=0.954) is mainly predicted by 1 cocurricular activities, learning enviro satisfaction, democratic climate, comp disorganization (negatively-correlated), the being 0.641, 0.569, 0.512, 0.482, 0.385 a Like wise the second, third and fourth ca found to be 0.231 , 0.167 and 0.151 res indicated that rural girls obtained significan on general mental ability, school achievemotivation as compared to rural boys on al
(IV) The analysis of variance in respect of G effects of the variables of sex, residence at sex and residence. The analysis in respect of cocurricular activities indicated the main effi
residence. (V) The learning environment vari into four components by factor analysing the environment variables in duded : ‘class org the variables of cohesiveness diversity, speed goal direction); democratic principles (comp
mocratic climate, satisfaction); and ‘group functioning’
liqueness, difficulty). While these three components contributed to 
growth of specified student, characteristics, the fourth
ponent, that is, ‘alienation from school’ (favoritism, apathy,
sorganization, competitiveness) appeared to be affecting adversely 
development of the students characteristics which were studied.

**AS GUPTA (1986) CONDUCTED** - An investigation into the
organisation of students activities and their relationship with
sonality characteristics of secondary pupils in Nagaland. The
jectives of the study were (I) To study the organizational set-up
students activities in the high schools of Nagaland. (II) To find
the existence of any relationship between participation in
ivities and personality characteristics of students, and (III) To
ake suggestions for the reorganization of student activities in high
hools of Nagaland. The major findings were: (I) Students who
re highly as well as moderately motivated towards student
ivities scored significantly higher than the lowly motivated on the
erced out going trait. (II) Students who were moderately as well
lowly motivated towards student activities scored significantly
her than highly motivated or ‘Less-Intelligent-More Intelligent’
‘Vigorous-Doubting’ traits. (III) Students who were highly
ivated towards student activities scored significantly higher than
: moderately as well as lowly motivated on ‘Affected by feelings-
tionally stable’ (among the latter the moderately motivated) and
venture some traits (IV) Students who were highly as well as
vily motivated towards student activities scored significantly
her than the moderately motivated on the ‘sober-Happy-go-
ky’ trait. (V) There was no significant difference among
ents who were highly, moderately and lowly motivated towards
ent activities on the Phlegmatic-Excitable, Obedient-Assertive,
edient-Conscientious, Tough-minded-Tenderminded, Placid-
rehensive, Group dependent, self-sufficient, Undisciplined-self-
lict-Controlled and Relaxed-Tense traits.

**RVE, M.V. (1986) STUDIED** - Preparation films and testing
ilm for teaching of science- a course in standard IX , and a study
of their comparative effectiveness in the teaching-learning process as compared to the traditional practice. The objectives of the study were (I) to prepare filmstrips on selected topics from the science-course of standard IX (II) to teach the selected units of the science course of standard IX by using these film strips (III) to compare the effectiveness of teaching with the help of film strips and the traditional practice of teaching science in terms of achievement of the learner (IV) to compare the effectiveness of teaching with the help of filmstrips and the traditional practice of teaching science in terms of achievement of the learner, considering sex and level of achievement as parameters and (V) to compare the effectiveness of teaching with the help of filmstrips in terms of achievement of the learner considering age, liking and availability of gadgets at home as parameters.

The major findings of study were: (I) Film strip was more effective than the traditional method for teaching the facts, principles and concepts in Science (II) film strip and the traditional methods were equally effective for teaching abstract concepts in Science. (III) Film strip was an effective teaching aid for all levels of learners i.e. low, medium and high achievers (IV) film strip was more effective for the learners between 13 and 16 years of age than for learners between 17 and 21 years of age. (V) Film-strip was more effective method of teaching science for both sexes, i.e. male and female.

DEOPURIA, R.P. (1984) STUDIED — A comparatives study of teaching science through environmental and traditional approach in schools of Madhya Pardesh. The objectives of study were (I) to compare the cognitive achievement of students of classes V, VII, IX and X towards science taught through the environmental versus the traditional approach. (II) To compare the environmental awareness and attitude of students when taught by the above two methods and (III) To compare the attitude of the teacher’s towards the environmental approach of teaching.

