CHAPTER III

REVIEW OF RELATED LITERATURE
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CHAPTER III

REVIEW OF RELATED LITERATURE

3.1 Introduction

For any worthwhile study in any field of research, the researcher must have an adequate knowledge with the work that has already been done in the area of his research. Review of literature provides better understanding of the problem which helps the investigator in evolving new insights and to build new approaches to the problem that has selected.

Research worker must have up-to-date information about what has been thought and done in the area of his research. Since effective research is based upon past knowledge, review of related literature helps to eliminate the duplication of what has been done and provide useful hypothesis and helpful suggestions for significant investigation (Best and Khan, 1995).

Review provides a greater understanding of the problem and its aspects and ensures the avoidance of unnecessary duplication; it enables to compare the data on the basis of which a researcher can evaluate and interpret the significance of areas findings, and in addition, contributes to the scholarship of
the investigator. Also these literatures are structural sources of objectives and hypotheses.

With these objectives, a survey has been made on the area of cognitive style, classroom environment and achievement motivation on achievement in physics (Science) at the secondary level. While surveying, it was found that the previous studies on achievement in physics (Science) were few and hence the researcher has made a survey on the related fields cognitive style, classroom environment, and achievement motivation.

Having discussed the problem on hand and established the need for the study, it is necessary for the researcher to probe into the main area of research conducted by other researchers only when a research project is based on all the relevant thinking and research that has preceded it, it becomes a fact of the formulated knowledge in the field and this contributes to the thinking and research as a whole.

3.2 Importance of Review of Related Literature

The review of related literature is as important as any other component of research process. The review of related literature involves systematic identification, location and analysis of documents containing information
related to research problem. The review tells the researcher what has been done and what needs to be done (Gay, 1990).

In the words of Best and Kahn (1992) "The review of related literature is a valuable guide to define the problem, recognizing significance, suggesting promising data gathering devices appropriate study design and sources of data".

Rath (1972) studied "Cognitive Growth and Classroom Learning of the Primary School Children in Orissa- A Cross Cultural Analysis".

Intellectual and cognitive manifestations of 330 brahmin, scheduled caste and scheduled tribe children studying in five different primary schools of Orissa were compared.

All the samples were administered the following tests: (i) the Raven's Progressive Matrices to measure intelligence; (ii) the Rotters' Aspiration Test to measure a particular kind of level of aspiration and achievement; (iii) the auditory Vigilance Test to measure attentional processes involved in signal detection and vigilance; (iv) the Stroop's Colour Word Interference Test to obtain an index of linguistic development; and (v) Verbal Concept Formation Tests to assess the range and quality of concepts based on the class IV language book. Marks secured by the children in the various school
examinations in all the subjects of study were noted to assess their academic achievements. By interviewing all the children and their parents, the motivational and aspirational problems of the subjects and their parents were investigated. The family and parental educational background was assessed by finding out the educational attainment of all the members of the family. Attendance and stagnation of the subjects under investigation were also found out from the school records. The estimation of the teachers about the abilities, behaviour and future academic possibilities of the subjects was also attempted. The average time taken to administer all the tests on a single child and to interview him for filling up the questionnaire was 5.5 hours.

It was found that the Brahmin children were younger by 9-10 months and were the most intelligent, closely followed by the scheduled tribe children. The tribal children were very ambitious and vigilant. The Brahmin children were consistently better in verbal abilities and concept formation.

Ary (1972) states the importance functions of related literature in the research project as:

i) Knowledge of related research enables the investigation to define the frontiers of his fields.

ii) An understanding of theory in the field enables the researcher to place his question in prospective.
iii) Through studying related literature one learns, which procedure and instruments have proved useful and which seems less promising.

iv) A thorough search through research avoids unintentionally a duplication of previous study.

v) The study of related literature places the researcher in a better position to interpret the significance of his own results.

The review has been done keeping the above functions in view.

Shah (1973) studied "Sex Differences in Factoral Structure of Cognitive Area at School Level".

The major objective of the study was to examine two hypotheses, namely, there are no sex differences in the organization of mental abilities of boys and girls, and the operation of mental functions cannot be separated from content.

The sample was drawn from four districts of eastern U.P. using the technique of random cluster sampling. As many as 400 boys and girls reading in class X were the respondents. The tools consisted of nine tests of different functions and contents and a test of general intelligence (B.P.T seven). The statistics used were the descriptive statistics, critical ration, Pearson's r, factor analysis, etc.
The major findings were: (i) special content as an independent factor was demonstrated among boys but not among girls, (ii) 'g' was represented among boys by a combination of reasoning and memory function along with verbal content, while among girls it was represented by a combination of reasoning function along with verbal and spatial content; (iii) verbal reasoning in girls was the most complex factor which included all functions and all content moderately related to 'g'; (iv) spatial reasoning in boys represented only verbal content in a low measure and in girls this factor represented reasoning and memory function unrelated to 'g'; (v) in case of boys high 'g' saturation went with even higher loadings in numerical reasoning and in girls high 'g' saturation went with even higher loading in verbal reasoning; (vi) factors common to boys and girls were spatial content, verbal content with reasoning and memory function; (vii) the study demonstrated only the spatial content as an independent factor; speed could not emerge as an independent function; (viii) the hypothesis of independence of functions and content was not supported except in case of spatial content and memory function; (ix) the hypothesis of no sex difference in mental structure of boys and girls was also not supported.
Bhasin (1974) studied "Relationship of School Perception to Academic Achievement at High School Level".

The study attempted to find out the relationship of total school perception to academic achievement of students at high school level, keeping in view the variables of intelligence, self-concept, sex, socio-economic status and teacher perception of students' behaviour. The main objectives were: (i) to prepare and develop an objective instrument, viz., a projective test for measuring the total school perception (SPPT); (ii) to prepare and develop a scale for school perception for validating the school perception (SPS); (iii) to prepare and develop a scale for teacher perception of students' behaviour (TPS); (iv) to determine factors in school perception; (v) to find out the relationship of school perception with academic achievement; (vi) to study the relationship of school perception with intelligence, self-concept, sex and socio-economic status; and (vii) to find out the relationship between school perception and teachers' perception of their students' behaviour.

The sample consisting of 200 students (100 boys and 100 girls) was selected randomly from the randomly selected high schools at Phagwara, Panj. The SPPT, the SPs and the TPS were developed. The SPPT was a picture test, semi-structured and cover the following areas of school perception; (i) physical environment of the school, (ii) behaviour of head master and teachers, (iii)
classroom teaching, learning activities, and (iv) academic achievement. Similar situations were taken for the SPS also. Teachers' perception of the students' behaviour related to the areas of work habits, study skills, general conduct, ambition, personal liking, prodding, acceptance by other students, acceptance by other teachers utilization of study objectives, emotional balance, thinking ability. Test-retest reliabilities for an intervals of 15 days were 0.939, 0.849, and 0.873 for ST, the SPS, and the TPS respectively. The convergent validity coefficient of SPT with SPS 0.512. Along with these tools, data were collected using the Modified Army Alpha – Form 9, the Data personality Work List, and the DES scale developed by Deo and Mohan. School examination marks were also noted. The data were analysed using point correlation, F ratio and t test.

The major findings of the study were as follows (i) The correlations of SPPT with other variables were (all positive and significant at 0.01 level). The academic achievement 0.354, with intelligence 0.3413 with self concept 0.212, and with sex 0.584. (ii) The correlation of SPPS with other variables were – with academic achievement 0.205, with intelligence 0.206, with concept of 0.353, with socio-economic status 0.192 with sex 0.395, (iii) The multiple R for SPPT academic achievement, intelligence, self-concept, socio-economic status was 0.455 and for SPS with these variables was 0.409. (iv) It was found that those high on academic achievement, intelligence, self concept and socio-economic status had high school perception and low on these
variables has low school perception. (v) Girls exhibited higher school perception as compared to boys. (vi) Teachers with students of higher school perception showed higher perception of their students' behaviour and teachers with students of low school perception had lower perception of their students' behaviour. (vii) The variables x factors located were – (i) Nonverbal Perception School, (ii) Verbal Perception of School, (iii) Self-Perception, (iv) General Intelligence, (v) Verbal Perception of Academic Achievement and Academic Authorities, and (vi) Socio-economic status.

Sharma (1975) undertook “Comparative Study of the Achievement of Boys and Girls in General Science and Mathematics at Delta Class in Rajasthan”.

The main objective of this study was to compare the achievement of pupils of delta class in general science and mathematics.

The instructions selected for the administration of the tests comprised 24 each of the four types of institutions, viz., rural, urban, boys' and girls' of the state of Rajasthan. The final form of the test in general science has 149 items and that in mathematics 100 items. The reliability of the tests was calculated by the application of split-half method on the scores of 200 boys and 200 girls. Guttman formula and Kuder-Richardson021 formula were used. The coefficients of concurrent and congruent validities of the tests were
obtained by correlating test scores with marks of pupils in the annual examination, and also with the ratings of the pupils made by their respective teachers in a predetermined five point rating scale. The coefficient of correlation was calculated by the application of product-moment correlation technique taking the entire sample of 1708 pupils into consideration. In order to find out the variance in attainment of the different strata of the samples, analysis of variance was used.

The study revealed the following: 1. The prevalent syllabus in general science and mathematics for the students of the delta class in Rajasthan was highly effective, outmoded and wanting in proper process of evaluation. There was no proper relationship between the course content prescribed in the syllabus and that presented in the textbook for the delta class pupils. 2. The reliability of the test prepared by the investigator in general science ranged from 0.91 to 0.93 and that in mathematics from 0.96 to 0.88. 3. The validity coefficients of the test in general science ranged from 0.45 to 0.58 and that for the test in mathematics from 0.44 to 0.57. 4. The performance of the pupils in general science was highest in Sirohi, Sikar and Tonk districts, and lowest in the districts of Bikaner, Udaipur and Bundi. 5. The performance of the pupils in mathematics was highest in Alwar, Ajmer and Sirohi districts, and lowest in Bundi, Sawai Madhopur and Udaipur districts. 6. There was a significant difference between the performance of boys and girls on the test in general
science and mathematics. The girls were superior to the boys in both the subjects. There was also a significant difference between the performance of the rural and urban population on the test in general science whereas there was no significant difference between the performance of the rural and urban population on the mathematics test.

Dave (1975) studied "Hierarchy in Cognitive Learning".

Two main purpose of the project were: (i) to evaluate the effectiveness of the Physics Resource Material (PRS) prepared by the staff of the Physics Department, Regional College of Education, Mysore; and (ii) to assess the feasibility of the Advanced Curriculum Model of Cognitive Learning (ACMCL). The study hypothesized (i) cumulative hierarchy between the levels of knowledge (K), understanding (U) and application (A); (ii) existence of hierarchy of Expected Behavioural Outcomes (EBOs) within the hierarchy of objectives of learning and (iii) efficacy of PRM in terms of EBOs in comparison with usual text and methods.

Forty-nine students were included in each of the experimental and the control groups selected from standards VIII, IX and X of the central, state government and private schools of Andhra, Kerala, Madras and Mysore. The total sample comprised 2430 students who were given a re-test the items of which were classified into objectives as well as behavioural categories. The
experimental groups were taught one of the units such as air pressure, work, power and energy, statics, hydrostatics and simple machines by the teachers who were intensively trained in the use of RM for a week. The control groups were taught by the regular teachers with the help of usual text and methods. After completion of teaching both the groups were simultaneously given a post-test consisting of thirty items which were carefully framed and classified into categories under study by the subject and education exerts. Since the distribution of data by and large was not normal and the theoretical assumptions of the study were also not compatible with the concept of normality, a series of non-parametric tests were used to test the tenability of the hypotheses.

The following were some of the significant findings: (i) While the overall data supported that K, U and A were hierarchically related, the same data, partitioned condition-wise, did not support that assumption for the control group, thereby indicating a difference between the process hierarchy (developmental goals) and the product hierarchy (developed goals) and also the need for making conscious attempts at developing them. (ii) There was more consistency in the performance of the experimental group with respect to different units than it was for the control group indicating some sort of relationship existing between content and hierarchy. (iii) Excepting the Malayalam language group, the data for the other languages lent substantial
support to the cumulative structure of hierarchy. (iv) The students taught with the help of the PRM using both its content and methods showed greater acquisition of knowledge with respect to all the five units, better understanding with respect to two units, and better abilities of application for solving problems in physics with respect to one unit, than those taught by usual text and methods. (v) It appeared that mental processes under K formed a predicted structure, whereas under U and A they did not form a particular pattern, but formed different clusters within each category, indicating either the peculiar nature of the content or weakness of the measuring tool.

Mohan (1975) studied “Development of Self Concept with Relation to Intelligence Learning Ability Achievement and Achievement Motivation of Adolescent Level”

The main objectives of the study were: (i) to trace the general growth of self concept over years of adolescence, both longitudinally and cross sectionally separately for males, females and for combined groups of adolescents for the perceived, ideal and social aspects of the self and the discrepancies among them (ii) to study the differential growth of self concept of high, average and low ability groups of intelligence, learning, achievement and achievement motivation and (iii) to establish the relationship of the
variables of self concept with the correlates of intelligence, learning (verbal
and nonverbal), achievement motivation achievement and originally.

In this investigation the developmental exploration survey of self
c oncept was coupled with the longitudinal and cross-sectional techniques.
The longitudinal growth was traced studying the same subjects for the
successive years only. This was combined was cross-sectional comparison of
self concept from the teen through twenty years, plotting graphically separate
growth curves for males, females and total adolescent group at each age level.
The data were analysed with the help of general and differential growth
curves, and descriptive statistics like mean, SD, standard errors, product-
moment and partial correlations. Multiple regression equation and factor
analysis were also used in analyzing data.

The main findings of the study were as follows: (i) longitudinal and
cross-sectional growth analysis revealed increasing trend of female perceived
self, male social self and decline of male perceived self and female social self,
(ii) ideal self for both sexes indicated rapid increase, (iii) discrepancies related
to perceived and social self suggested varying patterns, while those related to
ideal self revealed upward rising growth throughout adolescence, (iv) in most
of the differential growth curves, low and average groups indicated parallel
growth, while high groups scored higher on all variables of self, (v) in both
general and differential growth analysis the best period of growth was found
to be between sixteen and eighteen years, marking seventeenth year as the
peak point in growth of self concept, (vi) females showed more stability of self
than males during adolescence.

Mubayi (1976) undertook "A Study of the Achievement Motive of
Secondary School Pupils of Scheduled Tribes of South Gujarat".

The investigation attempted to study the need achievement of
scheduled tribe students studying in the high school classes of South Gujarat,
mainly a tribal area. The main objectives were: (i) to make comparative studies
of the n Ach levels of the following different groups. (a) tribals in tribal schools
with tribals in nontribals schools, (b) tribals in tribal schools with tribals in
nontribals schools, and (c) nontribals in tribal schools with nontribals in
nontribal schools; and (ii) to study the relationship of the following factors
with n Ach of pupils, (d) number of siblings, (e) birth order, (f) location of the
school, (g) educational level of the father, (h) occupational level of the father,
(i) mobility of the family, (j) pupils' vocational aspirations, (k) pupils' motivation
towards school, and (i) pupils' perception of achievement demands by peers,
teachers and fathers.

The sample consisted of 1506 students selected randomly from VIII, IX,
X and XI classes of forty-three tribal schools of South Gujarat comprising
Broach, Bulsar, Dang, and Surat districts. The tools administered were: (i) the Mehta’s TAT; (ii) an Identification data sheet; (iii) an inventory of qualities; (iv) the Junior Index of Motivation Scale; and (v) the Flexibility- Dogmatism and Idealism-Pragmatism scales. Mean, SD, t and coefficient of correlation were used to analyse the data.

The important findings were as follows: (i) Pupils in the nontribal schools had a higher n Ach level than those in the tribal schools. (ii) Nontribal pupils in the tribal schools scored significantly higher than tribal pupils in the same type of schools. (iii) The difference in n Ach between the tribal and non-tribal pupils in the nontribal schools was not significant. (iv) Nontribal pupils in the nontribal schools scored significantly higher on n Ach than the nontribals in the tribal schools (v) The mean n Ach of nontribals in the nontribal schools was higher than that of any of the other groups. (vi) Pupils of the Gamit and Vasava tribes in the tribal schools had a higher mean n Ach than their counterparts in the nontribal schools, but pupils of the Chaudhari and Kili tribes in the nontribal schools had a higher mean n Ach level than the pupils of these tribes in the tribal schools. (vii) The low mean n Ach level in each of the four groups was found to be due to the absence or low frequency of occurrence of components like negative instrumental activity, negative goal anticipation, negative affect, nurturant press and personal and world blocks. (viii) Girls in the nontribal schools, whether tribal or nontribal, scored higher
on n Ach than those in the tribal schools. The environment of the school and not the cultural background was found to be the factor influencing their n Ach level. (ix) A constant increase in n Ach of tribal pupils going through the high school classes of the tribal schools was evident. The same is true for tribal and nontribal pupils in the nontribal schools. (x) The n Ach level of pupils from rural schools was higher in the case of nontribal pupils; the pupils from the urban nontribal schools revealed a higher n Ach than the rural nontribal schools. (xi) The n Ach level of pupils in the tribal schools and nontribal pupils in the nontribal schools whose fathers were labourers was significantly lower than the n Ach level of pupils in the same two groups whose fathers were engaged in independent profession. There was no relationship between age of pupils and n Ach among tribal and nontribal pupils of the nontribal schools. (xii) The number of siblings in a family, birth order of the pupils, vocational aspirations of pupils, occupational level of the father, motivation towards school, pupils’ perception of achievement demanded by their peers, perception of achievement demanded by fathers and educational level of father, were not found to be related to n Ach.
Duncan and Sharon (1979) studied "Child Bilingualism and Cognitive Functioning: A Study of Four Hispanic Groups".

The purposes of this cross-sectional study were (1) to assess and describe the English/Spanish relative linguistic proficiency (RLP) of four Hispanic background populations in grades one and three, and (2) on the basis of this description, to assess the comparative performance of children at increasingly higher levels of RLP on three measures of intellectual functioning and field dependence/independence cognitive style.

Following a rationale emphasizing an interpretation of cognitive development and learning theory approaches, the primary prediction was that there would be significant differences in performance by children at increasingly higher levels of RLP on all three measures. It was also predicted that the bilingual children's performance on all measures would be superior to that of the monolingual children.

The subjects were 204 school children in grades 1 and 3, selected from urban and rural Mexican-American, and urban Puerto Rican-American and Cuban-American communities in four states. The Language Assessment Scales (LAS) were used to test oral language proficiency. The Cartoon Conservation Scales (CCS) the Children's Embedded Figures Test (CEFT) and the Draw-A-Person (DAP) Test were used to assess the intellectual development,
perceptual disembedding and figural drawing respectively. The assessment of RLP identified five linguistic comparison groups: Proficient Bilingual, Partial Bilingual, Monolingual, Limited Bilingual, and Late Language Learners.

In order to test the first prediction, orthogonal contrast procedures were used and three one-way ANOVAs were run. A series of t-test were computed to test the second prediction. The findings resulting from this investigation have to do with the nature of the relationship between RLP and cognitive/perceptual functioning.

One of the most important findings was that there was a positive and significant relationship between degree of relative linguistic proficiency and cognitive-perceptual performance of the children. The Proficient Bilingual children consistently and significantly outperformed the four other comparison groups on two of the three dependent measures. The children identified as Late Language Learners consistently produced the lowest mean scores on all dependent measures.

While the Partial Bilingual children did not outperform the Monolinguals, as initially hypothesized, what is more noteworthy, perhaps, is that there were no consistent differences between the Limited Bilinguals (children identified as having deficiencies in both languages) and Monolinguals. This finding supports a reversal of the usual view of limited-
English speaking children as being intellectually inferior to their monolingual peers. Furthermore, this no-difference finding can be interpreted as support for the proposal that a "threshold level" of bilingualism is required before the relationship between bilingualism and metacognition becomes apparent.

The educational implications of this study are implicit in the findings regarding the linguistic and cognitive heterogeneity of the sample.

Chaturvedi (1981) studied "Effects of State/Trait Anxiety and Field Independence upon Cognitive Competence".

The objectives of the study were (i) to measure teachers' characteristics with regard to two major but different characteristics – anxiety and cognitive style, (ii) to observe if these two characteristics had any direct effect on their competencies, especially, on academic competencies, (iii) to observe what type of academic competencies or cognitive competencies were more affected by such factors, and (iv) to find out whether state/ trait anxiety and field dependence factors identified as significant characteristics of teachers had a independent effect or interacted in their influence which would again differ, depending upon the nature of the task.

The study was divided into three sections for the purpose of investigation and analysis, each using a 2 X 2 factorial design. Section I dealt
with the effects of state anxiety and field dependence on cognitive measures in Section II, the effects of trait-anxiety and field independence on a series of cognitive measures were studied and, in Section III, the effects of state-anxiety and trait anxiety on cognitive competence were included for investigation. The total number of subject were 283 male graduate teachers attending the teachers' training course in the Regional College of Education, Bhubaneswar. They were all working teachers having put in at least five years in the teaching profession. The results were analysed using means and standard deviation. F-test and t-test were used to draw conclusions.

The major findings were: 1. Teachers who were field independent performed significantly better in each of the measures of cognitive competence than field dependent teachers. 2. Low state-anxious teachers performed significantly better in each of the measures of cognitive competence than high state-anxious teachers. 3. At low level of state-anxiety there was no difference between field dependent and field independent teachers, whereas at high level of state-anxiety, field independent teachers performed significantly better than field dependent teachers in each of the cognitive measures. 4. Teachers who were field independent performed significantly better in each of the measures of cognitive competence than field dependent teachers. 5. Low trait-anxious teachers performed significantly better in each of the measures of cognitive competence than high trait-anxious teachers. 6. At low level of trait-
anxiety, there was no difference between field dependent and field independent teachers, whereas at high level of trait anxiety field-independent teachers performed significantly better than field-dependent teachers in each of the cognitive measures. 7. High state-anxious teachers performed significantly better in each of the measures of cognitive competence than low state-anxious teachers. 8. Low trait-anxious teachers performed significantly better in each of the measures of cognitive competence than high trait-anxious teachers. 9. There was an ordinal interaction between state trait-anxiety of teachers in relation to each of the cognitive measures. In other words, the low trait-anxious and the low state-anxious group of teachers performed significantly better than the high trait-anxious group in relation to each of the cognitive measures.

Shinde (1982) conducted "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 objectives of the enquiry 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 sample comprised 1600 secondary students of Maharashtra selected on random basis from all the regions of the state. It also included 300 exerts. The tools used were a scale to measure involvement in scientific activities, scientific attitude scale, and a checklist. Descriptive statistics were used for data analysis.

The study revealed in the following: 1. The means of non-formal science activity scores achieved by adolescents differed from region to region. 2. The boys were better than the girls in their non-formal science activity involvement. 3. The correlation between the scientific attitude scores and non-formal science activity scores was negligible and non-significant. Thus scientific attitude of the secondary students was not related to their involvement in non-formal activities. 4. Academic achievement of the students was not related to their involvement in non-formal activities. 5. Field observations, activity participation, and activity independence of the students were related to one another. 6. The boys and girls did not differ in their scientific attitudes. 7. Students with high academic achievement had high scientific attitude, students with average academic achievement had average scientific attitude and the low achievers had a low scientific attitude. 8. Girls
showed a better relationship between scientific attitude and academic achievement than boys. Scientific attitude of the students differed from region to region. The boys and the girls from the same cultural group did not differ significantly with respect to their scientific attitude.


The major objectives of the study were: (i) to explore those learning environment variables which have a bearing on the development of selected student characteristics, and (ii) to study the influence of these variables on the student characteristics, namely, general mental ability (GMA), school achievement (SA), achievement motivation (AM) and the extent of their participation in co-curricular activities (PCCA).

A sample of 1200 students was randomly drawn from 24 higher secondary schools of Class XI of Bhopal division which comprised 700 boys (350 rural, 350 urban) and 500 girls (250 rural, 250 urban). They belonged to the age range of 14 to 19. The influence of 17 learning environment variables was studied on student characteristics. The five tools used for the collection of data were (i) Jalota’s (1972) General Mental Ability Test (GMAT), (ii) Prayag Mehta’s (1969) Achievement Motivation Inventory (AMI), (iii) Anderson’s (1973) Learning Environment Inventory (LEI) consisting of 17 learning
environment variables, (iv) the Co-curricular Activities Index Provided (CCAI), and (v) the Co-curricular Activities Participated (CCAP). Both the last mentioned tools were developed by the investigator for use in the study. Seventeen independent variables of learning environment and four dependent variables of student characteristics were analysed by making use of (i) correlation matrix to determine the inter-correlations between the dependent and independent variables, (ii) factor analysis of the scores of independent variables to find out the factor structure of the classroom environment variables, (iii) canonical correlation analysis in order to determine inter-correlations between the learning environment variables and student characteristics.

Major findings of the study were: 1. The environmental variables of co-curricular activities provided (CCAP), educational facilities provided (EFP), coherence, environment, democratic climate, satisfaction, competitiveness and speed correlated significantly at 0.01 level with student characteristics of GMA with correlation coefficients being 0.203, 0.208, 0.112, 0.216, 0.228, 0.153, 0.279 and 0.113 respectively. 2. The first canonical solution (RC= 0.704) indicated that the student characteristic of CCAP (structure coefficient = 0.954) is mainly predicted by pupil’s participation in co-curricular activities, learning environment variables of satisfaction, democratic climate, competitiveness, speed and disorganization (negatively correlated), the structure coefficients being 0.641, 0.569, 0.512, 0.482, 0.385 and 0.263 respectively. Likewise the
second, third and fourth canonical solutions were found to be 0.231, 0.167 and 0.151 respectively. 3. t-ratios indicated that rural girls obtained significantly higher mean scores on general mental ability, school achievement, and achievement motivation as compared to the rural boys on all these characteristics. 4. The analysis of variance in respect of GMA indicated the main effects of the variables of sex, residence and the interactional effects of sex and residence. The analysis in respect of pupil's participation in co-curricular activities indicated the main effects of the variables of residence. 5. The learning environment variables were categorized into four components by factor analyzing the data. The four learning environment variables included: 'class organization' (comprising the variables of cohesiveness, diversity, speed, environment, friction, goal direction); democratic principles' comprising the variables of democratic climate, satisfaction); and 'group functioning' (cliqueness, difficulty). While these three components contributed to the growth of specified student characteristics, the fourth component, that is, 'alienation from school' (favouritism, apathy, disorganization, competitiveness) appeared to be affecting adversely the development of the student characteristics which were studied.

The major objectives of the study were: (i) to identify significant processes of science with special reference to physics and detail them in depth, (ii) to develop and use the tests of processes of science incorporating the various processes identified for the study, (iii) to develop and use a test of achievement in physics based on certain educational objectives, (iv) to determine the inter-relationships between the scores on tests of science processes and the variables of SES, intelligence, and achievement in physics in the context of residence, and age levels of the pupils, (v) to determine mathematically the factor structure of the science processes along with other variables, and (vi) to study the longitudinal development of the processes of science as children grow up.

The study was conducted on 944 boys and 403 girls, studying in classes XI to XII who were randomly drawn from 20 schools. The tests used for the collection of data were Jalota's General mental Ability Test, a Battery of Tests of Science Processes – observing, measuring, drawing inferences and making predictions, hypothesis-making and hypothesis-testing, self-developed objective-based achievement test in physics, adapted from of SES
scale, and a bio-data form. Statistical techniques used for the analysis of data and hypothesis testing were analysis of variance, t-test, product-moment coefficient and correlation, and factor analysis.

Significant findings and conclusions of the study were as follows: 1. The scores on science processes were found to be correlated with intelligence and also with the components of SES. 2. A moderate relationship of achievement in physics was observed with the three processes of science, namely, observing, measuring and drawing inferences, and a low level of correlation was observed with the remaining processes. 3. Boys were found to be superior to girls on the processes of observing, measuring and drawing inferences. 4. With growth in age, a decline in ability to perform on science processes was observed. 5. Urban students outperformed their counterparts in rural areas on science processes. 6. The five factor structures which were extracted were named hypothesis-making ability, SES factor, maturity factor, abstract reasoning and the factor of convergent thinking.

Singh (1983) undertook "A Study of Deprivation, Achievement and Level of Aspiration in High School Students of Science Group".

The study was made with a view to studying the effect of deprivation and level of aspiration on achievement in science. The major objectives of the inquiry were (i) to study the effect of deprivation on high school students'
achievement in science, (ii) to study the various effects of deprivation on achievements in science, physics and chemistry, (iii) to study the effect of deprivation on level of aspiration of high school science students in relation to urban and rural areas, (iv) to study the significance of mean difference in achievement in relation to rural and urban areas, and (v) to study the significance of mean difference in level of aspiration in relation to rural and urban areas. The hypotheses of the study were: (i) There is no relationship between deprivation and achievement of high school science students (ii) There is no relationship between scores of various aspects of deprivation and achievement of the above mentioned students. (3) There is no significant difference between the mean scores of rural and urban students in deprivation. (4) There is no significant difference in the mean science achievement scores of rural and urban students. (5) There is no significant difference in the average scores in the level of aspiration of rural and urban students. (6) There is no significant difference in the mean achievement scores of high deprivation and low deprivation, high and middle deprivation and middle and low deprivation students. (7) There is no significant difference in the average scores in level of aspiration of high and low deprived, high and middle deprived, and middle and low deprived students.

The Prolonged Deprivation Scale prepared by Mishra and Tripathi (1976), and Level of Aspiration Test by Shah and Bhargava (1974) and the
Achievement Test in Science for high school students, developed by the investigator, were used. The sample comprised 450 students of high school science from 15 randomly selected institutions in rural and urban areas of Gorakhpur, Basti and Deoria districts. The collected data were analysed through the calculation of mean, percentiles, linear correlation coefficients, t and F-ratios.

Major findings were: 1. Deprivation had negative effect of achievement in science and level of aspiration 2. Measures for mitigating the effect of criterion aspects of deprivation – lack of parental sympathy and care, better childhood experiences, lack of proper educational facilities – had a positive effect on the achievement of the students and would enhance the level of aspiration of the students as well. 3. The rural students received lower marks than the urban students. 4. There was a positive correlation between level of aspiration and achievement.


The major objectives of the 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.

The sample for the construction of a scientific attitude test comprised 1265 students (804 boys and 416 girls) selected by stratified cluster sampling and by purposive sampling techniques. The sample was selected from a total of 48 schools from cities, towns and villages. For studying the cognitive style, 505 students out of 1265 students were selected at random. The tools used were Scientific Attitudes Study (SAS) constructed by the investigator and Group Embedded Figures Tests by Otman, Raskin, Witkin. The method employed for the study was a combination of the normative, correlational and comparative survey method. For analysis of the data and drawing of conclusions, analysis of variance, regression and factor analysis were used.

Some of the major findings were: 1. About 80 percent of the students had a positive scientific attitude. 2. Boys and girls did not differ in scientific attitude scores. 3. The scientific attitude of the science students was higher than that of the arts and commerce students. 4. The rural students were found to have a low level of scientific attitude as compared to urban students. 5. The scientific attitude decreased significantly with an increase in age. 6. About 71
percent of the students were clearly field-dependents. 7. Boys and girls did not differ in their cognitive styles. 8. 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. 9. The early-adolescents were found to be more field-independent than the middle-and late-adolescents. 10. Rajasthan students were more field-dependent than American students. The field-dependent-independent ability was related to the scientific attitude in general and cognitive aspects of the scientific attitude in particular. 11. The cognitive styles scores could be predicted from the scientific attitude with an efficiency of 4 to 5 percent.

Joginder (1984) studied "Alienation of Urban Youth: A Study in Relation to Personality, Achievement Motivation and Academic Achievement".

The objective of the study was to test the following hypotheses: (i) Alienation has a negative relationship with age. (ii) Alienation has a negative relationship with neuroticism. (iii) Alienation has a negative relationship with extroversion. (iv) Alienation has a negative relationship with the Lie-Scale (social desirability). (v) Alienation has a negative relationship with achievement motivation. (vi) Neuroticism has negative relationship with age. (vii) Extroversion has a negative relationship with age. Age is positively associated with scores on the Lie-Scale (social desirability). (viii) Academic
achievement has a positive relationship with age. Neuroticism has a negative relationship with academic achievement. The Lie-Scale (social desirability) has a negative relationship with academic achievement.

The investigation was concerned with studying the influence of three variables, viz., personality, achievement motivation and academic achievement on alienation. The personality varied in three ways – neuroticism, extroversion and introversion; achievement motivation varied in two ways – high and low; similarly academic motivation varied in two ways – high and low. A sample of 480 students from three types of colleges of Chandigarh, viz., coeducational, girls' and boys' was selected. The students were studying in pre-university, three-year degree course Part I, II and III and were in the age range of 16 to 25 years. The study focused attention on the factors of personality, academic achievement and achievement motivation in relation to alienation of urban youth. The 3 X 2 X 2 design was followed in the study. The first factor referred to three types of colleges, whereas the last two factors were at two levels (high and low) of the other variables. The following tools were used in the study: (i) the Eysenck Personality Inventory (1964); (ii) the Lynn (1969) Achievement Motivation Questionnaire; (iii) the Leo Srole (1956) Alienation Scale; (iv) the scores of students at the last annual examination. The data were analysed with the help of t-test F-value, product-moment correlation, multiple correlation and factor analysis.
The findings of the study were: 1. The students of girls' colleges obtained the highest alienation scores followed by the students of coeducational and boys' colleges. 2. The students of boys' colleges were the oldest, followed by coeducation college students and girls' college students. 3. Students going to the girls' colleges obtained the highest scores in academic traits followed by coeducational students and boys' college students. 4. Students going to coeducational colleges obtained the highest neuroticism scores followed by girls' college students and boys' college students. 5. The students of coeducational colleges obtained the highest extroversion scores followed by boys' college students and girls' college students. 6. The students of boys' colleges obtained the highest Lie-Scale (social desirability) scores, followed by coeducational college students and girls college students. 7. Achievement motivation was a good predictor of alienation in the case of the coeducational and boys' college sample.

Saxena (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 2 X 2 X 2 factorial design was considered. One thousand and seventy six students constituted the sample of the study. 'Recall', 'Principles', 'Questionning' and 'Application' were the dimensions of the Physics Cognitive Preference Styles Test whereas 'enthusiasm in physics learning', 'views on physics as a process', 'views on physics learning' and 'attitude towards physicists' constituted the dimensions of ATPS.

The findings were: 1. 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'. 2. The science students of different groups differed only in their 'principles' and 'application' preferences for the second and third ranks only. 3. '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. 4. The science students If all the eight groups were found to possess a favourable attitude toward physics. 5. 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.


The objectives of the study were (i) to compare performance of Harijans and Brahmin subjects on measures of level I and level II abilities (ii) to investigate the differences in speed of processing information among both the genetic groups, (iii) to find out the relationship between psychometric measures of general intelligence and speed of processing parameters, (iv) to investigate the interdependency and predictive power of various variables for group membership and (v) to extract the factor structure of measures of level I and level II abilities.

A sample of 262 subjects (102 Harijan and 160 Brahmin subjects) was drawn through stratified random method from government high schools of Haryana. The subjects were matched on sex, age, educational level, socio-economic status, school and urban-rural residence. All the subjects were males from grades IX and X and their age ranged from 156 months to 228 months. The subjects were administered the following tools: (i) Raven's Standard Progressive Matrices (1960); (ii) The Memory for Numbers Test (forward, backward and delayed); (iii) The Reaction Time Test (simple reaction time an
choice reaction time); (iv) The Pareek and Trivedi Socio-Economic Status Scale (1964). The subjects were divided into the two groups on the basis of mean scores on Raven's Progressive Matrices as having level I ability (above scores). The data so collected were analysed with the help of t-test, correlation and Jennrich's test of difference between correlation matrices and varimax factor analysis.

The findings of the study were: 1. The Harijan and Brahmin subjects difference markedly on level I and level II ability tests. 2. Harijanas and Brahmin groups differed significantly on speed of processing parameters. Viz., choice of reaction time and intra-individual variability in simple reaction time. 3. Complex chronometric measures, viz., choice of reaction time and inter-individual variability in choice reaction time were found to be negatively correlated with general intelligence. 4. Harijan and Brahmin groups differed significantly in pattern of correlation matrix. 5. Four factors were identified after factor analyzing the data. These factors were General Factor, Simple Chronometry, Complex Chronometry and Group Genetic Factors. 6. The multiple regression analysis showed that Raven's Progressive Matrices scores and intra-individual variability on simple reaction time were poor predictors of difference in Harijan and Brahmin groups. The choice of reaction time on the other hand was discriminating significantly between Harijan and Brahmin
groups. The subjects from two different socio-economic groups were more similar on level I abilities than level II level.


The objectives of the study were (i) to develop a cognitive style test for high school classes in home science on Heath’s Model, (ii) to develop an achievement test for high school classes in home science to study its effects on cognitive styles of students, (iii) to develop a social class scale to see its effects on the cognitive styles of students, (iv) to develop a home environment inventory to study its effects on cognitive styles of students, (v) to study the effects of age ranging from 13+ to 18+ on the cognitive styles of home science students, (vi) to study the relationship of achievement of high school girls with cognitive style of home science students, (vii) to study the relationship of social class of students with cognitive style of the students of home science, (viii) to study the relationship between cognitive ability and preference modes of high school students in home science, (ix) to study the relationship between cognitive style scales and their achievement in home science, and (x) to study the effects of home environment on the cognitive styles of students in home science.
The sample consisted of 600 students of home science of high school classes drawn from nine intermediate colleges of Agra city. All of them were girls and their ages ranged from 13+ to 18+. For measuring the achievement of students in home science, an achievement test was constructed. A Social Class Scale was developed to measure social class. The scale comprised items related to occupation, income, education, caste, sacrifice made for the country, status of relatives, home and other resources. The test-retest reliability coefficients ranged from 0.94 to 0.98. A Home Environment Inventory was developed to measure home environment. The items were related to recognition of the child as a person, care for the child, observance of family traditions, parental aspirations for the child, forbearance of child's wishes, anxieties about the child, reproaches and punishments for undesirable behaviour, explaining undesirability of life, parental affection, indoctrination, encouragement for initiative and freedom. The test-retest reliability coefficient was 0.75. The cognitive style was measured with the help of a Cognitive Preference Styles scale developed by the investigator. The items were related to questioning (Q), recall (R), application (A), and principle (P). The KR-20 formula was used to study the reliability of the test. The reliability coefficients ranged from 0.34 to 0.70. The data were analyzed with the help of correlation, factor analysis, and analysis of variance techniques.
The findings were 1. The cognitive preferences of individuals were stale along age, and during adolescence. 2. Girls in general expressed reference for a questioning mode of cognitive functioning in higher mental functions. Further, high achievement went with questioning and low achievement with recall modes. 3. With regard to cognitive styles of high school girls in relation to their social class, it was found that questioning, recall, application and principle was an ordered sequence. 4. Cognitive functioning was independent of the information taught and the distinction between the preference and ability modes were artificial. 5. Scientific curiosity, scientific rule, and technology, were the three factors described as instrumental for the high achievement of the girls in home science while dependence on the utility and memory factors made these girls' achievement low. 6. Each one of the four modes of cognitive style, viz., questioning, recall, application and principle, were positively and significantly correlated with them environment scores. The factors of home environment like recognition of child, parental aspiration, forbearance for the child's wishes, explaining undesirability of life, parental affections, encouragement for initiative and freedom were found to bear a positive and significant correlations with each of the four modes of cognitive styles. Observance of family traditions, reproaches and punishments and anxiety for the child were irrelevant as cognitive determinants or, rather, played an inhibitive role in the achievement and free
development of students. 7. Reproaches and punishments were rarely used in the families of girls and their parents nursed high aspirations for their daughters. On factors recognition of the child, care for the child, indoctrination and encouragement for initiative, the parents were very frequently inspired, while on factors like forbearance for the child, anxiety about the child, explaining undesirability of life, parental affection and freedom, the parents displayed a moderate behaviour with regard to their daughters.

Agnihotri (1987) undertook “Study of Influence of Some of the Methods of Teaching Physics on the Achievement in Physics of Class X Students in Delhi”.

The objective of the study was to test the following hypotheses: (i) There is no significant difference between the mean achievement in physics of different groups of students taught by different methods, viz., lecture-cum-demonstration method, laboratory method, programmed instruction and assignment-cum-discussion method. (2) The interaction between teaching methods and different schools is not significant. (3) The interaction between teaching methods and different levels of students is not significant.

The investigation followed the pre-test/post-test experimental method of research where two units of physics were taught according to the design by different methods, viz., the method devised by the investigator, the traditional
method, or the lecture-demonstration method, programmed instruction and assignment-cum-discussion method. For the experiment ten schools were selected from Delhi in which physics was taught. A sample of 520 grade X students was selected. They were divided into four groups of 130 each. The achievement of students in physics in each of the four groups in each of the schools was similar prior to the experimental teaching. The tools used were: (i) An achievement test, (ii) the programmed learning material and (iii) instructural material for different teaching methods.

The findings of the study were: 1. The traditional method or the lecture-cum-demonstration method followed by the verification type of laboratory work was more effective than the assignment-cum-discussion method but this method was less effective than the programmed instruction method for the teaching of physics. 2. With respect to achievement in physics, programmed instruction for the teaching of physics was less effective than the method of teaching physics systematically designed by the investigator, but this method was found to be more effective than the assignment-cum-discussion method and the traditional method or the lecture-demonstration method followed by the verification type of laboratory work. 3. Out of all the four methods, the method of teaching physics systematically designed by the investigator was found to be most effective with respect to achievement in physics and the assignment-cum-discussion method was found to be the least
effective with respect to achievement in physics. 5. The relative effectiveness of all the four methods with respect to achievement in physics was the same, not only for all the schools but also for all the levels of students. 6. If all the four methods selected for this investigation were ranked with respect to achievement in physics, it was found that the method of teaching physics systematically designed by the investigator was the first, the programmed instruction modified by the investigator for the teaching of physics was the second, the traditional method or the lecture-demonstration method followed by the verification type of laboratory work was the third and the assignment-cum-discussion method was the fourth.