Some of the major findings were: (I) The students of the experimental group of classes V, VII, IX and X obtained higher
achievement scores due to teaching of science through the environmental approach. The environmental approach showed greater cognitive gain in knowledge, understanding and application of science concepts related to environmental education at primary, middle and secondary school levels. But it was not effective in the teaching of factual recall type concept at middle and secondary school levels. (III) The students of primary schools of the experimental group showed considerable improvement towards environmental awareness. (IV) The environmental attitude inventory showed significant positive gains in attitudes towards the environmental for the entire experimental group of students. (V) The obtained value of ‘t’ showed that teachers of the experimental group of schools had a very high positive attitude towards the environmental approach for teaching science. (VI) No significant difference between male and female teacher’s attitude towards the environmental approach revealed that sex had no effect on the attitudes towards the environmental approach. (VII) There was no significant difference between the attitude of teachers towards the environmental approach followed at different grade levels.

JOSHI, B.P. (1981) STUDIED - Development of science education for upper primary classes based on the Environmental approach. The objectives of the study were (I) to locate environmental problems, particularly in the state of Rajasthan, which might have a bearing on the rural and semi-urban life. (II) To analyse and enumerate the scientific viewpoint and the implications of the problems so located and thereafter grade them according to their sophistication and to inject them into the school curriculum and thus make the programme environment oriented, and supplementary reading material, both for the students and teachers.

The major findings of the study were: (1) Environmental education at the upper primary level was essential and vital to develop in sight and skills needed to influence not only the environmental-attitudes and behaviour in the students but also to stimulate their reorientation of values regarding the importance of environmental studies (II) children at the primary stage were interested in and learnt from
experiences with real things that they could manipulate in same way

(III) The teachers did not identify the objects outside the classroom which might be usually brought inside for study (IV) The environment outside the school was potentially significant for educational purposes (V) The syllabus was not environmentally oriented, lacked in field studies did not contain information about ecological balances, protection of fauna and flora, did not include topics like conservation of resources, pollution of water and air and preservation of wild-life, was not interesting and motivating and did not have relevance to real life.

- **MUDDIE, Y.M. (1978) STUDIED** - A study of the effectiveness of the use of motion pictures as aids in the teaching of biological science as compared to the used methods. The objectives of the study was to test the following hypothesis: (I) Films provide the elements for vicarious visual-experiences (II) The use of effective and appropriate films results in more learning in less time and better retention of what is learned (III) Films help in increasing factual knowledge, teaching skills, building attitudes, changing motivation, retention of knowledge etc. (IV) Films are the most powerful, prolific, popular, pointed and polished of all the media that penetrate into the conceptualistic skeleton of the human mind.

The findings of the study were (I) There was a significant improvement in the post-test performance of students in both the groups over the pretest. (II) There was significant improvement in post-test performance over pretest performance in higher ranges of scores particularly in the case of experimental group (III) There was a definite improvement in the pass percentage in case of the experimental group (IV) The sound pictures helped to a great extent the above average students to comprehend the subject matter in biology (V) The use of films in teaching of biological sciences helped in more learning in lesser time and better retention of what was learnt (VI) Instructional films stimulated the scientific interest of the students (VII) Instructional films had immense potentials in teaching and provided the elements for various visual experiences
which in turn made the lessons more vital and further they made the language used in lessons more meaningful.

**NATRAJAN M.R. (1983) STUDIED** - Evaluation of district level science fairs and educational exhibitions. The objectives of study were (I) to evaluate the organization of district of Andhra Pradesh and (II) to evaluate the achievement of the objectives of the science fairs and exhibitions organized at district level. The objectives of the study were (I) Many students felt that they benefited from the books of science and made use of their own efforts in the organization of science-fairs (II) Students felt that these fairs are not only motivated them, but also motivated their teachers to use innovations in the classroom. (III) Teachers as well as students felt that the science fairs helped in using local resources easily (IV) With the science fairs and organization of exhibitions, the teacher-student interaction and participation of both teachers and students increased (V) The science fairs and exhibitions helped in building rapport among administrators, teachers and pupils (VI) with the organization of science fairs cognitive insight of teachers and pupils increased. (VII) Teachers expressed that the scheme was good and it helped them to make their teaching easier for pupils (VIII) In case of organizational aspects of science fairs, 66 percent of teachers opined that winners should be given certificates, but most of them favoured that participants should be provided scholarships (IX) Pupils, teachers and the organizers of the view that there was a need for separate committees for arrangement of Science fairs and a different Committee was required for speedy judgment.