Singh (1988) studied "Attitudes of Secondary Stage Students towards Science Curriculum and its Relationship with Achievement Motivation".

The study focuses on assessing the attitudes of secondary stage students towards science curriculum and its relationship with achievement motivation.

The objectives of the study were: (i) To determine the attitude of science students about science curriculum, (ii) to compare the differences between urban/rural, intelligent/weak, male/female students about the attitudes towards science curricula and (iii) to determine the extent and direction of relationship between attitude and achievement.
A sample of 500 students was drawn through the survey method. The tools included in the study were an Attitude Scale by the investigator and Achievement Motivation Test by Prayag Mehta. The collected data were analysed qualitatively and quantitatively.

The major findings were: (1) Students from rural and urban schools as well as male and female had favourable attitude towards science curriculum. (2) There were significant differences in some aspects such as scientific temper, and teaching methods. (3) Students from urban schools scored highest on the achievement test, (4) Most of the weak students scored less on the achievement test. (5) Female students scored higher than their male counterparts. (6) Enriched academic programmes helped in developing favourable attitudes.

Shrivastava, Madhulika (1988) studied "An Investigation into the Scientific Aptitude of Higher Secondary Science Students in Relation to their Cognitive Style".

The present study is designed to study the scientific aptitude of higher secondary school students in relation to the cognitive style.

The objective of the study was: to assess the scientific aptitude of the students in relation to the cognitive style of those who want to execute their studies in the field of science.
The sample of the study comprised 500 students, covering 250 boys and 250 girls, who were randomly drawn from higher secondary schools. The tools used in the study included Scientific Aptitude Test by K. K. Agrawal, a test of General Mental Ability by M. C. Joshi, Hindi adaptation, and Dogmatism Scale by Hasan, based on the 'D' form of the original Rokeach's scale. The descriptive and inferential statistics were used in the present study.

The major findings of the study were: (1) The boys students are better than female students in the area of scientific aptitude as significant difference was found between both the groups. (2) Both the groups of boys and girls were of high scientific aptitude and had insignificant difference on dogmatism. (3) The male and female students of low scientific aptitude had significant difference on dogmatism.

Mohan, Gita (1988) studied "Cognitive Preferences of High School Students in Relation to Certain Academic and Personal Variables".

The study attempts to assess the relationship of cognitive preferences with certain academic and personal variables among high school students.

The objectives of the study were: (i) To analyse the cognitive preferences of students in terms of different dimensions of learning experiences for different kinds of learning tasks, and (ii) to find out the
relationship between cognitive preferences and certain aptitudinal academic and personal variables.

The sample consisted of 1,000 students drawn from class IX from 27 secondary schools in Mysore city. A stratified proportionate sampling procedure was used. The tools used were: cognitive Preference Inventory and Subject Preference Inventory. Mean, SD, 't' test, multiple regression analysis and two-way ANOVA were used for the analysis of results.

The major findings of the study were: (1) The overall subject preferences showed no relationship with four of the six dimensions of cognitive preferences. (2) No significant relationship was observed between cognitive preferences and the four aptitudinal variables. (3) The personality variables of extraversion, neuroticism and achievement motivation, taken together, showed no significant relationship with any of the cognitive preference dimensions. (4) No significant relationship between academic achievement and the cognitive preference dimensions of "reception-discovery", "passivity-activity" and "superficiality-depth" was revealed. On the other hand, a negative relationship was indicated between academic achievement and cognitive preference dimensions of "concreteness-abstractness", "induction-deduction" and "analysis-synthesis". (5) On four of
the six cognitive preference dimensions, the effect of SES was found to be linked with the sex difference variable.

Mohapatra (1989) studied "Four Dimensions of the Teaching-Learning of Science: Characteristics and Implications".

The present study focuses on studying in pupils' popular preconceived concepts about scientific events related to their day-to-day life observations and the implications of the same for organizing suitable teaching-learning strategies through utilization of their experiences.

The objectives of the study were: (i) To study the review of related studies on the origin of scientific concepts formation in the minds of children, (ii) to discuss some of the major characteristics of different alternative concepts in the minds of children, (iii) to identify the role of the teacher and their learner in the teaching-learning process in developing an modifying scientific concepts, and (iv) to determine the implications of various types of concepts development process in the teaching-learning situations.


This study examines the relationships among variables such as achievement in science, attitudes towards science and problem-solving ability
under certain conditions such as location, socio-economic status, parental education, occupation and typology of school among secondary school children.

The objectives of the study were: (i) To study the science achievement, attitude towards science and problem-solving ability of high school students, (ii) to find out interrelationships of science achievement, attitude towards science vis-à-vis problem-solving ability, and (iii) to examine the relative effect of sex, socio-economic status, parental education, parental occupation, family facility, and type of school on science achievement, science attitude and problem-solving ability.

The study sample comprised 812 students of class IX selected randomly after giving weightage to outside factors such as location and typology of school attended. The tools used to collect the data were the Science Test developed by the investigator, the Science Attitude Scale developed by Grewal, and Problem Solving Ability Test developed by the investigator.

The major findings of the study were: (1) The study indicated significant relationships between scores on scientific attitude and achievement in science. (2) Significant sex differences in achievement in science and problem-solving, ability existed. (3) High socio-economic status, family facility and sciences, scientific attitudes and problem-solving ability.
Brahma (1990) studied “Effectiveness of Concrete Materials to Enhance Learning in Physical Sciences”

A large proportion of science concepts of both basic and applied nature require students to operate at the formal operational level of intellectual development. But a large majority of students (at secondary, higher secondary and even at college level) do not use formal operational thinking when dealing with such concepts and problems. They exhibit large differences in their ability to grasp and understand science concepts. This mismatch between the level of pupils’ thinking and the intellectual demand of the subject-matter is one of the major causes of learning difficulties in science. The present study was undertaken to assess the effectiveness of concrete materials to enhance learning in physical sciences.

The objective of the study was: To study whether concretized instruction helps in learning formal level concepts.

The concretized instruction of four formal level science concepts were tried out on Class IX students in two different schools. The instructions to one section of Class IX in each school was subjected to experimental treatment. The two sections in each school (control) and (experimental) were made equivalent on the basis of a pre-test. The researcher prepared materials for concretized instruction for all the four formal level concepts. A test of multiple
choice items as developed and administered to both the groups. The differences were qualitatively analyzed.

The major findings of the study were: (1) It was found that the performance of student’s learning by concretized instruction was better than those learning by traditional instruction. (2) The average increments in marks of the experimental group of students on concrete level items was 8.8% and that of formal level items, 8.4%. As the tests comprised of items based on different logical operations and of concrete and formal opinion level, the responses of such tests may be test diagnose the learning difficulties of students. Remedial help can also be provided to the models, analogies, more had examples and other manipulable materials based on concrete thoughts and sequencing instruction in a three-stage cycle were found to help the concrete level operates in understanding. The three-stages of learning cycles were introduction, concept formation and concept application.

Sharma (1990) studied “Need Motivations as a Function of Job Status and Cognitive Style”.

This is an attempt to study the relationship of job status and cognitive style with four need motivations (n Ach, n Aff, n App and n Power) and to examine variations in it due to certain personal social variables.
The objectives of the study were: (i) To examine the relationship between various kinds of need motivations (n Ach, n Aff, n App and n Power) and cognitive style, (ii) to examine the relevance of need motivations as functions of job status and cognitive style in the industrial setting, (iii) to examine the effects of age, educational status, job status and cognitive style on need motivations, (iv) to assess the role of biographical factors in the acquisition of need motivations, and cognitive style of industrial managers and workers, and (v) to study the differential cognitive style and motivational potentialities of managers and workers.

The sample consisted of 91 managers and 90 workers selected randomly from the Bhilai Steel plant in M. P. A systematic random quota sampling technique was employed in the selection of samples. The workers were matched on a number of personal and organizational variables. The tools used included: the Achievement Motivation Inventory (AMI) of Prayag Mehta, the Approval Motive Scale (AMS) of Tripathi and Tripathi, McClelland’s six Projective TAT pictures, and the Hindi adaptation of Witkin’s Hidden Figures Test of Palnikkar and Helode. Mean, SD, ‘t’ test, ANOVA and product moment correlations were computed to test the hypotheses.

The major findings of the study were: (1) n Power and n Aff were found to be highly and positively correlated both in the managers’ as well as
workers' samples. (2) The relationship between cognitive style and the four need motivations was found to be very weak. (3) While n App was significantly affected by the age of workers, job status and the age of employees, n Aff was affected by the age of managers, workers and employees as well as the educational status, and n Power was affected by the cognitive style of managers. (4) The managers and workers showed significant differences in the style of their n Ach, n Aff and n Power, but not in the level of n App. (5) Managers scored significantly higher on the test of cognitive style than workers showing that the former were more FI than the latter. (6) The FI and FD employees differed significantly only in the level of n Aff.


The present study is aimed at examining the impact of different problems that the teachers were facing in teaching new science syllabus on the achievement levels of pupils. Hence this study also meant to reveal the impact of certain curricular problems on pupils' achievement in teaching the new syllabus.

The objectives of the study were: (i) To examine the difficulty level and suitability level of all lessons and exercise included in the new science syllabus as perceived by science teachers, (ii) to examine the problems
involved in the implementation of the students' activities suggested in the new science textbook and the problems therein, (iii) to examine the problems faced by teachers about the content and teaching methods in the in-service training programmes (iv) to study the nature of execution of the exercises faced by teachers within the context of content, teaching methods, audio-visual aids, suggested pupil activities, level of achievement, and (v) to suggest measures which would improve the quality of science teaching.

Using a multi-stage stratified random sampling technique, a final sample of 300 teachers and 1,500 students was selected from three regions representing Andhra Pradesh. Questionnaires, check-lists and achievement tests were used for data collection. Data so collected were analyzed using percentages the square, ‘t’ test, analysis of variance and Kram’s test.

The major findings of the study were: (1) More than 60% of the teachers found the content in the recent syllabus new as well as overloaded. (2) Dictation of new by teachers was the dominant method of get exercises done by the students. (3) Lack of facilities for science teaching continued to both teachers a lot. (4) It was observed that achievement in science favoured significantly those students, whose teachers had attended an to service education programme. (5) It is proposed that school conditions need to be improved though, say supply of science kits and hand books for teachers so
that pupils may participate in the teaching-learning process by practicing processes of science such as classifying inquire and experimenting, etc.


The present study focuses on concept mapping used as a teaching-learning strategy in physical science and its relation to scholastic performance, cognitive ability, attitude towards concept mapping and science interest.

The objectives of the study were: (i) To find out the influence of concept mapping on scholastic performance in physical science among standard IX students, (ii) to find out the relationship between relevant psychological variables in terms of cognitive ability, attitude towards concept mapping, science interest and performance in concept mapping, (iii) to study the significance of difference in scholastic performance between those students who learnt physical science through teaching with concept mapping and those who learnt physical science through teaching without concept mapping, and (iv) to find out the difference in concept mapping performance and scholastic performance among boys, girls and in a coeducation setting.
The total sample of 286 standard IX students covering boys, girls and co-education students were taken from the state and central board schools. They were distributed in three experimental and control groups. The age of the subjects ranged between 13-14 years. The tools used in the study included concept maps. Scholastic Performance Test in Physical Science, Concept Mapping Attitude Scale, Cognitive Ability Test and Science Interest Inventory. The collected data were treated with correlation, path analysis and path coefficients, analysis of co-variance and critical rations.

The major findings of the study were: (1) It was found from the path analysis that the relevant psychological variables such as cognitive ability, attitude towards concept mapping and science interest had both a significant direct influence on scholastic performance and an indirect influence through concept mapping. Similarly, concept mapping as a teaching-learning strategy had a significant positive influence over scholastic performance. The path direction had been the same with the girls and co-education students. (2) On comparing the coefficients of determination, the highest extent of determination had been found between cognitive ability and concept mapping. Cognitive ability accounted for concept mapping performance, for boys it had been 49% and it had girls 44%. The contribution of cognitive ability in scholastic performance had been lower in all the three groups: the 19% in case of boys 37% in the case of girls, and 38% in the case of
coeducation students. (3) The experimental had control groups of boys, girls and coeducation students were found to have no difference in the post-test scholastic performance scores in physical science. 94) Girls were found to high performed better than boys in post-test scholastic performance scores in physical science. (5) Coeducation students were found to high performed better than girls and boys in post-test scholastic performance in physical science (6) Coeducation students were found to high performed better than girls and boys in concept mapping.

Radha (1991) studied "Effective Content Learning in Science Education: A Theoretical Instructional Mode".

The present study attempts to examine one of the major concerns of science curriculum, namely the problem of generals an effective participatory learning process for the development of scientific concepts keeping in view the learner, the specific learning situation in the nature of concept, through the adopts of appropriate instructional technology.

The objectives of the study were: (i) To make a rational analysis of the factors of learning context, instructional strategies, process of development of scientific concept, interaction process and the role of learners in different learning situations. It identify the steps for concretization of concerns through a progression process from concerts of quasi-concrete to abstract
representation (iii) to evolve a theoretical instructional model is effective utilization of a variety of instructions tools for ensuring proper learning by students.

The researcher used rational analysis method of anlysing research studies and attempted to present models of unstructional process through diagrams and visuals.

The major findings of the study were: (1) It was observed that planning instructional strategies, the sex, cultural factors, the educational environment and the learner's style of learning have to be given due consideration. (2) Blending a number of instructional media might be useful in general. Learning climate that fosters interaction of status components of learning process (3) In the selection of learning strategy, the active role of the learner, the place of teacher, learning materials and process of concretization for impact development had to be cautiously emphasizes. (4} While determining locus of control in the teaching-learning process, the impact of external factors outside the learner as well as internal factors within him/her had to be carefully considered.

This is an attempt to study the developmental changes on decoding competence and speech related cognitive processes.

The objectives of the study were: (i) To investigate the difference between good and poor decoders (Oriva word reading) in their speech related processes: and time, speech rate, sequence repetition and serial word recall. (ii) to examine the developmental difference in the speech-related processes of good and poor decoders, (iii) to find out the pattern of relationship among speech-related processes and decoding in a developmental processes and (iv) to analyse developmental changes in the pattern of this relationship for good and poor decoders.

The sample comprised 60 children of grades I and III, drawn from two Oriya-medium schools in Cuttack from 6-7 and 8-9 year age groups. They were randomly selected from the pools of good and poor readers identified by teachers in terms of their reading competence. The tools used were the Decoding Test of Dash, the Serial Word Recall Test of Das and Naglieri, Naming Time Test, the Speech Rate Test of Das and Mishra, and Sequence Repetition Test. The data were analyzed using Mean, SD, ANOVA and correlations.
The findings of the study were: (1) Performance in decoding as well as speech related processes, except sequence repetition, improved as a function of age and grade. (2) A significant difference was found between the performance of good and poor decoders in naming time, speech rate and sequence repetition, but not in serial word recall. (3) A highly significant positive relationship was found between decoding and naming time for both grades. While the relationship held good for both groups in grade III, it was true only for good decoders in grade I. (4) The various measures were found to be positively correlated with each other, but the strength of relationship was generally greater at grade III than at grade I, particularly for good decoders.

Koopman (1993) studied "Learning and Achievement Motivation of Secondary School Pupils in Namibia".

The aim of this study was to determine the most important intrinsic and extrinsic learning – and achievement motives of groups of secondary school pupils in Namibia and related factors.

Related aspects were first studied, namely: (1) Do factors such as family completeness and scholastic and professional training of parents contribute to the formation of learning motivation? (2) What is the degree of interaction between the interest, study habits and attitudes, self-concept with the
learning- and achievement motivation of grade 12-pupils? (3) Can the school contribute to learning motivation?

Following was evident from the literature study: (i) The adolescent's becoming relates to his actions in learning. (ii) Every learner has a unique and complex motivational orientation. (iii) Modification of learning – and achievement motivation is a long and complex process because of the forces and influences in the life world of the child, which influence his, will to learn. (iv) A variety of motives, which differ in intensity hamper the process of determining them.

Following major conclusions stem from the empirical study: (i) Late school entrance, a high degree of school change, large families, poor qualifications of parents and a lack of participation in extramural activities by pupils hamper their motivation to learn. (ii) Role of the teacher, possibility to make independent choices (especially girls) need to experience success, a correct attitude towards study and the experience of positive failure anxiety are evaluated as prominent learning – and achievement motives by the pupils. (iii) The intrinsic learning – and achievement motives (especially those of grade 12-pupils) correlate higher in general than their extrinsic learning – and achievement motives with scholastic achievements. (iv) Learners from the high socio-economic group are more failure oriented than the learners from the
middle and low socio-economic groups. (v) Five of the eight most prominent learning – and achievement motives feature more prominent in the learning behaviour of failures and non-failures in the school. (vi) Standardized measuring instruments such as the SSHA and ASCS provide the best usable supplementary information about the learning – and achievement motivation of grade 12-pupils.

Acharya (1995) studied "Personality, Motivational and Cognitive Competencies of Invulnerable Children".

The objectives of study were: (1) To identify invulnerability and invulnerable. (2) Studying the mechanism and process of its operation and characteristics that contribute and are associated with it. (3) To promote this in children through appropriate educational programmes.

The sample comprised of 1000 Students of classes VI to IX from four school of Berhampur Town. The data were collected with the help of HSPQ by Cattell, Peer Nomination Technique and Check List developed by researcher.

The findings of study were: (1) Both peer and teachers seemed to show a positive bias in favour of the lucky and bright (advantage competent) students. Only in five out of 14 HSPQ primary factors, the four groups were found to differ significantly. These factors were B, G, D, C and O₃. (2) The
invulnerable children (Disadvantaged competent) were found to be more or less similar to the advantaged competent children. Out of ten desired second order personality factors, four groups differ in seven, such as Anxiety, School Achievement, Neuroticism, Delinquency, Proness, Capacity to recover on Delinquency, Creativity and Leadership Potential. (3) In the Motivational assessment using Rotter's level of Aspiration, the invulnerable children were frequently shifted their Aspirations and readjustment their goals continuously as compared to the other.

Joshi (1998) made "A Study of Some Factors Affecting the Achievement of the Students of the Ashramshalas".

The objectives of the study were: (1) To find out the relationship of achievement of the students studying in Ashramshalas with their intelligence, some factors of personality, creativity, self-concept and school climate. (2) To study the individual contribution of intelligence, some factors of personality, creativity, self-concept and school climate in predicting achievement of the students studying in Ashramshalas. (3) To study the joint contribution of intelligence, some factors of personality, creativity, self-concept and school climate in predicting achievement of the students studying in Ashramshalas. (4) To compare achievement of the students studying in Ashramshalas in respect of their areas by taking intelligence and creativity as covariates. (5) To
compare achievement of the students studying in Ashramshalas in respect of their standard (8th and 9th) by taking intelligence and creativity as covariates. (6) To compare achievement of the students studying in Ashramshalas in respect of their sex (boys and girls) by taking intelligence and creativity as covariates. (7) To compare achievement of the students studying in Ashramshalas in respect of each factor of personality by taking intelligence and creativity as covariates. (8) To compare achievement of the students studying in Ashramshalas in respect of their self-concept by taking intelligence and creativity as covariates. (9) To compare achievement of the students studying in Ashramshalas in respect of their school climate by taking intelligence and creativity as covariates. The hypotheses were stated taking into account the objectives.

Considering the nature and objectives of the study as well as the resources of the investigator normative survey method of research was used. For the study Stratified Cluster Sampling method was used. The tools used were Personality inventory developed by K.G. Desai, Creative ability test developed by J. Z. Patel, General Ability test by M. T. Patel, Self - Concept inventory by J. H. Shah, and Organizational climate description questionnaire by K. A. Gandhi. Multiple regression and multiple co-efficient of correlation were used for describing the relationship between the dependent and
independent variables, where as ANOVA and t-test were used for the differential studies.