**SCERT (ANDHRA PRADESH) (1982) STUDIED** - Evaluation study of in-service training of sec school science teachers in improvisation techniques in science teaching courses of the college of education. The objectives of the inquiry were (I) to study the relevance of courses content of the in-service training programme (II) to study the relevance of activities to the objectives of the training programme to the objectives of the training programme (III) to study the relevance of improvisation techniques being taught in the in-service training programme and (IV) to study the attitude...
of in services teachers towards improvisation of science equipment for science teaching in secondary schools.

The findings of the study were (I) More than 60 percent of the participants felt that the course was good and acquainted the teachers with new developments in science (II) Most of the participants felt that there was not adequate staff and individual attention was not given during the course (III) The participants felt that they could not attend the course properly because of too much interference from the education officers and other supervisors (IV) The participants felt that the course was theoretically relevant but practically many of the problems of science account (V) the participants felt that the teacher educators did not consider them as equals but treated them as students. (VI) The participants had a feeling that even the teacher-educators were not fully acquainted with modern concepts and development in Science (VII) Most of the teaching activities being practiced during the in-service training programme were not usually applicable in the classroom situation (VIII) The methods of teaching being preached for science teaching in the training programme were already practiced by the participants in one way or another (IX) Improvisation of the science apparatus was a good activity but it was not fully relevant to the environmental set-up of the schools in which they worked (X) Because of the interference of the head masters and other colleagues, it was not possible to use the improvisation techniques (XI) The improvisation of science apparatus was not possible as much of the time was used in covering the prescribed syllabus (XII) The improvisation of science apparatus as taught in the constlier items improvisation was rarely used.

SCERT (ANDHRA PARDESH) (1980) STUDIED - Evaluation study of state level science fair and educational exhibition. The objectives of the study were (I) to examine the science fair and educational exhibition with a view to evaluating creativity (II) to evaluate the science-fair and educational exhibition from the point of view of organizers, teachers and participant pupils and (III) to access the effectiveness of the science-fair and educational-
exhibition from the point of view of teachers and students with respect to attainment of new knowledge using innovations in teaching.

The findings of the study were (I) More than 50 percent teachers felt that the main themes selected for the science-fair for high school and upper primary classes were clearly brought out (II) Almost all participant pupils felt that science fair was helpful to clarify their understanding of various concepts in science (III) The organizers felt that creativity of the pupils was fully exhibited in the science-fair. They also opined that creativity was more in physical science than in life sciences (IV) The teachers felt that the sciences-fair was helpful in bringing out creative talent among the students (V) The innovations brought out in the science-fair were of high standard (VI) The teachers felt that the prizes given in the science fair were not adequate (VII) The pupil participants felt that the criteria of judgment was suitable and appropriate. (VIII) The organizers indicated that students who showed their talent in the state level-exhibition should be given extra-coaching by the state to compete for science talent examinations held at national level (IX) The organizers and the teacher felt that the science-fair was very effective as the students were able to learn many new concepts which otherwise could not be easily clarified in the classroom (X) The pupil participants felt that after the science-fair the teachers used many new methods of teaching to teach concepts in science.

SHINDE,Y.K., (1982) STUDYED - A study of non-formal science activities in secondary schools of Maharashtra state with special reference to their impact on scientific-attitude and achievement in science. The objective of the inquiry were: (I) to study the involvement in non-formal scientific activities of secondary school students, (II) to develop a scale to study the scientific-attitude of students at the secondary stage (III) to study the scientific attitudes of secondary students, (IV) to inquire into the relationship between the extent of involvement in scientific activities, scientific-attitude and achievement in science, and (V) to study the science teachers role in encouraging non-formal science activities.
The study revealed the following: (I) The means of non-formal science activity scores achieved by adolescent differed from region to region. (II) The boys were better than the girls in their non-formal science activity involvement. (III) The correlation between the scientific attitude scores and non-formal science activity scores was negligible and not significant. Thus scientific-attitude of the secondary students was not related to their involvement in non-formal activities. (IV) Academic achievement of the students was not related to their involvement in non-formal activities. (V) Field observations, activity participation, and activity independence of the students were related to one another. (VI) The boys and girls did not differ in their scientific attitudes. (VII) Students with high academic achievement had a high scientific attitude, students with average academic achievement had average scientific attitude, and the low achievers had a low scientific. (VIII) Girls showed a better relationship between scientific attitude and academic achievement than boys. (IX) Scientific attitude of the students differed from region to region. (X) The boys and the girls from the same cultural group did not differ significantly with respect to their scientific attitude.