The major findings were: (1) Creativity is related to achievement of the students of Uttar Buniyadi Ashramshalas. (2) Intelligence is related to achievement of the students studying in Uttar Buniyadi Ashramshalas. (3) Self-concept is related to achievement of the students of Uttar Buniyadi Ashramshalas. (4) School climate is related to achievement of the students of Uttar Buniyadi Ashramshalas (letter basic residential school). (5) Creativity is related to intelligence of the students in Uttar Buniyadi Ashramshalas (letter basic residential school). (6) Creativity is related to self-concept of the students of Uttar Buniyadi Ashramshales (letter basic residential school). (7) Intelligence is related to self-concept of the students of Uttar Buniyad Ashramshalas (letter basic residential school) (letter basic residential school). (8) PE (extroversion) is not related to school climate of the Uttar Buniyad Ashramshalas (letter basic residential school). (9) PN (Neuroticism) is related to school climate of the Uttar Buniyad Ashramshalas (letter basic residential school). (10) PL (lie scores) is related to school climate of the Uttar Buniyad Ashramshalas (letter basic residential school). (11) Creativity is related to school climate of the Uttar Buniyad Ashramshalas (letter basic residential school). (12) Intelligence is related to school climate of the Uttar Buniyad Ashramshalas (letter basic residential school). (13) Self-concept is related to school climate of the Uttar Buniyad Ashramshalas (letter basic residential school).
The adjusted means of achievement scores of students of Uttar Buniyadi Ashramshalas (letter basic residential school) belonging to seven districts differ significantly when intelligence and creativity are taken as covariates. This may lead one to believe that area does influence the achievement of the students of Uttar Buniyadi Ashramshalas (letter basic residential school). The adjusted means of achievement scores of the students of Uttar Buniyadi Ashramshalas belonging to standard 8 and 9, differ significantly when intelligence and creativity are taken as co-variates. It can, therefore, be said that standard does influence the achievement of the students. The adjusted means of achievement scores of students of Uttar Buniyadi Ashramshalas belonging to boys and girls do not differ significantly when intelligence and creativity are taken as covariates. It can, therefore, be said that sex does not influence the achievement of the students. It is interesting to note that all the three factors of personality (i.e. E, N, L) do not influence the achievement scores of the students of Uttar Buniyadi Ashramshalas. The adjusted means of achievement scores of students of Uttar Buniyadi Ashramshalas belonging to high, average and low levels of self-concept differ significantly when intelligence and creativity are taken as covariates. It can, therefore, be said that students with high level of self-concept are higher in achievement than that of the students of other levels. The adjusted means of achievement
scores of students of Uttar Buniyadi Ashramshalas belonging to open, intermediate and close type of school climate do not differ significantly when intelligence and creativity are taken as covariates. It can, therefore, be said that school climate does not influence the achievement of the students. (20) The mean score of achievement of Valsad district is significantly higher than that of Bharuch, Baroda, Panchmahals and Sabarkantha district. The mean score of achievement of Surat district is significantly higher than that of Bharuch, Baroda, Panchmahals and Sabarkantha district. The mean score of achievement of the students of Ahmedabad district is higher than that of Bharuch, Baroda, Panchmahals and Sabarkantha district. The mean score of achievement of the students of Panchmahals district is significantly higher than that of Baroda district. The mean score of achievement of the students of Sabarkantha district is significantly higher than that of Baroda district. (21) It is interesting to note that there is no significant difference between all the pairs of district with reference to the mean scores of extroversion. (22) The mean score of neuroticism of the students of Valsad district is significantly higher than that of Surat, Ahmedabad, Baroda, Panchmahals and Sabarkantha districts. (23) The mean score of Lie of the students of Ahmedabad districts is significantly higher than that of Valsad and Panchmahals districts and the mean scores of Lie of the students of Baroda district is significantly higher than that of Panchmahals district. (24) The mean score of CN (creativity) of the
students of Bharuch district is higher than that of Valsad, Surat and Baroda districts. The mean score of CN (creativity) of the students of Valsad district is significantly higher than that of Surat district, whereas the mean of CN scores of the students of Ahmedabad district is significantly higher than that of Valsad, Bharuch, Surat, Baroda, Panchmahals and Sabarkantha districts. The mean score of CN of the students of Baroda district is significantly higher than that of Surat district. The mean score of CN of the students of Panchmahals district is significantly higher than that of Valsad, Surat and Baroda districts, whereas the mean scores of CN of the students of Sabarkantha district is significantly higher than that of Surat and Baroda districts. (25) The mean of CC scores of the students of Valsad district is significantly higher than that of Bharuch, Surat, Baroda, Panchmahals and Sabarkantha districts, whereas the mean of CC scores of the students of Bharuch district is higher than that of Surat and Baroda districts. (26) He mean scores of uniqueness of the students of Valsad district is significantly higher than that of Bharuch, Surat, Baroda and Panchmahals districts, whereas the mean scores of uniqueness of the students of Ahmedabad district is significantly higher than that of Bharuch, Surat, Baroda and Panchmahals districts. The mean scores of uniqueness of the students of Surat district is higher than that of Baroda district. The mean scores of uniqueness of the students of Panchmahals district is higher than that of Bharuch district, whereas the mean scores of uniqueness of the students of
Sabarkantha district is significantly higher than that of Bharuch, Surat, Baroda and Panchmahals districts. (27) The mean of creativity scores of the students of Valsad district is significantly higher than that of Surat and Baroda districts, whereas the mean of creativity scores of the students of Ahmedabad district is higher than that of Valsad, Bharuch, Surat, Baroda, Panchmahal and Sabarkantha districts. The mean of creativity scores of the students of Bharuch district is significantly higher than that of Baroda district. The mean of creativity scores of the students of Baroda district is higher than that of the Surat district. The mean of creativity scores of the students of Panchmahals district is higher than that of the Valsad, Surat and Baroda districts, whereas the mean of creativity scores of the students of Sabarkantha district is higher than that of Surat and Baroda districts. (28) The mean scores of intelligence of the students of Valsad is significantly higher than that of Bharuch, Baroda, Panchmahals and Sabarkantha districts. The mean scores of intelligence of the students of Surat district is significantly higher than that of Bharuch, Baroda, Panchmahals and Sabarkantha districts. The mean score of intelligence of the students of Ahmedabad district is significantly higher than that of Valsad, Bharuch, Surat, Baroda, Panchmahals and Sabarkantha districts. The mean score of intelligence of students of Bharuch district is significantly higher than that of Baroda and Panchmahals districts. The mean score of intelligence of the students of Sabarkantha district is significantly higher than
that of Panchmahals district. (29) The mean score of self-concept of the students of Surat district is significantly higher than that of Valsad, Bharuch, Baroda, Panchmahals and Sabarkantha districts. The mean score of self-concept of the students of Ahmedabad district is significantly higher than that of Valsad, Bharuch, Baroda, Panchmahals and Sabarkantha districts, whereas the mean score of self-concept of the students of Valsad district is significantly higher than that of Baroda, Panchmahals and Sabarkantha districts. The mean score of self-concept of the students of Bharuch district is significantly higher than that of Panchmahals and Sabarkantha districts. The mean score of self-concept of the students of Baroda district is higher than that of Panchmahals and Sabarkantha districts.

Khurana (1998) undertook “Study of influence of differences in medium of instruction at senior secondary level on Spiritual, Academic Achievement and Personality”.

The objectives were: (1) To study the effect of different medium of teaching on Academic Achievement of students. (2) To study the effect of different medium of teaching on Academic Achievement in Mathematics and Social Science. (3) To study the effect of different medium of teaching on development of overall maturation amongst students. (4) To study the effect of different medium of teaching on development of Indian Life Value amongst
students. The hypotheses were: (1) There is no effect of different medium of teaching on Academic Achievement of students. (2) There is no effect of different medium of teaching on Academic Achievement in Mathematics and Social Science. (3) There is no effect of different medium of teaching on development of overall maturation amongst students. (4) There is no effect of different medium of teaching on development of Indian Life Value amongst students.

Sample was selected through Random Sampling Method. It comprised of 3 Hindi medium schools and 3 schools having English medium of instruction. All schools were affiliated to Rajasthan Board of Secondary Education, Jaipur. From these chosen schools, the students having average intelligence & coming from medium – economic family were selected. Survey Method was followed for this study. Group Intelligence Test developed by P.N. Malhotra, S.P. Kulshestra’s Socio-economic status scale, Urban, J.P. Srivastav’s Educational Motivation, L.N. Dube’s Mathematics Achievement test, Social Study Achievement Test developed by investigator, Emotional Maturity Scale developed by Yashvir Singh & Mahesh Bhargava and Value Inventory developed by Leena Joshi were used for collecting data. Obtained data were analyzed through t-test, F – Test.
The findings were: (1) The academic achievement of students studying through English medium was found to be more. (2) Students studying through English medium had more academic expectation than the students studying through Hindi medium. (3) Students studying through English medium were more academic motivated than the students studying through Hindi medium. (4) The study habits of students studying through Hindi and English medium did not differ. (5) The Academic achievement of student studying Mathematics through Hindi medium was more than that students studying through English medium. (6) The Indian Life Value was more visible in students studying through English medium.


The objectives of the study were: (1) To compare the objectives, curriculum, textbooks and teaching methods of science education of Uttar Buniyadi schools and secondary schools. (2) To compare the science essays of and state level prizes won by the pupils of the Uttar Buniyadi schools and secondary schools. (3) To compare the two types of schools in terms of prizes and medals won by the science teachers. (4) To compare the number of books for pupils and teachers in the library of the Uttar Buniyadi schools and secondary schools. (5) To compare the science laboratories of the two types of
the schools. (6) To compare the science achievement of the pupils of the two types of the schools. (7) To find out the correlation between science achievements of pupils of the two types of the schools.

The survey method was employed for the study. The sample was selected by employing Stratified Random Sampling Technique. The sample comprised of 125 Uttar Buniyadi schools (letter basic school) and 125 secondary schools of Gujarat state. 500 pupils (250 from each types of the school) of standards VII, IX and X were selected. Five Uttar Buniyadi schools were selected for personal visit. The tools used were interview and questionnaires for principals, science teachers and pupils. The questionnaires were prepared by the investigator. The data were analysed by Chi-Square test.

The major findings were: (1) The objectives, curriculum and textbooks of science in both the types of schools were same. (2) In both the types of schools, majority of science teachers were ready to seek guidance from seminars/orientation courses. (3) So far as the teaching methods were concerned, lecture method was used by majority of science teachers of secondary schools. About half the teachers of the Uttar Buniyadi schools used lecture method. A few teachers in both the types of schools used programmed or heuristic method. Many teachers used question-answer method and pictures and examples. (4) Majority of the teachers in both the types of schools
took the pupils to laboratory and helped them in their assignments. (5) The teachers were not satisfied with the textbook of science. (6) The average number of science magazines in the Secondary schools and Uttar Buniyadi schools was 9 and 6 respectively. Many teachers emphasized on the need of classroom library. (7) The syllabus of Standard IX Science was difficult whereas the syllabus of Standard X was comparatively easy. (8) Less weightage was given to units related to physiology, hygiene, environment and rural culture. (9) The laboratories were not well equipped in both types of schools.


The history of science was included in the first nationwide content standards document for K–12 school science, *Benchmarks for Science Literacy* (AAAS, 1993). Other national standards in science education, including the *National Science Education Standards* also state that students should know the history of science (NRC, 1996).

This study was intended to investigate both the *extent* and *manner* in which the history of science was included in current secondary school physics textbooks. Four secondary school physics textbooks were analyzed in this study. Three research tools were produced during the process of analysis: (a) a
The findings of this study are: (i) the foci of the history of science passages (HOS Units) included in the textbooks were found to be aligned with the foci of the standards documents. Standards descriptions were found to emphasize students' mastery of scientific concepts. A significant number of HOS units focused on developing Conceptual Understanding. (ii) the Conceptual Understanding in science required “depth” rather than “breadth”. Most history of science examples in the textbooks were superficial and lacked in-depth elaboration. (iii) the textbooks examples concerning the Procedural of Science (the process of thinking, investigation, and application) made little use of the historical approach to science education. (iv) the history of science depicted by the standard documents is an ideal tool for helping students recognizes their cultural heritage. However, limiting the content of history of science to a western view of science is insufficient to meet the goal of global science education.

The chief implication of this study was: Current science textbooks need major “surgery” to keep only the essential content for effective science instruction and learning. The reconstruction of science textbooks needs to be guided by clear vision for science literacy. The history of science to be used to
present the science, society, and technology in an integrated fashion for effective learning and understanding.


This study was a description and analysis of student learning when required to use vector mathematics to represent two-dimensional situations in the solution of grade 12 physics problems. Coupled with this exploration, the role of a teacher as a facilitator in creating effective conditions and interactions to facilitate student's knowledge construction was critically analyzed. Nine grade 12 physics students volunteered to participate in a process of articulating their reasoning and problem solving strategies over a sixteen-week period in a regular secondary school classroom setting. The participants were taught the normal content of the Saskatchewan grade 12 physics curriculum by the researcher who was an accredited, experienced physics teacher. Video recording of classroom sessions, interviews, student assignments, and field notes were maintained by the researcher during data collection.

Student learning is described through a combination of excerpts of student discourse and data collected from other sources during the study. A constructivist perspective of student knowledge construction and conceptual
development in science education, and the personal teaching experience of
the researcher inform interpretation of student-teacher interaction. Student
learning during increasingly complex use of vector mathematics is described.
The sequence of topics begins with vector addition and subtraction, and
problems requiring those functions for solution. Vector components are then
developed using a combination of classroom activities and interactive
discussion. The final topic developed is momentum.

Students were found to have well developed experiential knowledge,
which interfered with their construction of conceptual knowledge. Concrete
examples did not guarantee that students would develop conceptual
understanding of a given phenomenon. Students used algorithms
indiscriminately and often did not know if their answers were reasonable.
When momentum was introduced, the students showed a variety of attempts
at constructing the concept. They did not appear to understand the complex
process of mathematical representation during the study even when they were
instructed about the process. Students confused the meanings of equal and
balanced which led to mistakes in writing vector equations representing
relationships between forces. They did not seem to understand why vector
mathematics had to be used in solving problems even when they correctly
employed them in calculations. Transfer of knowledge from mathematics
classes to physics classes was almost non-existent.
In the final chapter recommendations for changes to physics curriculum and instructional strategies are presented. Student difficulty in applying vector mathematics to physics problem is explained in terms of student difficulty in understanding direction as a characteristic of some physics concepts and in representing physics concepts using mathematical models. Suggestions for future research include development of instruction to facilitate student understanding of mathematical representation and metacognitive skill development by students.

Wittman (1998) studied "Making Sense of How Students Come to An Understanding of Physics: An Example From Mechanical Waves".

While physics education research (PER) has traditionally focused on introductory physics, little work has been done to organize and develop a model of how student come to make sense of the material they learn. By understanding how students build their knowledge of a specific topic, investigator can develop effective instructional materials. In this dissertation, researcher describes an investigation of student understanding of mechanical and sound waves, how investigator organizes the findings, and how results lead to the development of curriculum materials used in the classroom.

The physics of mechanical and sound waves at the introductory level (using the small-amplitude approximation in a dispersionless system) involves
fundamental concepts that difficult for many students. These include: distinguishing between medium properties and boundary conditions, recognizing local phenomena (e.g., superposition) in extended systems, using mathematical functions of two variables, and interpreting and applying the mathematics of waves in a variety of settings. Student understanding of these topics is described in the context of wave propagation, superposition, use of mathematics, and other topics. Investigations were carried out using the common tools of PER, including free response, multi-choice, multiple-response, and semi-guided individual interview questions.

Student reasoning is described in terms of primitives generally used to simplify reasoning about complicated topics. Researcher introduces a previously undocumented primitive, the object as point primitive. Investigator organizes student descriptions of wave physics around the idea of patterns of associations that use common primitive elements of reasoning. Investigator can describe students as if they make an analogy toward Newtonian particle physics. The analogy guides students toward describing a wave as if it were a point particle described by certain unique parts of the wave. A diagnostic test has been developed to probe the dynamics of student reasoning during the course of instruction.
Investigator has replaced traditional recitation instruction with curriculum materials designed to help students come to a more complete and appropriate understanding of wave physics. Investigator find the research-based instructional materials are more effective than the traditional lecture setting in helping students apply appropriate reasoning elements to the physics of waves.

Mackin and Joan (1998) conducted "Investigation of Selected Outcomes of The Dynamic Physics Learning Environment: Understanding of Mechanics Concepts and Achievement By Male and Female Students".

The study investigated the Dynamic Physics learning environment to determine its effectiveness in promoting understanding of mechanics concepts and achievement as well as the differences between male and female students in understanding of physics concepts and progress in the course. The Dynamic Physics learning environment was chosen for research since it offered an opportunity to study an introductory calculus based physics that incorporated recommendations, goals, and strategies for effective learning outlined in recent reports on physics education.

Data were collected using pre-tests and post-tests, course assessments, surveys, students' evaluations, and midterm feedback interviews. The data from the pre-test, post-test and course assessments were analyzed using a
difference of means $t$ test ($p < 0.05$). Data from evaluations and interviews were analyzed to identify central themes in students' response.

Students made above-average normalized gains in conceptual understanding from pretest to posttest when compared with a range of normalized gains from physics education studies. Analysis of interviews and evaluations of the course indicated students perceived they understood physics concepts in this learning environment and realized this understanding was important background for future courses. Students suggested that connections to real world applications, the format of the course, and collaborative learning were factors that helped them to understand physics concepts by making them more meaningful. Students' responses suggested that teaching strategies used in the course not only helped them to develop understanding, but confidence in their ability to learn physics.

The sample of female students had significantly lower average scores in the pretest and posttest compared to male students; however, the sample of female students made the same or higher average gains in conceptual understanding when compared to the male students. Additional findings included that groups with one or more female member earned higher averages in-group assessments than all male groups. Female students' perceptions of physics changed over the course; female students indicated an increase in
relating personal experiences and real world experiences to the study of physics.

The study indicated the Dynamic Physics Learning Environment offered the opportunity to learn for both male and female students and promoted understanding of physics concepts.

Chasser and Phyllis (1998) studied "The Effect of Alternate Forms of Feedback on Student Achievement and Motivation".

This study examined the effect of a computerized Decision Support System (DSS) on sixth grade students' achievement and motivation. The study attempted to increase student motivation and achievement utilizing interactive graphical feedback and textual motivational messages, through the use of a computerized Decision Support System that was designed expressly for the study.

The population for the study was students enrolled in one south Florida school. Comparisons were made between two groups: one textual feedback group and one graphical group. Students entered their test grades into the DSS, which provided them with their grade point averages. The textual feedback group used a simple entry/output form of the DSS and received textual information about their grade point average. The graphical feedback
group used the same DSS, which also contained additional motivational messages and an interactive graphical representation of their grades, updated with each entry. Both groups had the ability to formulate future possibilities of grades. It was hypothesized that the graphical and motivational feedback would increase the intrinsic motivation of the students, and thereby boost their achievement.

A spelling achievement test was developed from spelling words provided by the teacher partaking in the study. Spelling tests were given to the students at the beginning of the study, and again at the end of the study to allow correlation of the data collected. Students' intrinsic motivation was measured with data obtained through the utilization of a special questionnaire designed for the study, which was given as both a pre-test and a post-test.

This research indicates that a student's intrinsic motivation is positively affected by the receipt of feedback through the utilization of a computer decision support system. By integrating the student into the decision making process, a student will be motivated to achieve, which demonstrate a distinct relationship between intrinsic motivation and spelling achievement.

McCrink and Lourdes (1998) studied "The Role of Innovative Teaching Methodology and Learning Styles on Critical Thinking".
The purpose of this study was to determine the role of innovative teaching methodology on critical thinking skills (Research Question 1) and the interaction between students' learning styles and teaching methodology on critical thinking (Research Question 2). An undergraduate Humanities course was used based on the liberal arts content and the relationship, according to the literature, between a liberal arts curriculum and the fostering of critical thinking skills. Two sections of Humanities 1020 at Miami-Dade Community College were identified for the study. The total number of subjects was 79 and the same instructor taught both sections. Out of several humanities sections offered, one section was randomly assigned and became the experimental or innovative group and the other section became the comparison or traditional group. Independent variables were the teaching methodology and the learning styles and the dependent variable was critical thinking.

The research design consisted of a four by two factorial analysis where the four levels of the assigned variable represented each of the learning styles and the two levels of the active independent variable represented the teaching methodologies. The Watson-Glaser Critical Thinking Appraisal instrument was used to measure the level of critical thinking skills from pre- to post-test using two sample t-tests and analyses of covariance; final grades and teacher evaluations were also compared. The Gregorc Style Delineator was used to assess students' learning styles during the first week of the term.
Demographic characteristics were collected to provide further description of the population.

Findings revealed no significant difference between the innovative and traditional methodology gourds on critical thinking skills at the .05 levels. The number of students completing the Gregorc Style Delineator was not adequate for statistical analysis. Given the low number of respondents, no conclusions could be drawn from this study.

Patrick (1998) studied "Expanding The Parameters of Self-Regulated Learning: Relations Among Children's Academic and Social Self-Regulation and Achievement".

This dissertation-integrated literature regarding children's social competence into a social-cognitive framework of self-regulated learning. The objectives was to make explicit some of the social processes, in addition to academic processes, related to children's self-regulated learning and achievement. Specifically, this study explored whether strategies and knowledge about selecting those strategies (i.e., conditional knowledge) were associated across the academic and social domains, and, if so, which aspects were related. Additionally, it investigated whether social strategies and conditional knowledge were related to achievement, independently of academic strategies and conditional knowledge.
Using structured interviews with third (n = 40) and V (n = 38) grade children, measures of strategies and conditional knowledge for reading, mathematics and social situations (verbal and physical provocation) were constructed. Analyses involved investigating associations between the academic measures and achievement scores, and between the social measures and peer – rated social acceptance. Finally, analyses were conducted to investigate associations between social strategies and conditional knowledge, and academic strategies, conditional knowledge, and achievement.

In the first section, regression analyses indicated that academic strategies and conditional knowledge were related to both reading and mathematics achievement. Similarly, in the second section regression analyses indicated that social strategies and conditional knowledge were related to peer acceptance.

The third section addressed hypothesized indirect and direct associations between social strategies and conditional knowledge and achievement. Zero order correlations indicated some support for the hypothesis that conditional knowledge for academics and social situations were related, thus suggesting a possible indirect association between social competence and achievement. There was also evidence of a significant direct association between social competence and achievement. Regression analyses
indicated that social strategies and conditional knowledge added significantly to the variance in achievement over and above that explained by academic strategies and conditional knowledge, grade level, and gender.

These findings suggest that giving greater salience to social factors, such as children's strategies for social interactions, and their knowledge regarding selecting those strategies, may both increase our understanding of processes related to achievement and explain the well documented positive relation between social competence and achievement.

Ismail and Kassem (1998) studied "Science Achievement of Students in the Republic of Yemen and Implications for Improvement of Science Instruction".

The purpose of this study was to establish a research base from where strategies could be developed for improving science education in Yemen. The study measured the achievement in general science of Yemeni students attending primary, preparatory, and secondary schools, and their country parts attending three- or five-year education programmes in primary teacher training institutions. A sample of 1,984 students from six major cities of Yemen was given the Second International Science Study test in May 1998. Achievement scores of these selected groups were compared. The achievement in general science was 11.93 for science track students, for
three-year teacher training institution students, and 8.49 for five-year teacher training institution students. These means scores were based on total of 35 items.

This low level of achievement was further verified by making comparisons of the achievement of selected groups from Yemeni high schools in cities with each other. The following factors were measured in this states location, grade level, gender and type of science programme me studied.

Selected groups from Yemeni high schools were also compared to the peers in other nations. The researcher compared students of the science track and teacher training institutions to their counterparts in 13 nations and students of the literature track to their counterparts with the scores their counterparts in 15 and 17 nations respectively, in every comparison every Yemeni group ranked at the bottom of the achievement list.

The outcome of this research indicates the profound need to improve science programme in all grade levels in Yemen. The research recommendations for improvement in science education in Yemen fall into four categories: 1) a change in attitudes toward education, 2) a change in teacher education 3) change in classroom conditions, and 4) a change in educational opportunities for women.
Because this research study was based on a sizable sample and more hypotheses were tested, this work has contributed appreciably to the data available and for the future researchers. This study also implemented by the SISS instrument for the first time in Arabic.

White and Renee (1999) undertook "An Investigation of Gender and Grade-Level Differences in Middle School Students' Attitudes About Science, in Science Process Skills Ability, and in Parental Expectations of Their Children's Science Performance".

The primary purpose of the study was to examine different variables (that is science process skill ability, science attitudes, and parents' levels of expectation for their children in science, which may impinge on science education differently for males and females in grades five, seven, and nine.

The research question addressed by the study was: What are the differences between science process skill ability, science attitudes, and parents' levels of expectation in science on the academic success of fifth, seventh, and ninth graders in science and do effects differ according to gender and grade level?
The subjects included fifth, seven, and ninth grade students (n = 543) and their parents (n = 474) from six rural, public elementary schools and two rural, public middle schools in Southern Mississippi, U.S.A.

A two-day (grade X gender) multivariate analysis of variance (MANOVA) was used to determine the differences in science process skill abilities of females and males in grade five, seven, and nine. An additional separate two-day multivariate analysis of variance (grade X gender) was also used.

Montgomery (1999) undertook "The Development of The Scale of Academic Motivation".

This study addressed conceptual and methodological issues surrounding the assessment of children's academic motivation. Specifically, the present study concerned the development of a measure of variables that influence students' (grades 6 - 12) academic motivation called the Scale of Academic Motivation (SAM). Intended for use in an intervention context, this instrument was designed to be a measure of motivation and characteristics of students' classrooms and homes that research has shown to be associated with academic motivation. This study consisted of three phases. The first two phases involved the development and refinement of items and response format for the SAM through input from students and teachers. The third phase focused on investigating the psychometric properties of the SAM. The
participants in this study were 406 sixth-through twelfth-grade students. Internal consistency coefficients and test-retest correlations demonstrated the reliability of the SAM. Results of a factor analysis provided evidence for the three SAM subscales (Self, Classroom, and Parents) and the construct validity of the SAM. Students' academic motivation was generally positively related to their self-concepts, motivation orientations, and academic performances. Composite scores were calculated by summing the totals of the Self, Classroom, and Parents subscales. However, upon review of the correlational patterns among the three subscales and other measure, and given the long-range goal of using the SAM in an intervention context, it was determined that the Composite score is not warranted. Future research with the SAM will not include the Composite scores. The psychometric properties of the SAM demonstrate that it is capable of reliably and validity measuring difference in children's perceptions of three sources of influence on their academic motivation.

Catello and James (1999) studied "The Effect of the R.E.A.L. (Reinvention of Education for Active Learning) Classroom Experience on Motivational Orientation Among Middle School Students".

There is a noticeable decline in early adolescent's academic motivation and other skills and attributes once they make the transition from elementary
school to either a middle school or a junior high school. This phenomenon is called the "school transition effects". These declines have been well documented and a number of explanations have been proposed, from biological (pubescent) dynamics to the change in student-teacher relations. Many school districts have implemented changes in school policy and practices to counter this downward trend with little success. The R.E.A.L. Initiative (the acronym stands for Reinvention of Education for Active Learning) is a systematically designed programme me that created a series of changes to improve the entire middle school culture, not just a single aspect of it. The ultimate challenge for the R.E.A.L. Initiative is to demonstrate that the downward trend of academic motivation on the part of middle school students is reversible. This study monitored student progress on twenty variables over the first two years of the project.

The primary purpose of this research was to determine if the experiences for students in R.E.A.L. classrooms would influence their academic motivational orientation. Specifically, the study examined whether students would experience a shift from being motivated solely to satisfy extrinsic factors (good grades, teacher and parental approval, etc.) to being motivated to satisfy intrinsic drives (challenge, curiosity, sense of mastery and self satisfaction, to test their own judgment, etc.). The instrument selected to measure the hypothesized shift was Dr. Susan Harter's Scale of Intrinsic vs.
Extrinsic Motivational Orientation in the Classroom, assessing five distinct components of academic motivation.

Considering all of the data, it is reasonable to conclude that the R.E.A.L. Initiative demonstrated that the downward trend of academic motivation among middle school students could be altered if not totally reversed. By integrating specific learning strategies into the daily classroom routine, combined with its accent on a student-centered, interactive, holistic approach to learning, the R.E.A.L. classroom experience resulted in shifts of varying degrees in motivational orientations from extrinsic to intrinsic for most students.

Chamberlain and Kathleen (1999) studied "The Student Perceptions of Their Middle School Learning Environment".

The learning environment within a middle school from the students' points of view is the major focus of this study. First, an overview of the philosophy of middle level education as defined by the Carnegie Council on Adolescent Development, the National Association of Secondary School Principals, and the National Middle School Association is presented.
Miller and Huff (1999) studied "The Relationship of Temperament at School Entry, Cognitive Ability, Gender, SES, and At-Risk Status to Later School Achievement".

This retrospective study investigated the construct of temperament as a moderating influence on the educational achievement of 214 preschoolers whose parent-generated Temperament Assessment Battery for Children (TABC) ratings were obtained. At kindergarten registration, at kindergarten entry, the differences between children entering kindergarten (K) and those entering transitional kindergarten (TK) as an at-risk population were explored. Age, gender, SES, ability, as measured by the Otis-Lennon School Ability Test (OLSAT) and temperament variables was compared. Significant differences between these groups were found. TK students were younger, of lower SES, and were rated as more difficult to manage, and less persistent than their K counterparts. Lower SES males were more likely to be recommended for TK.

The relationship of parent-generated temperament ratings to later school achievement in grades one, four, and seven was explored for the entire sample. At each designated grade level, standardized achievement scores and teacher-generated grades in reading and mathematics were used as criteria. Demographics (age, gender, SES) ability (OLSAT) and temperament variables were entered as the three-predictor sets in the hierarchical regression
analyses. With the effects of ability controlled, the temperament variables of intensity, distractibility, and adaptability related significantly to the explained variance in first grade-standardized achievement. At the seventh grade level, adaptability and distractibility were associated significantly with both standardized scores and classroom achievement. Intensity was associated with fourth grade teacher-assigned reading grades only. All correlations were low to moderate.

Specific parent-generated temperament variables obtained at school entry were related to achievement in reading and mathematics even with the effects of ability controlled. These retrospective data provided evidence for the developmental stability of temperament, and suggest that environmental influences may reinforce specific temperament attributes at different ages. Temperament characteristics manifested may differ depending on task demands.

Hathaway (1999) studied "Differential Learning of Physics According to Gender".

Academic achievement of students in small learning groups in an introductory physics course was studied to determine if there was a relationship between achievement and group gender composition. The question, "Will women in groups with more female learners score higher on
achievement tests in physics than women in groups where they are the only females” was studied. The environment for the study was a physics course in a university physics department. The course was taught using an inquiry-based method. The study had a pre-test/post-test design. The data were analyzed using an analysis of covariance. Two studies were conducted; a pilot study and a larger study, one year apart. In the pilot study of 92 students, the women were found to score significantly higher when they were in groups with 2 or more females. In the second study of 187 students, there was no significant difference in female scores by group gender composition. When questioning why this could have occurred, a possible answer lied in the fact that the two groups of students had different preparation by gender, with the males being significantly better prepared in the second study. This was different from the pilot study where there were no significant differences by gender in preparation or in overall achievement. It was considered that possibly the effects of working with similar learners was outweighed in the second study by the effects of working with better-prepared students.

Heilman (1999) studied “Classroom Climate Factors Related to Student Motivation and Effort”.

The combined impact of reform efforts, content coverage, the importance of grades, honor roles, and non-school interests of students
pressure teachers to replace strategies that motivate students with strategies that promote efficiency and competition. How teachers emphasize learning or competitive goals and regulate the purpose of the class in response to the multitude of influence determines classroom climate. Strategies that motivate students to invest in learning are based on quality student-teacher relationships, on tasks that are valued by students, and shared student-teacher control over learning tasks.

A researcher-developed survey instrument was used to collect data from a random cluster of 412 students in eighteen classrooms to determine the relationship between student effort and self-perceptions of ability to theories of motivation. Scales included in the survey instrument included teacher support, teacher control, organization and rules, and task orientation (socialization theory); task value and self-perceptions of ability (expectancy theory); mastery-orientation and performance-orientation (goal theory); mastery evaluation (self-regulation) and performance evaluation (traditional grading) (behaviourism).

Independent samples t tests indicated that mastery-oriented experiences of students are related to higher levels of self-perceptions of ability, effort, teacher support, task value, organization and rules, and promotion of self-regulation than performance-oriented class experiences.
Proctor (1999) studied "Cognitive Style and Achievement: Student Performance on The Thinking Styles Inventory, Raven's Progressive Matrices, Iowa Test of Basic Skills, and The FLORIDA WRITERS! Test".

The purpose of this study was to investigate whether students, cognitive styles affect performance on two distinct types of tests: a standardized, multiple-choice test of language skills (Iowa Test of Basic Skills; ITBS) and a state-developed performance assessment of writing skill (FLORIDA WRITERS). The measure of cognitive style was the Thinking Style Inventory (TSI; Sternberg and Wagner, 1991) studied a self-report instrument based on Sternberg's (1997b) theory of thinking styles. Participants were 154, VIII and IX grade students. The main hypothesis was that cognitive style could explain variance in ITBS and FLORIDA WRITERS! Scores that in an accounted for by cognitive ability alone. Participants were administered the TSI and a measure of general cognitive ability, the Raven's Standard Progressive Matrices (SPM; Raven, Court, and Raven, 1983). ITBS and FLORIDA WRITERS! Scores were obtained from the county database multiple regression analyses were conducted, with thinking style and SPM as independent variables, and ITBS and FLORIDA WRITERS! As dependent variables. Results of multiple regression analyses demonstrated the SPM was the only variable to correlate significantly with either ITBS or FLORIDA WRITERS! Cognitive style was not found to correlate with either dependent measure. An exploratory factor analysis of the
TSI performed and the subscale level did not support Sternberg's five-factor structure; rather two-factor model was the best fit for the data. Some relationships between subscales were consistent with Sternberg's theory, whereas others were not supported. Limitations of the current study are discussed, in addition to implications for further research on the TSI. Finally, the relevance of cognitive style to students' academic success is considered.

Purvis (1999) studied “Contrasting Cognitive Abilities in Children with Attention Deficit Hyperactivity Disorder and Reading Disability”.

Attention Deficit Hyperactivity Disorder (ADHD) and Reading Disabilities (RD) are common developmental disorders that frequently co-occur. In children who meet criteria for both disorders, it is not known if one disorder is primary, the other secondary or if both true disorders are present. The overall objective of this investigation was to test for the distinctiveness or independence of the two single disorders (ADHD-only, RD-only) and the independence of the two cognitive domains, executive function (EF) and phonological processing (PP) which are proposed as central to ADHD and RD respectively, using a classic double dissociation design. A 2 (ADHD vs. no ADHD) x (RD vs. no RD) model was used to examine the cognitive profile of 4 groups of 17 children each, aged between 7 – 11 years: ADHD, RD, ADHD+RD and controls. The EF tasks involved two measures of inhibitory control, while the phonological measures
The purpose of the present study was to determine if there are differences in the perceptions of the classroom environment among high school students who are classified as resilient, average, and non-resilient. Resilience research derives from at-risk research, in which individuals such as...
Garmezy (1983) have identified those factors that are associated with the increased likelihood of an individual developing an emotional or behavioral disorder in comparison with a randomly selected individual from the same population. The growing consensus is that classroom environment appears to be a key factor in enabling students labeled “at-risk” to be successful in school. Research on resilience differs from research on at-risk in that it seeks to find those factors that contribute to school success rather than school failure. These factors may be personal attributes, such as self-efficacy and optimism, or environmental, such as a supportive adult relationship. The Resilient Model in educational literature (McMillan and Reed, 1994) offers a paradigm for research into the educational success of these students.

Overall, the students in all groups in the survey had above-average perceptions of five of the eight scales, with Involvement, Affiliation, and Rule Clarity being the highest rated. The highest significant differences, indicated by the F-values, occurred for Satisfaction and Task Orientation. The three groups also perceived affiliation high overall, and results indicate significant differences between the groups, but not at the same level of significance as the other findings. There were no significant differences in the perceptions of the groups based on gender. There were no significant differences between the groups based on ethnicity, but there was a significant main effect for ethnicity. African American students had a significantly higher perception of
Involvement. Task Orientation and Rule Clarity than Caucasian students, but the effect sizes indicate the differences are not educationally significant. There were two significant results for students' perceptions based on if they work or do not work after school. Resilient students who do not work after school had higher perceptions of Involvement, Teacher Support, Task Orientation, Order and Organization, and Satisfaction than Non-resilient students. Resilient students who work over 15 hours per week also had higher perceptions on the same scales.

Implications for theory include increasing student participation and teacher support for the student. Implications for practice include using relevant activities in the classroom, providing more planning time for teachers, and using a variety of teaching models. Implications for future research point to student criteria for resilience job-related differences.


Attaining an understanding of basic principles of inheritance and their implications in crucial for all people as society is confronted with a variety of ethical, sociological and ecological questions generated by the rapid growth of genetic knowledge. College level students are burdened by terminology, have difficulty making associations among related ideas, and often possess
misconceptions or fragmented ideas about how traits are inherited. Subject comprehension is evaluated mostly with object testing techniques which do not show how well students truly understand concepts.

This research was done to determine how prior subject knowledge in biology and general cognitive ability affected community college students' understanding of several genetic principles both before and after competing a one-semester college biology course. Understanding of genetic principles was determined with a videotape assessment that evaluated student written explanations of experimental events. The evaluations were then used to place students into three categories: descriptive, transitional, and relational type learners. A subject of students was interviewed to better determine how thoroughly genetic concepts depicted in the videotape programme me were understood.

Ross and Michael (1999) studied "The Relationship Among Academic Achievement Motivation, Motivation Orientation, and Ability-Achievement Differences in Reading".

The relationship among academic achievement motivation, motivation orientation, and ability-achievement differences in reading was examined. The ability of these motivation variables to predict reading achievement and ability-achievement differences in reading was also investigated. Seventy-one
fourth and fifth grade students from elementary schools in Alabama and Arizona participated in the study. Individual testing of cognitive ability (WISC-III Vocabulary and Block Design subtests) and reading achievement (WJ-R Broad Reading cluster) was conducted with each student; each student also competed a self-report measure of motivation orientation in reading (revised Scale of Intrinsic vs. Extrinsic Orientation in the Classroom). Each student's teacher competed a teacher report of academic achievement motivation in reading (revised Teacher Rating of Academic Achievement Motivation) regarding each student as well. Additional information (such as group reading achievement scores and SES data) was also gathered and included in analyses. Multiple correlations were computed to determine the relationship among the different variables, and multiple regression analyses were completed to determine the best predictors of reading achievement and ability-achievement differences in reading.

Motivational, cognitive, and achievement variables were generally found to be significantly positively correlated. Ability was found to be the best predictor of reading achievement, teacher report of academic achievement motivation in reading and student report of motivation orientation in reading also contributed to the variance in reading achievement (depending on the measure). Teacher report of academic achievement motivation in reading accounted for a significant amount of the variance in ability-achievement.
differences, as well, specifically when achievement was higher than predicted based on ability. The extent to which teacher ratings of motivation are predictive, however, may be dependent on the time of year that the ratings are made.

The results from this study appear to have implications for school psychologists in their assessment, intervention, and consultation roles. An assessment of motivation variables would allow school psychologists to provide a more complete picture of the students whom they evaluate and would help shape interventions to confront motivation/achievement deficits. School psychologists could fulfill their consultation role by educating teachers and administrators on these issues.

White and Hatley (1999) studied "Constructivism in A College Biology Classroom: Effects on Content Achievement, Cognitive Growth, and Science Attitude of At-Risk Students".

This study examined the effect of different teaching approaches – traditional (the control group) and constructivist (the experimental group) – on the cognitive development, achievement, and attitude of students in the Principals of Biology course at a small, co-educational, liberal arts junior college of particular interest is the effect of instrumental mode on at-risk college students. The study used a quasi-experimental pretest – post-test
control group design with intact sections of Principles of Biology. The students registered for classes on their own. The equivalence of the two classes was measured using high school GPA and SAT scores. Each group was pre-tested and post-tested for the dependent variables: content knowledge, cognitive development, and attitude toward science.

Analysis of variance, analysis of covariance, and correlations were used to evaluate the data. The change in cognitive development, as measured by pre-test and post-test using the GALT, was significant in the experimental group, but not in the control group. Neither group showed significant changes in attitudes toward science over the course of the semester. Both groups demonstrated gains in content knowledge; the gain by the experimental group was significantly greater than the gain with the control group. Additionally, the at-risk students (those with SAT scores < 800) in the experimental group exhibited significant gains in content achievement and logical thinking.

Mashile and Oupa (1999) studied “Psychological and Social Factors Related to Physical Science Achievement and Attitude of Secondary School Students”.

School physical science is a prerequisite for science courses at institutions of higher education. Science graduates are an important link in a nation’s scientific and technological development, which often shapes a
country's economic development. The purpose of this study was to investigate psychological and social factors influencing physical science achievement and attitude of black secondary school students in South Africa.

The first part of the literature study, which was concerned with physical science education in South Africa, revealed that few black students chose to study science after standard seven that failure rates were high and that science education was generally in a state of crisis. The second part of the literature study identified psychological and social factors related to science achievement and attitude. These were home environment variables, teacher and school related variables, personal variables (self-concept, motivation, gender, ethnicity) and students' abilities. The third part was the construction of a Structural Equation Model (SEM) specifying the relationships among the psychological and social factors and their effects on physical science achievement and attitude.

The theoretical SEM fit the data reasonably well. The best fitting model, however, was a revised model in which several paths were constrained. The latter accounted for a substantial variance in attitude towards physical science (70.3%) and a meager 17.7% in physical science achievement.

The variables ability, home environment and self-concept had the greatest total effects on physical science achievement. Self-concept, home
environment and motivation made the greatest total contributions to physical science attitude. Teacher characteristics and social environment had non-significant effects on physical science achievement and attitude. Multiple-group structural equation modeling analyses found no significant difference in the structural parameters of boys and girls.


Researchers of self-regulated learning have demonstrated that students are capable of initiating and directing their own efforts to acquire knowledge and skills. To explore whether Asian students (i.e., Taiwanese students in this case) can benefit from self-regulatory strategies as well as do Western students, a repeated-measures experimental design was constructed to investigate the effects of participative goal setting and comparative information on Taiwanese students, achievement goal orientations, perceived self-efficacy, and development of fraction skill. Following the pretest, eighty-four fourth grade children were randomly assigned to one of four treatment groups: goal setting with self-comparison, goal setting with social comparison, self-comparison only, and social comparison only. Students took the posttest on goal orientations, self-efficacy, and fraction skill after the training sessions
had been completed. The results indicated that children in the self-comparison group possessed significantly higher fraction skill than did children in the social-comparison group. Also, students receiving the self-comparison treatment judged themselves more efficacious in working the fraction problems than did their counterparts who received social comparison information. However, in terms of the effect of participative goal setting, findings of the present study failed to verify the original research hypothesis. Students in both goal-setting and no-goal groups scored similarly on both the fraction skill as well as self-efficacy tests. With respect to the effects of situational factors on students' achievement goal orientations, children in the self-comparison group were more mastery-oriented than students in the social-comparison group after receiving the intervention. On the other hand, students receiving the treatment-combining goal setting with social comparison were significantly more performance-oriented than students in other groups. As to the effects of comparison information on children's goal-setting behaviour, results of the current research.

Weiner and Jerome (1999) studied "The Effects of Discrepant Events on The Low Level Paradigms of High School Physics Students".

Constructivist learning theory indicates that high school physics students do not enter their physics classrooms empty-headed. Students come
with preconceptions that they constructed over time, which are based on their observations of the environment. One function of physics teachers is to facilitate students in altering their preconceptions if they are not in agreement with the currently accepted scientific view.

Kuhn described a paradigm shift as a process that scientists undergo when they discard a currently accepted paradigm in favor of a more complete paradigm, because of the new paradigm’s greater explanatory power. Physics students may undergo low-level paradigm shifts when constructing, or reconstructing, their low level paradigms as they observe small parts of their world.

This research was a multiple case study based on eight discrepant event exercises. Twenty-two self-selected, untutored first year high school physics students individually performed these exercises. The students’ written documents, student interviews, and the researcher’s field notes were triangulated to describe the process that emerged as the students described their low level paradigms before and after performing the discrepant events exercises.

The following research questions were addressed. Do students employ similar low-level paradigms to explain the same physical phenomenon? Do the discrepant events observed by the students have a consequential effect upon
their current low-level paradigms? Are there specific discrepant events that affect students' low-level paradigms to a greater degree compared to other discrepant events that are grounded in the same physical phenomenon? Do students apply scientific terminology, within its proper context, after their exposure to a discrepant event, compared to their utilization of scientific terminology prior to their exposure to the discrepant event? Can the students' low level paradigms be generalized to situations that are beyond the scope of a specific discrepant event?

This research indicates that by limiting the cognitive demands of laboratory exercises more students may be able to connect the theoretical constructs developed in the classroom to the associated laboratory exercises. Laboratory exercises should be simple in design and involve as few concepts as possible, thus allowing students to perform multiple laboratory exercise based on the same physical phenomenon.

Marston and Hemphill (1999) studied "Science Conceptions and Connections: How Third Graders Engage in Inquiry to Learn Science".

In this teacher-research study, researcher explores the process of inquiring to learn science from the perspective of third graders. As a teacher-researcher, this study was conducted in researcher third grade classroom over the course of a year. Researcher used qualitative research methods to
construct five ethnographic case studies on researcher students. The study focused on (1) third graders' conceptions of science and being scientists. It examined how these conceptions changed (or did not change) throughout the year, and (2) the connections that these students made (or did not make) between science and reading, writing, talking, and listening. Student interviews, observations, and written documentation, as well as researchers own reflective journal, informed the case studies.

The data suggests that these third graders' conceptions of being a scientist are directly related to their definitions of science. These third graders compare their actions to their conceptions of science to determine if they are scientists. In addition, the data reveals that these students' reading, writing, talking, and listening experiences influence their science conceptions. In particular, researcher identifies three variables, context, definition, and relationships that interact to contribute (or distract) from these third graders' thinking about themselves as scientists. The context in which science is explored plays an important role in these third graders' conceptions. The places where science is performed and who conceives the original ideas to be tested are important conditions. These third graders' definition of science and the relationships they construct within the curriculum and each other also influence their conceptions of being scientists.
Overall, this study finds that these third graders use the processes of reading, writing, talking, and listening to enhance their science understanding. It also points to the importance of having the students engage in scientific inquiry both in and out of the classroom. This research suggests an interdisciplinary approach to teaching/learning science and proposes ways that teacher and other educators can better support science learning for students.

Simpson and Day (1999) studied "Relationships Between The Academic Achievement and The Intelligence, Creativity, Motivation, and Gender Role Identity of Gifted Children".

The purpose of this study was to describe the relationships between the intelligence, creativity, motivation, and gender role identity and the academic achievement of gifted fifth grade students. The study was based on Renzulli's triad model of giftedness (Renzulli, 1978). That model defines giftedness as the integration of three clusters: high intelligence, creative ability, and high levels of task commitment (motivation). The model argues that it is the interaction among these three clusters that is necessary for outstanding performance.

The study used a correlational research design and a sample of 71 gifted fifth grade students to estimate the individual and collective...
relationships between the intelligence, creativity, motivation, and gender role identity (masculinity and femininity) and the academic achievement.

Analyses using the Pearson product-moment correlation technique and multiple linear regression procedures yielded the following results: (1) intelligence was a significant predictor of mathematics and reading achievement; (2) motivation was a significant predictor of mathematics and reading achievement; (3) creativity was not a significant predictor of mathematics and reading achievement; (4) masculinity was a significant predictor of mathematics achievement but was not a significant predictor of reading achievement; (5) femininity was not a significant predictor of mathematics or reading achievement; (6) when examined in combination, only motivation was a significant predictor of mathematics achievement; and (7) when examined in combination, only intelligence and motivation were significant predictors of reading achievement.

The results of this study seem to support Renzulli's contention that intelligence and motivation are key factors in the academic performance of gifted children but do not support his argument that creativity is a key factor in the academic performance of gifted children. The results also suggest that gender role identity is not a key factor in the academic performance of gifted children.
Knowles and Travis (1999) studied "The Effect of Teacher Engagement on Student Achievement and Motivation".

This study examined the effect of teacher engagement on student achievement and motivation. Teacher engagement referred to a combination of teacher characteristics related to teacher knowledge and teacher motivation. The four teacher characteristics included teachers' pedagogical knowledge about English, teachers' pedagogical knowledge about student motivation, teachers' intrinsic motivation toward teaching, and teachers' self-efficacy toward teaching. It was predicted that the four teacher characteristics would be associated with students' achievement and motivation.

The data for this study were acquired from the National Educational Longitudinal Study: 1989 (NELS: 88). A nationally representative sample of eighth and tenth grade students, and their associated English teacher were the participants in this study. The dependent variables were student achievement, assessed by a reading achievement score, and student motivation, assessed with a measure constructed from relevant student questionnaire items. Factor analyses were executed to form statistical constructs representing each teacher characteristic.

To measure the relationship among the teacher characteristics and student outcomes, multiple regressions were performed, with any overlap...
caused by the other three teacher characteristics controlled for. Analyses revealed that teachers' pedagogical knowledge about student motivation positively predicted tenth grade student achievement and motivation, after prior achievement and motivation were controlled. Analyses revealed that teachers' pedagogical knowledge about English negatively predicted tenth grade achievement, and positively predicted tenth grade student motivation, after prior student achievement and motivation were controlled. Teachers' intrinsic motivation toward teaching positively predicted tenth grade student achievement and motivation, after prior achievement and motivation had been controlled. Teachers' self-efficacy toward teaching negatively predicted tenth grade student achievement and motivation after prior student achievement and motivations were controlled. Analyses also revealed that the four teacher characteristics were positively correlated with each other, and could be statistically represented with one factor (teacher engagement). Teacher engagement predicted tenth grade student achievement and motivation, after prior student achievement and motivation had been controlled.

These findings suggest that teachers who are knowledgeable about student motivation and English, and are motivated toward teaching positively influence high school students' achievement and motivation. Teacher engagement was also shown to be a statistically supported construct, and was predicted of student achievement and motivation.
Silver and Bernais (1999) studied "Indicators of Academic Achievement: A Structural Equation Model".

Current research reveals that there are many factors affecting academic achievement. The overall purpose of this research was to empirically evaluate the hypothesized structural relationships among five social cognitive latent variables and a latent GPA variable. Data was collected for the latent constructs of study skills self-efficacy, learning goal orientation, performance goal orientation, perceived future consequences, and persistence as each is defined under the social cognitive theoretic perspective, as well as grade point average. Of the 398 community college students administered the survey in a sample of convenience, 386 consented to participate. Data were screened and cases were excluded on the basis of outlying response patterns and excessive amounts of missing data. The resulting data set contained 338 cases.

This initial specified structural model hypothesized that SSSE would have a direct relationship with estimated GPA, and would indirectly be related to GPA through all of the constructs within the model. Findings showed that study, skills self-efficacy and persistence have a direct positive relationship to grade point average for this sample. Not surprisingly, indirect relationships to GPA were detected for perceived future consequences and performances goals. There was also a direct negative relationship between future consequences
and persistence. Individuals with a greater focus on the future social rewards of doing well academically (good grades lead to a personal payoff, such as rewards from researcher family, money, graduation, etc.) demonstrated lower persistence responses.

Finally, the practical significance for the GPA construct in the study, also termed effect size, was .44 (R2 = .44, p < .05). This finding allows the interpretation that; overall, this research does contribute to our understanding of academic achievement and the role of self-efficacy for self-regulated study behaviours, goal orientation, perceived future consequences, and persistence.

Hill and Norbert (1999) studied "The Effects of School Climate, Student Background, Teacher Expectations and School-Community Integration on Academic Achievement Among High Poverty Urban Schools".

A number of states' primary indicators of student academic achievement for the public school accountability system are standardized achievement tests. Though the factors that affect student achievement are complex, it is generally held that such tests potentially inform all educational stakeholders of how effective public schools are at meeting the academic needs of all children served. The Texas Assessment of Academic Skills (TAAS) a criterion-referenced test, is used for this purpose in Texas.
A theoretical model was developed to facilitate an examination of the impact of school climate, teacher expectations of their jobs and students, student background, and school-community integration on student mathematics and reading achievement among high poverty campuses. Twenty-two hypotheses were tested at both the student and campus levels using OLS regressions and bivariate correlations, respectively.

Though campuses in this study were all high poverty and from the same large urban district in southeast Texas, they produced tremendous differences in school TAAS scores. Some reportedly had 90% of the students passing all sections of TAAS (reading, mathematics, and writing) while others had 30% passing. Participants (N=5,139) from 35 high poverty urban schools were elementary students in grades III, IV, and V whose 1998 TAAS tests were scored.

Regression analyses performed at the student level, explained 16% of the variance in mathematics (R² = .161) and 17% of the variance in reading (R² = .175). Regression and correlation analyses revealed that more than 25% of the variables tested, produced statistically significant associations at both the student and campus levels. Most hypotheses were either partially confirmed (at either level) or completely confirmed (at both levels). Three hypotheses were rejected at the student level, and two produced no
statistically significant effects or associations at both levels of analyses. Furthermore, qualitative analyses, reported in the form of narrative summaries, were used to augment quantitative findings.

Results of this study are a valuable contribution to understanding the relationship between structural representations and TAAS performance. Moreover, the study provides a clearer understanding of the nature of school practices and policies that have an impact on the variation of student performance in high poverty urban schools.

Tice (1999) studied "The Integration of Science Process Skills in Elementary Science, Mathematics and Language Arts: A Case Study of The Effect upon Student Science Achievement".

This study investigated the student science achievement results related to the infusion of an elementary process science programme me into a rural/suburban school district, which had already implemented a process curriculum in language arts and mathematics. It ascertained trends in student science content and process skill achievement during the four years following the curricular innovation.

The investigative method employed a comprehensive quantitative analysis of the New York State Elementary Science Programme me Evaluation
Test administered to all fourth-grade students every academic year. Four consecutive classes were treated as a cohort samples with each exposed to increasingly more multidisciplinary process instruction. A test for determining school ability was administered to each cohort sample as a means to establish that each cohort sample was similar to each other with respect to school ability. This was essential as it had been previously determined that school ability was the greatest predictor of student attainment of the science process skills.

Targeting a series of five research questions, this study demonstrated that there were significant increases in student science achievement scores from the onset to the conclusion of the study. Some evidence is presented to suggest that females were among those showing the greatest gains. In particular, the achievement scores of the content, inquiry skill and manipulative skill sub-tests over the course of the study demonstrated significant changes when student attainment of science mastery was examined. Utilizing the test to differentiate between student ability levels, it was also shown that students of low and moderate school ability significantly increased their performance on the manipulative skill portion of the test as compared to some higher ability students who demonstrated significant improvements in science content achievement. Additionally, this study determined that the students who were exposed to a process mathematics
approach as opposed to a traditional mathematics programme also collectively demonstrated improved performance in all sub-test areas. Finally, a series of multiple regression models confirmed much of the aforementioned matched-pair analyses suggesting that the improved scores were best predicted by the school ability measures and the number of years the student was enrolled in the programme.

Beatty (1999) conducted "A Qualitative Study of Secondary School Students' and Teachers' Perceptions of Motivating Influences Upon The Students' Academic Achievement".

This qualitative study attempts to identify those factors that play a key role influencing student motivation in school. As part of the study, researcher conducted guided interviews with four teachers and five students—three juniors and two sophomores. Researcher also distributed 205 surveys to the sophomore and the junior class in order to capture their beliefs about student motivational influences. The faculty and the students who served in this research study were from a metropolitan St. Louis Country School district.

From the teachers' perspective, motivation is a problem amongst the students and it is a topic that needs to be addressed at a secondary school level. Researcher identified some factors, which researcher felt influenced student motivation: class choice, grades and attitudes toward grades, the
influence of the school environment upon student motivation, and other factors that motivate the students.

From the start of the interview process, a discrepancy was identified between the teachers' interpretation of student motivation and the students' outlook of the situation. The teachers seemed to label the students as being more extrinsically motivated, yet extrinsic motivation did not appear to be as prevalent from the viewpoint of the students. The teachers viewed the students as not motivated or motivated for the incorrect reasons. The students, in their summation, appeared to be motivated and identified a number of factors that provided them motivation.

The students identified individual teacher expectations as factors that influence their motivation. Teachers with higher expectations motivated the students more than the teachers with lower expectations. Both the students and the teachers agreed that home played both a positive and a negative role in student motivation. In order to motivate the students, the teachers tried to make the classes practical and hands-on. The students also identified the practically of the classes as being a motivational force. Praise from parents and from teachers and a positive feeling as a result of their successes in classes both served as motivating influences in the eyes of the students.
Joanne (1969) studied “Gender, Achievement, Motivation, and Mental Health Among Adolescents in the 1990s”.

This dissertation explored gender difference in motivation, achievement, choices, and mental health among gifted and non-gifted adolescents in the 1990s. Data were from a longitudinal survey study of motivation, activity, choice, mental health, and peer and family relationships among 1179 European American children. The first study hypothesized that there would be few or no gender differences in mathematics and science motivation and achievement choices among high school students in the 1990s because of increased efforts to encourage young women to enter technology, physics, and applied mathematics field in recent decades. Overall, giftedness was a stronger determinant of attitudes and behaviors than gender. Growth curve hierarchical linear modeling (HLM) with an accelerated longitudinal design of three cohorts from first through twelfth grades showed that mathematics expectancies and values declined over time for all students, with the exception of gifted girls whose mathematics expectancies increased. There were no gender differences in mathematics, but there were gender differences favoring males in science expectancies and values in both ability groups. Cross-sectional analyses in high school showed that non-gifted girls took AP calculus less frequently than gifted boys. Girls in both ability had higher educational aspiration and expectations than boys, and gifted girls planned to
go into mathematics and physical science jobs more frequently than gifted boys. It is suggested that educators now need to focus on girls in science, and physics in particular. The second study hypothesized that gifted girls would experience more psychologic conflict over career vs. family and more academic anxiety and depression than their peers. Growth curve analysis with HLM showed that it was non-gifted girls, rather than gifted girls, who experienced the most psychological distress on all mental health indicators from seventh through twelfth grades. Furthermore, gifted girls' mental health was positively, and negatively, affected by their desire to have children. In sum, across both studies, it was non-gifted girls who had the lowest motivation and mental health. In addition to implications of these findings, the nature of giftedness in this sample is also discussed.

Cervantes and Rachel (1999) studied "The Condition of School Facilities As Related to Student Academic Achievement and Behaviour".

The purpose of this study was to examine the relationship between the school building condition and academic achievement and behaviour of students who are enrolled in Grades IV, VII, and XI in selected Alabama public schools. These school facilities were assessed by using the Guide for School Facility Appraisal Instrument (H. Hawkins and E.H. Lilley, 1992) in 6 major areas: school site, structural and mechanical, plant maintainability, school
building safety and security, educational adequacy, environment for education, and overall building condition.

The quantitative study of 19 schools was comprised of 8 unit schools, 4 elementary schools, 2 middle schools, and 5 high schools. The Stanford Achievement Test (IX ed.) reading and mathematics scores measured academic achievement, while the number of suspension rates at these selected schools measured student behaviour. The achievement scores and suspension rates were analyzed using the Pearson correlation statistical procedure to establish any possible relationship between the total building condition rating and the 6 major building categories.

In Hypothesis 1, findings in the unit schools indicated an inverse relationship between reading achievement and the school building category environment for education. Further, findings indicated a relationship between mathematics achievement and the building category school site. In Grade 11, across all schools, the relationship between reading achievement and the building category of school site was noted.

In Hypothesis 2, findings in the unit schools indicated an inverse relationship between the number of suspensions and three building categories: total building condition, structural mechanical, and educational adequacy. Another relationship was observed in the building category safety
and security. In Grade VII, across all schools, an inverse relationship was observed between the number of suspensions and 4 building categories: total building condition, structural mechanical, educational adequacy, and environment for education. Similarly, Grade XI, across all schools, indicated an inverse relationship between the number of suspensions and the building category educational adequacy.

The condition of school facilities represents a wide array of implications for students, as well as a broad spectrum of possible problems and accountability for communities across the nation. Providing school facilities that are well maintained and safe and that promote quality-learning conditions is an issue that needs to be addressed.

Condly (1999) studied "Motivation to Learn and to Succeed: A Path Analysis of The CANE Model of Cognitive Motivation".

Commitment and Necessary Effort (CANE) model of motivation, a modification of M. Ford's Motivation Systems Theory (MST) posits two stages in motivated behaviour. In stage one, positive or strong levels of self-efficacy, emotions, and values interact multiplicatively to predict goal commitment (or persistence). In stage two, self-efficacy and persistence predict the exertion of mental effort (the use of non-automatic elaborations). Together, persistence and mental effort are hypothesized to influence achievement.
343 urban high school students representing a variety of ability, ethnicity, and programme groups were surveyed on their perceptions of self-efficacy, emotionality, task value, persistence, and mental effort relative to their performance on a college-level laboratory assignment in their biology or chemistry class. Responses were analyzed using traditional multivariate statistical techniques and a structural equation modeling path analysis.

Self-efficacy was found to be highly correlated with persistence. Emotional state (mood) correlated significantly with persistence as well, but emotional trait (personality) did not. Values correlated significantly with persistence with the stronger values correlating more strongly than the weaker ones (i.e., importance correlated more strongly than interest, and interest than utility). The path analysis showed that general science self-efficacy (as compared to the lab-specific self-efficacy) had the strongest relationship with persistence, both through its direct effect and its indirect effects through specific self-efficacy importance, interest, and utility. Emotionality was found to be a non-factor in the path analysis.

The path analysis revealed no significant contributing factor to mental effort. The inverted-U nature of this factor may preclude any significant correlation with motivational variables such as self-efficacy and persistence. It
is concluded that better instruments need to be developed to measure students' use of non-automatic elaborations.

Overall fit of the CANE model was good (CFI = .908). The model's predictive and explanatory validity can be strengthened by refining the measure of task-related emotionality, improving the measure of mental effort, and in having a more uniform, broad-based measure of task achievement.

Mattern and Garland (1999) studied "Relationships Between Attitudes Toward The Achievement in Science For Rural Middle School Students: Patterns Across Gender".

Four causal models describing the relationships between attitudes and achievement have been proposed in the literature. The cross-effects, or reciprocal effects, model highlights the effects of prior attitudes on later achievement (over and above the effect of previous achievement) and of prior achievement on later attitudes (above the effect of previous attitudes). In the achievement predominant model, the effect of prior achievement on later attitudes is emphasized, controlling for the effect of previous attitude. The effect of prior attitudes on later achievement, controlling for the effect of previous achievement, is emphasized in the attitude predominant model. In the no cross-effects model there are no significant cross paths from prior attitudes to later achievement or from prior achievement to later attitudes.
To determine the best-fitting model for rural seventh and eighth grade science girls and boys, the causal relationships over time between attitudes toward science and achievement in science were examined by gender using structural equation modeling. Data were collected in two waves, over one school year.

A baseline measurement model was estimated in simultaneous two-group solutions and was a good fit to the data. Next, the four structural models were estimated and model fits compared. The three models nested within the structural cross-effects model showed significant decay of fit when compared to the fit of the cross-effects model. The cross-effect model was the best-fit overall for middle school girls and boys.

The cross-effects model was then tested for invariance across gender. There was significant decay of fit when model form, factor path loadings, and structural paths were constrained to be equal for girls and boys. Two structural paths, the path from prior achievement to later attitudes, and the path from prior attitudes to later attitudes, were the sources of gender non-variance. Separate models were estimated for girls and boys, and the fits of nested models were compared. The no cross-effects model was the best-fitting model for rural middle school girls. The new no attitudes-path model was the best-
fitting model for boys. Implications of these findings for teaching middle school students were discussed.

Ayers (1999) studied "The Relationship Between High School Facilities and Achievement of High School Students in Georgia".

Student achievement is affected by many variables. This study focused on one area that has received minimal attention through the years: the relationship between high school facilities and student achievement. This study explored the relationship between certain design features identified in the literature and student achievement as measured by the Georgia High School Graduation Test (GHSGT). The purpose of this study was to determine if a relationship existed between the selected design features and the GHSGT. The population of the study included 27 public high schools in two Regional Service Educational Area districts. Multiple regression analyses were conducted on the data set. Correlative variables including socio-economic status, educational background of the teachers, average number of years teaching, and the size of the student population of each school were used as variables in the equation. The Design Appraisal Scale for High Schools (DASH-I) was completed for each school to determine the total score for the educational facilities variable. This was also included in the regression equations as a correlative variable. Regression models were examined to
determine the amount of variance that was explained by DASH-I. Based upon the results of the analyses, school design variables explained approximately 6% of the variance related to the English and Social Studies, 3% of the variance related to the Science, and 2% of the variance related to both the Mathematics and Writing.

Deemer and Alysia (2000) studied “Classroom Goal Orientation in Secondary Classrooms: Revealing Links Between Teacher Attributes and Classroom Environments”.

Relationships among teacher belief, instructional practices, and motivational environments in high school science classrooms were examined in this study. High school science teachers (N = 90) and their students (N = 1680) completed surveys regarding their perceptions of mastery and performance goals in the classroom. Teachers also completed surveys about their levels of personal teaching efficacy, theories of intelligence, and perceptions of school culture. Both mastery and performance goals were found in the high school classrooms in this study, demonstrating that these goals were not orthogonal. Path analyses conducted on the models for mastery and performance goals revealed that teachers’ instruction practices and beliefs do not solely determine classroom goal structure. Contrary to hypotheses, in both of the models, evidence suggested that the relationship between teacher belief
variables and classroom goal orientation was not mediated by teachers' instructional practices. An examination of the direct effects between teacher belief variables and instructional practices revealed that personal teaching efficacy and perceptions of a mastery-oriented school culture were related to teachers' use of mastery instructional practices. The use of performance-oriented practices was predicted by perceptions of a performance-oriented school culture. Although no direct effects were hypothesized between teacher belief variables and classroom goals, a relationship was found between teachers' perceptions of mastery school cultures and mastery classroom goal structures. A similar relationship between performance school culture and classroom performance goals was not observed.

Findings are explained in the context of the secondary classroom, and suggestions are offered as to why several hypothesized relationships were not discovered. In addition, measurement issues concerning the assessment of performance goals and theories of intelligence are discussed. The findings also suggest that preservice and in-service training should focus on enhancing teachers' levels of efficacy. In addition, schools should support and reward teachers who pursue academic ventures, recognizing that teachers who display effort and persistence in their own learning endeavors will encourage these attributes in their own classrooms. Future research on classroom goals needs to consider the complex interactions of student, teacher, and school-
level variables in order to understand how classroom goal orientations are created.

Ye Renmin (2000) studied "The Effects of Teacher Characteristics, Beliefs, Relations With Students, and In-Service Education on Student Science Achievement".

This study investigated in the effects of science teacher characteristics, beliefs, and relations with students, and in-service education on student science achievement. The study also compared these effects on student science achievement by student gender and ethnicity.

Four factors of science teachers were independent variables, student science achievement was dependent variable and SES and previous science scores were control variables. The study revealed the relations between independent variables and dependent variables.

The correlation between four teacher factors, forty-one items and student science achievement were analyzed by Pearson correlation and Partial correlation. A three-way ANCOVA was used to compare the difference of influence of three category variables on the dependent variables. Correlation and ANCOVA were also used to compare of effects of teacher factors on student science achievement by student grade and ethnicity. Multiple Linear
Regression was used to analyze collective effects of four teacher factors on achievement. This study used sampling weights and design effects.

Pearson correlation showed that the correlation between teacher backgrounds and student science achievement was significant, but Partial correlation did not show significance for that correlation. The effects of teacher beliefs on student science achievement did not reach significant level after using design effects. Teacher relations with students had significant correlation with student science achievement at both conditions of control variables existing and not. Effects of teacher in-service training and school supports to in-service education on student science achievement did not reach significant levels.

This study supported the science researcher conclusions that some factors of science teacher backgrounds were related to student achievement. It established direct relationships between teacher beliefs and student science achievement. This study also revealed that teachers whose beliefs in their own abilities had positive effects on student achievement, but whose beliefs in methods did not. The relationship between teachers and students was an important factor to influence students' science achievement, especially to that of male students. The results of teacher in-service education would promote science teacher educators to consider providing more effective programmes.
and academic activities. The effects of previous science achievement and SES on student science achievement were very great in this study.

Cakan and Mehtap (2000) analysed “Interaction Between Cognitive Styles and Assessment Approaches”.

The present study investigated the interaction of cognitive style and assessment format (multi-choice (MC) and performance-based assessments (PBA) in second language proficiency. The participants consisted of 258 eight-grade students. The Eighth Grade Proficiency/Credit Exam: French researcher assessed the second language achievement of the students. The Group Embedded Figures Test assessed the cognitive style of the students. The study also examined study habits and attitudes of field-dependent (FD) and field-independent (FI) students toward the two assessment formats.

The study utilized a sequential mixed-model design, consisting of both quantitative and qualitative methods. Phase researcher consisted of a quantitative study investigating performance difference between FD and FI students on different test formats. Phase II consisted of a qualitative study to investigate assessment preference and study habits of FD and FI students.

Results revealed that cognitive style had a statistically significant effect on student performance whereas the effects of gender, ethnicity and socio-
economic status of the students were not significant. A two-factor split-plot analysis revealed a significant interaction of cognitive style and test format. FI students outperformed FD students in the MC, but no indication of such difference was observed for the PBA. Furthermore, FD students scored better on the PBA than they did on the MC. The FI students scored better on the MC. Overall, the study indicated that compared to multiple-choice format, the performance-based assessment of second language proficiency is less impacted by student attributes such as cognitive style, gender, ethnicity, and socio-economic status.

Qualitative interview with students and their teachers revealed that there are differences between study habits of FD and FI students, but no difference was observed in terms of their assessment preferences. Lincoln and Guba’s (1985) constant comparative method was utilized for the analysis of the results.

Carlson and Ann (2000) studied "Classroom Environment As Perceived By Successful and Unsuccessful Students".

This study explored the relationship between student academic performance and classroom environment in an introductory, college-level accounting course. Using a cross sectional correlation research design, the study focused on the influence of two sets of factors: (a) fit between the
preferred and actual classroom environments as perceived by the students and (b) demographics characteristics. The criterion variables were the quantitative scores from the Adult Classroom Environment Scale versions Form researcher (deal environment) and Form A (actual environment) and student academic success as measured by final grade. The population was total student enrollment in Principles of Accounting researcher during spring semester 1999 at two community colleges in the southeastern United States. The sample was composed of eleven selected sections at those two community colleges.

Overall, the test revealed no correlation between classroom environmental fit and academic success using Spearman's rho correlation coefficient and stepwise multiple regression analysis. The results of this study are not generalizable beyond these two community colleges. Descriptive data about this sample that was used in the analyses are available in this study.

Brown (2000) studied "What Students Are Saying About Science: Student Perspective of Meaningful, Effective and Ineffective Learning Experiences in Science Class".

Research studies have rarely incorporated the subjective experience of students as they are engaged in learning. When the students' position is viewed at all in a research study, it is usually viewed from the perspective of the adult educators' interests and ways of seeing. As a result, the most
conspicuously absent feature from the research literature is the first person voice of the student. With regards to science education specifically, few studies have focused on the students’ perspective of their experience in science. Therefore, the purpose of this study was to describe and understand student perspectives of meaningful, effective, and ineffective learning experiences in science class. The following served as guiding questions: (1) What do students describe as meaningful and effective learning experiences in science class? (2) What do students describe as obstacles to their effective learning in science class?

An interpretive research methodology was chosen for this study. Nine participants that took part in the study were grouped as self-directed, teacher-guided, and teacher-dependent learners. A variety of data gathering techniques were used including field notes, participant observations, interviews and focus groups. Throughout the study, inductive analysis was employed as a process for making sense out of the data. More specifically, the constant comparative method was used to categorize the data and facilitate the search for meaningful patterns. The analysis included a thick description of the students’ experience of science in the first person voice of the student.

The results of this study indicate that teachers play the fundamental role in the establishment of an effective learning environment and that
students' consider their improved understanding to be a key to their meaningful learning. In addition, the students' improved understanding requires that teachers are actively involved in their progress and are willing to explain concepts on an ongoing basis.

The study concludes by asserting that effective teachers must accommodate the needs of both self-directed and instructor-centered learners. Finally, it is argued that student feedback can be used to improve classroom effectiveness.

Tyrell and Marie (2000) studied "The Effects of Using Guided Notes and Reviews of Science Achievement For Male and Female Students".

The National Science Foundation predicts a shortage of scientists and engineers within the next 15 years. Some agree that the participation of women in science will be required to help meet the future demand for scientists (Malcom, 1990). Consequently, conscientious teachers search for learning strategies that provide opportunities for young women to achieve success with others in their science classes. This research concerns a note taking and teaching strategy that involves seventh grade science students. The investigation measured student achievement under three prescribed conditions. The treatment conditions were reviewing, guided notes, and guided notes with reviewing. For this experiment, the Solomon four-group
design was utilized. This 2 x 2 factorial design tested for treatment effect and pretest sensitivity. Data was collected on seventh grade boys (n = 119) and seventh grade girls (n = 139) in science. Comparisons were made between the boys and girls groups.

The results showed that achievement improved significantly when reviewing car using guided notes independently. The results also showed the significant improvements in achievement were not observed when participants used guided notes and reviewing together. Analysis was completed to measure how well the participants performed according to gender. This research showed that both boys and girls significantly improved their achievement in science equally well for all treatment conditions. This research went a step further by factoring in cognitive ability test scores and comparing them to the treatment results. This provided the researcher with information on which treatment condition worked best for high or low achieving students.

Nukeri and Jabulani (2000) conducted "An Intervention Programme me to Promote The Choice of Physical Science By Secondary School Learners".

This study designs, implements and tests an intervention programme me promoted the choice of Physical Science as a school subject by secondary school learners. The programme me is based on learner variables, in
particular achievement, self-concept and view of Physical Science as a valuable subject, as well as teacher variables, for example, teaching methods (demonstration and cooperative learning) and exposure to appropriate role models.

To test the intervention programme me, a questionnaire was administered as a pretest and post-test to two groups of grade nine learners from two similar schools. One school was the experimental group (where the programme me was implemented for a semester) while the other school was a comparison group.

A major conclusion from the study is that if investigator intends to promote the choice of Physical Science as a school subject by secondary school learners, learners should be exposed to programmes that may improve their achievement and self-concept in Physical Science, including their view of Physical Science as a valuable subject. Furthermore, learners should be exposed to teaching methods such as demonstration and cooperative learning and also to appropriate role models in Science. How learners' view of Physical Science as a valuable subject can be improved, needs further research. The fact that this aspect may be influenced by culture or socio-economic background is an important finding of the research.
Huybrechts (2000) studied "Integrating The History of Science Into A Middle School Science Curriculum".

This study examined the effect of incorporating the history of science into a middle school physical science curriculum on student attitudes toward science and the work of scientists. While there is wide support for including some science history in middle school science lessons within both the science and science-education communities, there is little curriculum designed to meet that objective. A series of five lessons was written specifically for the study. Each lesson included a brief biography of a scientist whose work was of historical significance, and a set of directions for duplicating one or more of the experiments done by that scientist. A thirty-questions, Likert scale survey of the attitudes of middle school students toward science and the work of scientists was also written for this study. The survey was administered to two groups of students in a single middle school:

One group – the experimental group – subsequently used the science history curriculum; the second (control) group did not. The same attitude survey was re-administered to both groups of students after study of the science-history curriculum was completed.

The results of the study indicated that there was no statistically significant difference between the pre-test and post-test scores of either the
experimental or control group students. Further analysis was done to
determine whether there were differences between the pre-test and post-test
scores of boys and girls, or between "regular" or "honor" students. In both
cases no statistically significant difference was found.

Kirk (2000) studied "The Relationship of Attitudes Toward Science,
Cognitive Style, and Self-Concept to Achievement in Chemistry at The
Secondary School Level".

There is currently a crisis in science education in the United States. This
statement is based on the National Science Foundation's report stating that the
nation's students, on average, still rank near the bottom in science and
mathematics achievement internationally.

This crisis is the background of the problem for this study. This
investigation studies learner variables that were thought to play a role in
teaching chemistry at the secondary school level, and related them to
achievement in the chemistry classroom. Among these, cognitive style (field
dependence/independence) attitudes toward science, and self-concept had
been given considerable attention by researchers in recent years. These
variables were related to different competencies that could be used to measure
various types of achievement in the chemistry classroom at the secondary
school level. These different competencies were called academic, laboratory,
and problem solving achievement. Each of these chemistry achievement components may be related to a different set of learner variables, and the main purpose of this study was to investigate the nature of these relationships.

Three instruments to determine attitudes toward science, cognitive style, and self-concept were used for data collection. Teacher grades were used to determine chemistry achievement for each student.

Research questions were analyzed using Pearson Product Moment Correlation Coefficients and t-tests. Results indicated that field independence was significantly correlated with problem solving, academic, and laboratory achievement. Educational researchers should therefore investigate how to teach students to be more field independence so they can achieve at higher levels in chemistry.

It was also true that better attitudes toward the social benefits and problems that accompany scientific progress were significantly correlated with higher achievements on all three academic measures in chemistry. This suggests that educational researchers should investigate how students might be guided to manifest more favorable attitudes toward science so they will achieve at higher levels in chemistry.
An overall theme that emerged from this study was that findings refuted the idea that female students believed that science was for males only and was an inappropriate and unfeminine activity. This was true because when the means of males and females were compared on the three measures of chemistry achievement, there was no statistically significant difference between them on problem solving or academic achievement. However, females were significantly better in laboratory achievement.


For over three decades, the gender gap in science education has received attention from teachers, policy makers, and scholars of various disciplines. During this time, feminist scholars have posited many reasons why the gender gap in science and science education exists. Early feminist discourse focused on girls’ "deficits", while more recent work has begun to consider the problems with science and school science in the quest for a more gender inclusive science. Specifically, feminist scholars advocate a transformation of both how students learn science and the science and the science curriculum that students are expected to learn.
This study was designed to examine more deeply this call for a changed science curriculum and its implication for girls' participation, interest, and scientist identities. If investigator reinvisioned ways to "do" science "learn" science, and "be a scientist" in school science, would girls come to see science as something interesting and worth pursuing further? This question framed researcher ethnographic investigation.

Researcher examined the culturally produced meanings of "science " and "scientists" in to high school physics classroom (one traditional and one non-traditional class framed around real-word themes) how these meanings reproduced and contested larger sociohistorical (and prototypical) meanings of science and scientist, and how girls participated within and against these meanings. The results complicate the assumption that a classroom that enacts a non-traditional curriculum is "better" for girls. This study explained how each classroom challenged socio-historical legacies of school science in various "spaces of possibility" and how prototypical meanings pushed the potential of these spaces to the margins. Girls in the non-traditional class, though attracted to alternative practices, struggled with the conflicting promoted student identities that did not allow them easy access to "good student" identities. in neither class were girls' perceptions of what it meant to do science and be a scientist challenged. And, in neither class did girls connect to a legitimate scientist identity. These findings leave unanswered the
question of whether changes in pedagogy and curriculum alone will produce more gender fair school science.

Turpin and Jordan (2000) conducted “A Study of The Effects of An Integrated, Activity-Based Science Curriculum on Student Achievement, Science Process Skills, and Science Attitudes”.

This study investigated the effect of an integrated, activity-based science curriculum on science content achievement, science process skills, and attitudes toward science. The research was conducted in seven Integrated Science (IS) classrooms using IS for the first time and seven traditional science classrooms. The instruments included the Iowa Test of Basic Skills (ITBS) to measure science achievement, the South Eastern Regional Vision for Education (SERVE) Science Process Skills Test to measure science process skills, and the SERVE Science Attitudes Survey to measure student attitudes.

In the experimental group, 532 seventh grade ITBS Science scores were matched to same student ITBS sixth grade scores. In the control group, 450 matches of seventh grade ITBS Science scores were matched to same student ITBS Science sixth grade scores. Analysis of Covariance was use to determine group difference with the sixth grade score serving as the covariate. The experimental group had a significantly higher ITBS Science adjusted posttest mean when compared to the control group.
Students were given the SERVE Process Skills Test as a protest at the beginning of the school year and were post tested with the same test at the end of the school year. In the experimental group 531 matches were made pretest to posttest while 398 matches were made in the control group. The experimental group adjusted posttest mean score on the process skills test was significantly higher than the control. When specific science process skills were examined, the experimental group adjusted posttest mean score was significantly higher than that of the control group on the science process skills of Identifying Experimental Questions, Identifying Variables, Designing Investigations, and Interpreting Data. The experimental and control groups showed no significant differences in adjusted posttest means on the science process skills of Formulating Hypotheses and Graphing Data.

Students were also given the SERVE Attitude Survey as a pretest at the beginning, of the school year and at the end of the school year as a posttest, with the same matches being achieved as with the process skills test. The attitude adjusted posttest means of the experimental and control groups were not significantly different.
Voorhis, Landis (2000) studied "The Effects of Interactive (Tips) Homework on Family Involvement and Science Achievement of Middle Grade Students".

The purpose of the study was to investigate the effects of interactive and non-interactive science homework assignments on family involvement in homework, homework completion and accuracy, student science achievement, and student and parent attitudes about science. Most previous research on homework has examined what parental involvement results naturally, without prompts or instruction from teachers. In contrast, this study experimentally examined the effects of teacher prompts to parents for involvement in their children's homework. Two hundred and fifty-three students from 10 classes of sixth and eighth grade students participated in the study that lasted 18 weeks of the school year. Six classes of students completed the TIPS (Teachers Involve Parents in Schoolwork) interactive homework assignments, and four classes completed the non-interactive assignments that contained the same content and questions as the TIPS assignments. TIPS students received instructions to involve a parent or other family partner in certain sections of the homework assignment. ATIPS students received the same assignment with no instruction to involve another person. Results indicated that TIPS students more often involved parents in their science homework assignments than ATIPS students. However, TIPS science students reported to more parental
involvement in homework than ATIPS students in subjects not assigning interactive homework. Therefore, the TIPS instructions elicited more parental involvement in homework than the ATIPS assignments. TIPS students did not differ from ATIPS students in the percent of homework returned or accuracy. Students who rated the homework more positively and involved families regularly returned more homework assignments than students who did not do so. TIPS students did earn significantly higher science report card grades than ATIPS students after controlling for background variables, teacher effects, and percent of homework returned. Exploratory analyses of matched student and parent data suggest the importance of both student and parent data in research of interactive homework. The results of the study indicate the benefits of well-designed interactive homework for levels of family involvement, science attitudes, and science achievement.

Chan and Ke-Sheng, (2000) studied "The Impact of Infusing The Interactive Historical Vignettes Into X Grade High School Science Instruction in Taiwan on Student Understanding of The Nature of Science and Science Achievement".

The purpose of the study was to evaluate whether the Interactive Historical Vignettes (IHVs) can be used as an effective tool in current high school science education in Taiwan to facilitate students' understanding of the
nature of science without compromising their science achievement to accomplish this goal, this study employed a quasi-experimental, pretest-posttest, control-group experimental design to investigate the impact of infusing the IHVs into regular high school science instruction in Taiwan on 94 X grade female students' understanding of the nature of science and science achievement. The independent variable used in the experiment was the IHVs treatment. The dependent variables were students' overall as well as specific understanding of the amoral, creative, developmental, parsimonious, testable and unified nature of science and their science achievement. Administering the Chinese version of the Nature of Scientific Knowledge Scale (CNSKS) and Physics Achievement Test (PAT) prior to and immediately after the 12-week IHVs treatment collected pretest and posttest measures of all the dependent variables. The analysis of covariance (ANCOVA) was used to analyze the data and test the eight research hypotheses of the study.

Overall, the results of statistical analysis indicated that the IHVs did significantly enhance the participating students' understanding of the creative and testable nature of science without negatively affecting their achievement in the required science content. As a result, it was concluded that the IHVs educational strategy could indeed be used as an effective tool in current high school science education in Taiwan to facilitate the development of students'
understanding of the nature of science without producing any negative side effects on their science achievement.


The education of gifted adolescents that underachieving is a significant problem that impacts on the child's educational opportunities and possible career trajectory in Taiwan. In recent years, many researchers have investigated the relationship between motivational orientation and achievement. This study used an occupational science paradigm to examine the relationship between motivational orientation, school-related occupations, and achievement. Participants were 91 high achieving gifted and 57 low achieving gifted junior high school Taiwanese students from northern, middle, and southern Taiwan. Participants provided information on age, IQ score, percentile ranking, sex, and social economic status. They also completed The Occupational Questionnaire (Smith, 1986) and The Scale of Intrinsic versus Extrinsic Motivation (Harter, 1981).

In this investigation, there were four questions addressed. The results indicated that school-related occupational were delineated as on-campus academic, school-support, and off-campus academic school-related occupations. There were statistically significant relationship between
achievement and time expended, and importance of school-related occupations in Taiwanese gifted children. Secondly, there were statistically significant relationship between achievement and motivational orientation on Preference for Challenge, Independent mastery, Internal criteria, and total scores in Taiwanese gifted children. Thirdly, the results indicated that there were statistically significant positive linear relationship between motivational orientation in total scores and time expended, and interest in school-related occupations in Taiwanese gifted children.

This study has cross-cultural comparisons to U.S. students regarding the time expended on on-campus and off-campus school-related occupations for teenagers' gifted children, and regarding the comparisons on the cultural value of schooling. Second, this study has the cultural implications of the relationship of societal value and academic achievement; and the relationship of motivational orientation for school-related occupations and schooling in Taiwan. Lastly, the implications for Occupational Science and children's education were also discussed. The present investigation partially supported the hypotheses. There may four reasons for the unsuccessful results. Therefore, there were five topics for future study suggested.

The objectives of the study were: (1) To study the effectiveness of ITM in terms of students' (a) Higher mental ability in science, (b) General Creativity, (c) Scientific Creativity, (d) Inductive Reasoning Ability, (e) Theory building Capacity, (f) Achievement in Science and (g) Reaction towards ITM. (2) To compare ITM with Traditional Method (TM) in terms of students' (a) Higher mental ability in science, (b) General Creativity, (c) Scientific Creativity, (d) Inductive Reasoning Ability, (e) Theory building Capacity and (f) achievement in Science separately by taking Intelligence, Socio-economic State (SES), Scientific aptitude and previous achievement in Science as covariates. (3) To study the influence of Treatment, Sex and their various interactions on students' (a) Higher mental ability in science, (b) General Creativity, (c) Scientific Creativity, (d) Inductive Reasoning Ability, (e) Theory building Capacity and (f) achievement in Science separately. (4) To study the contribution of previous achievement in Science, General Creativity, scientific creativity, and Scientific Aptitude in the prediction of (a) Higher mental ability in science, (b) Inductive Reasoning Ability, (c) Scientific Creativity, (d) Inductive Reasoning Ability, (e) Theory building Capacity and (f) achievement in Science separately of the students taught through ITM. (5) To study the
change in Attitude towards science of the students treated through ITM as well as treated through TM. (6) To study the change in students’ reaction towards ITM.

The sample comprised of 226 students (132 boys and 94 girls) of class IX of different schools. The study was an Experimental in nature and it employed Pretest–Posttest Non equivalent Control Group Design. The tools used were Intelligence test, SES scale, Higher Mental Ability in Science test (HME in Science), General Creativity test (GC), Science Creativity test (SC), Inductive Reasoning Ability test (IRA), Theory Building Capacity test (TBC), Achievement in Scientific Aptitude scale (SA), Science Attitude scale and Reaction Towards ITM scale.

The major findings of the study were: (1) ITM was found to be more effective than TM in terms of GC, SC, IRA, TBC, achievement in Science and reaction towards ITM, but in case of HMA in Science ITM and TM were found to be equally effective (2) ITM was found to be significantly superior to TM in terms of GC, SC, IRA, TBC, Achievement in Science, but ITM was found to be insignificant in terms of HMA in Science when the groups were matched statistically with respect to Intelligence, SES, scientific Aptitude and precious Achievement in Science. (3a) Treatment did not produce significant influence on HMA in Science whereas GC, SC, IRA, TBC and Achievement in Science
were significantly influenced by treatment. (3b) Sex did not produce significant influence on HMA in Science, GC, IRA, and Achievement in Science whereas SC, TBC were significantly influenced by Sex. (3c) Area did not produce significant influence on HMA in Science, SC, IRA, and TBC whereas SC, TBC were significantly influenced by Area. (3d) Interaction between treatment and Sex did not influence significantly HMA in Science, GC, IRA, TBC and Achievement in science, whereas SC was significantly influenced. (3e) Interaction between Treatment and Area did not influence significantly HMA in Science, IRA whereas GC, SC, TBC and Achievement in Science were significantly influenced. (3f) Interaction between Sex and Area did not influence significantly HMA in Science, GC, SC, IRA, and Achievement in science, whereas TBA was significantly influenced. (3g) Interaction among Treatment, Sex and Area did not influence significant HMA in Science and GC, whereas SC, IRA, TBC and Achievement in Science were significantly influenced. (4a) HBA of ITM group could be predicted through previous Achievement in Science and SC. (4b) IRA of ITM group did not contribute substantially. (4c) TBA of ITM group could be predicted through GC and SC. (4d) Achievement in Science of ITM group could be predicted through previous Achievement in Science and scientific aptitude. (5a) HBA and IRA of TM group did not contribute substantially. (5b) TBC of TM group could be predicted through previous Achievement in Science. (5c) Achievement in
Science of TM group could be predicted through previous Achievement in Science and GC. ITM did bring about significant favorable change in the class IX students' reaction toward ITM where as ITM did not bring changes of those students.

Ruby and Michael (2001) studied "Hands-On Science and Student Achievement".

From the late 1950s through today, hands-on science has been promoted as a method of science instruction. Currently, recent national science reform efforts seek to temper its role. However, no consensus has been reached on the relationship of hands-on science to student achievement though this topic has been researched since the turn of the 20th century using various methods. To improve upon the literature, this work addresses three major limitations of past research – the lack of data on performance assessments of student achievement, the need to control for factors affecting both hands-on science and test scores, and the potential for a differential relationship by student ability.

This work focuses on three research questions: (1) whether hands-on science is positively related to student achievement as measured by standardized test scores using both multiple choice and performance tests, (2) whether this relationship is stronger when using performance tests, and (3)
whether this relationship differs by student ability. Investigator apply regression analysis to two data sources. The primary data set is the 1994 RAND Survey of 1400 VIII grade students and their teachers in Southern California that includes multiple choice and performance test scores. A second data source is the nationally representative NELS: 88 with a focus on the VIII grade student sample.

The initial findings vary by source of report, student or teacher, on the level of hands-on science. When accounting for the quality of the reports, the results show an association between the level of hands-on science and student test scores for both multiple choice and performance tests. The results find little difference for this relationship by type of test. Nor do they show strong evidence for a differential relationship due to student ability. These findings support the promotion of hands-on science at the middle school/junior high level while rising a concern about current science reform attempts to reduce and redirect its use. They also provide little evidence to support performance test programmes on the grounds that they better reflect what is learned though hands-on instruction. Caveats on the findings and further research needs are discussed.

Jiang and Guang-rong (2001) studied “Class Environment and Its Relations to Teacher Style and Student Development".

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The class environment has a peculiar value to the development of students under the school system in China. This study focused on the structure of class environment in Chinese schools, the influence of the class environment to the development of pupils, and the impact that the head teacher of a class imposes on the class environment.

It has been discovered that class environment has a multidimensional structure. The main dimensions include teacher-student relationship, student-student relationship, order and discipline, competition, and learning load. All these 5 dimensions are relevant to the developmental results of students. A 5-subscale questionnaire entitled researcher Class was developed to measure the dimensions.

Life satisfaction, school adaptation, and trait anxiety were selected as the criteria for evaluating the development of the students. With a 2-level Hierarchical Linear Model (HLM) it was found out that both at the individual level and the class level of analysis, the class environment was a strong predictor of the development of students. This effect was even stronger when investigator predicted the average development of a class based on the average perception of the class.

The Leary-Wobbles model, a two-dimension structure to describe the interpersonal teacher behaviour, was used in the study. The result has
showed that there is very close relation between the teacher style (characteristics in interpersonal teacher behaviour) and the class environment. Each of the variances in the dimensions of the class environment has a significant proportion that can be interpreted by the teacher style. When comparing to other factors, which includes sex and years of teaching of a teacher, the school identity and the size of a class, and the average SES of the students’ families in a class, the teacher style has the strongest effect on the class environment.

A set of hypothetic models about the relationships among the class environment, the teacher style, and the outcome variables of the students has been tested by applying structural equation model (SEM). The results support the main hypotheses that the class environment had direct influence on the students’ outcomes, and the class environment itself is affected by the head teacher’s interaction style, whereas the class environment mediates the main effects of the teacher style on the students’ outcomes.

Utne, Stephen, (2001) studied “Relationship Between Student Socioeconomic Status and Perceptions of School Environment, Academic Achievement, and School Attendance”.

An historical perspective of the effects of student socioeconomic status (SES) on school satisfaction and performance begins with the Coleman Report
and shifts to the Effective Schools programme of Brookover, Edmonds, and associates. On the one end of the continuum was the notion that school could make no impact on student performance with respect to SES. On the other end of the continuum, Effective Schools held that with the proper characteristics in place, school could have an effect on student performance irrespective of SES.

This quantitative study was concerned with the statistical relationship between fifth grade elementary school student socioeconomic status (SES) perceptions of their school environment, academic performance, and school attendance. Four research questions were presented dealing with each of the three dependent variables and the relationship between the three variables. Sample schools were selected from high and low SES schools in a midwestern city. Student samples were selected from student eligible for federal free school lunch and students not eligible for free lunch. Student perceptions of school environment were measured by the administration of researcher School Inventory (Fraser, Anderson, and Walberg, 1982) to 108 fifth grade students in 14 schools. Students were selected from lists of eligible free and non-free school lunch students. The Fall 2000 administration of the Stanford Achievement Test, Ninth Edition was the measure of academic achievement. Percent of daily attendance from the 1999-2000 school year was the measure of school attendance.
This study found differences in SES school types in two subscale scores of researcher School Inventory. The study found differences in both SES school type and SES student type for all SAT-9 subtests and total battery. No differences were found in percent of daily school attendance with either SES school or student type. Statistically significant correlations were found between several student perceptions of school environment, academic achievement, and school attendance to support research question four.

The data from this study suggest that significant school effects are apparent in two dependent variables. Significant findings were present with respect to student perceptions of the school environment and academic achievement. Intuitively, student perceptions of satisfaction would be found where there was a predominance of high SES students and friction would be evident in the presence of low SES students. Intuitively, academic achievement would be higher in schools with predominantly high SES students. But, if free lunch students from high SES schools score better on standardized academic achievement tests, is this a function of the school or SES effects?
Paolucci and Jean (2001) studied "Gender Roles and Science Beliefs and Their Relationship to Science Interest".

This study investigated adolescents' views about the nature of science (NOS) and conceptions of their gender identities, and revealed whether these conceptions and views are related to their science interest. Participants were 566 high school students enrolled in chemistry courses at three high schools in a New England state. A questionnaire was used to assess participants' science interest, gender role perceptions, and views about science, as well as to provide background and mathematics and science achievement data.

The study found that while student scores of NOS understanding did not differ by gender, some significant differences were noted on the student responses to statements about science. Students with higher-than-average science interest scores responded to these statements differently than students with lower science interest scores; their responses tended to more closely match statements about NOS taken from current reform documents. The study also found that mathematics and science achievement, masculinity scores, and NOS scores accounted for a greater variance of science interest for girls than for boys, though all three also contributed significantly and positively to the regression equation for boys. These predictor variables predicted membership to the lower or higher science interest groups, but could not
predict students’ career aspiration groups. Thus, other mediating factors not considered in this study may translate high science interest to science career aspiration. The results of this study coed prior research, which found that science and mathematics achievement and masculinity are positively and significantly related to science interest for boys and girls. Moreover, the study found that achievement in mathematics and science courses is a greater predictor of science interest for girls than for boys.

The results of this study provides a rationale for incorporating the nature of science into the science curriculum. Moreover, since the science interest of boys was also found to be related to NOS understanding, these curricular changes may positively affect all students.

Katz and Alicia (2001) studied “The Relationship Between Learners’ Goal Orientation and Their Cognitive Tool Use and Achievement in An Interactive Hypermedia Environment".

This study investigated the interrelated and combined effects of learners’ goal orientation (GO) on their cognitive tool use and achievement in an interactive hypermedia environment (IHME). Results can assist educators and designers to understand the active roles of learners’ goal orientations and cognitive tool use within and for the design of learner-centered IHMEs. Cognitive tools included bookmark, find, glossary, help, map, and notebook. A
mixed-methods approach was employed with quantitative investigation as the primary method and qualitative investigation as secondary. A total of 50 African American and Latina American undergraduate females from two data collection sites constituted the sample population. Random sampling identified 2 African American and 12 Latina American participants from a large southwestern state university. Purposive sampling identified 46 African American participants from a small southern state Historically Black College and University. Seven participants were interviewed regarding their experience with the culturally and gender appropriate hypermedia treatment entitled *HIV and AIDS Prevention Education for Women of Color.*

Data were collected via survey instruments; computer generated tracking files, and telephone interviews using depth interviewing. ANOVAs and multiple regressions were used to analyze effects and relationships. Interviews were transcribed and analyzed using inductive analysis. Forty-three participants were identified as task (T) oriented learners, 4 as performance-approach (PAPP) and 3 as performance-avoid (PAV).

Results indicated that learners’ different GOs demonstrated different strategies of cognitive tool use and achievement outcomes in an IHME. PAV learners used the map tool and a total amount of all tools significantly more than their T and PAPP cohorts. A significant positive relationship was found...
between achievement and the amount of time (in minute) the glossary tool was used. A significant negative relationship was found between achievement and the number of times the glossary tool was used. This study corroborates previous studies that found variant learner characteristics to elicit adaptive and maladaptive behaviours and achievement outcomes. Further research is needed to investigate the effects of learners' dynamically changing GOs on their cognitive tool and self-regulated learning strategy use in hypermedia and traditional learning environments, respectively. The implications of learners adopting multiple and borderline GOs require further investigation.


The present study investigated the effect of reference material when it is used with self-explanation on cognitive skill learning. The main objective of this study was to investigate if there was an interaction effect between self-explanation and availability of reference materials.

The independent variables of this study were self-explanation (high/low) and the availability of reference materials (available/not available). The dependent variable of this study was the result of an immediate post-test.
Seventy-three college students studied computer-based instruction on the topic "permutation" in mathematics. The participants were randomly assigned either to the reference materials available group or to the reference materials not available group. All the participants were promoted to explain the content to them while they studied the target instruction. Participants were divided into either high self-explainer or low self-explainers based on the amount of self-explanation they made.

No interaction effect between self-explanation and availability of reference materials on the result of cognitive skill learning was found. Self-explanation effect was replicated. The result did not show an effect of reference materials.

Pierre-Pipkin and Jean (2001) studied "The Impact of School Climate on African-American Student Achievement in The Middle Schools".

The purpose of this study was to examine the influence of selected demographic and school variables on the academic achievement of middle school students. Specifically, the researcher sought to determine what effects the variables, school climate (open, closed, engaged and disengaged); ethnicity of the principal (black, and white); and income status of the school's community (Low-income, Middle-income and Upper-middle income) separately and combined, would have on the academic achievement of middle
school students on the mathematics and reading sections of the state mandated test – the Texas Assessment of Academic Skills (TAAS).

A factorial research design was employed in the study. The research design involved surveying one group of respondents from each of the six middle schools (teachers and professional staffs); and random sampling of VIII grade students, who took the TAAS test, in the six middle schools.

The Organizational Climate Descriptive Questionnaire - Revised for Middle schools (OCDQ-RM) was administered to respondents in each of the six middle schools. The researcher sought to determine the perceived school climate as being, open, closed, engaged or disengaged. From a total of 1548 eighth-grade students, 288 students were randomly selected for the study.

Using ANOVA to analyze the parametric data, the researcher examined the interactions of the independent variables, separately and combined, on the dependent variables – the mathematics and reading performance of VIII grade students on the TAAS test. Hypotheses generated for this study were tested at the .05 levels of significance or better.

School climate was found to be the only significant factor influencing school achievement. Students in schools perceived as engaged, outperformed their eight grade counterparts on the mathematics and Reading sections of the
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TAAS test. No interaction effects were present between the independent variables.

African-American students, who resided in communities of comparable income levels as their white counterparts, performed equally as well or better on the mathematics and reading sections of the TAAS test. However, there were indications that African American students from low-income communities, who attended schools in higher income communities, performed 15 or more points below their white counterparts in both reading and mathematics.

Honigsfeld (2001) made "A Comparative Analysis of The Learning Styles of Adolescents From Diverse Nations By Age, Gender, Academic Achievement Level, and Nationality".

Previous research conducted in the United States and selected countries revealed that students' learning-style preferences were significantly discriminated by age, achievement, gender, and cultural differences. This researcher further investigated the learning-style characteristics of 1,637 adolescent from five countries- Bermuda, Brunei, Hungary, Sweden, and New Zealand. She analyzed their similarities and differences by age, gender, academic achievement, and nationality, and she also explored the interactive relationships among these four factors and adolescents' learning-style
preferences. The English or appropriate foreign language (Hungarian, Malay, and Swedish) versions of the Learning Style Inventory (LSI) (Dunn, Dunn and Price, 1996) for Grades 5–12 were used. For descriptive statistics, means and standard deviation were calculated. For inferential statistics, univariate analyses of variance (ANOVAs) t-tests, a multiple analysis of variance (MANOVA) and Scheffe post-hoc tests were applied. A discriminant analysis also was conducted for one subset of the data. The alpha level was established at the $p < .05$ levels.

Findings supported that: (a) 16 of 22 learning-style elements (light, persistence, design, responsibility, structure, learning alone versus with peers, authority-figure oriented, learning in several ways, auditory, visual, and tactual perceptual strengths, intake, late morning, afternoon, and being parent – and teacher-motivated) significantly discriminated among 13-, 15-, and 17-year-old students; (b) 8 elements (motivation, persistence, responsibility, learning alone versus with peers, learning in several way, kinesthetic perceptual strength, and being parent- and/or teacher-motivated) differentiated between males and females; (c) 15 of the 22 learning-style elements (light, temperature, self-motivation, persistence, responsibility, learning alone versus with peers, authority-figure oriented, learning in several ways, visual and tactual perceptual strengths, evening versus morning, late morning, afternoon, and being parent-and teacher-motivated) significantly
discriminated among the gifted, high-/average- and low-achieving students; (d) 21 learning-style variables (all except the auditory perceptual preference) significantly distinguished among the student populations in the five participating countries; and (e) five significant interacting were found for overall learning-style preferences when country was on of the interactive factors: age-by-country, gender-by-country, achievement-by-country, age-by-gender-country, and age-by-achievement-by-country. These findings supported and supplemented previous research by Dunn, Milgram and Price (1993) Ingham, Ponce Meza, and Price (1998) Lo (1984) and Pengiran-Jadid (1998).

Jeffery and Shird (2001) studied "High School Science Teacher Perceptions of the Science Proficiency Testing as Mandated by the State of Board of Education".

There is correlation between the socioeconomic status of secondary schools and scores on the State of Ohio's mandated secondary science proficiency tests. In low scoring schools many reasons effectively explain the low-test scores as a result of the low socioeconomic. For example, one reason may be that many students are working late hours after school to help with family finances; parents may simply be too busy providing family income to realize the consequences of the testing programme. There are many other
personal issues students' face that may cause them to score poorly and the test. The perceptions of their teachers regarding the science proficiency test programme may be one significant factor. These teacher perceptions are the topic of this study.

Two samples groups were established for this study. One group was science teachers from secondary schools scoring 85% or higher on the XII grade proficiency test in the academic year 1998-1999. The other group consisted of science teachers from secondary schools scoring 35% or less in the same academic year.

Each group of teachers responded to a survey instrument that listed several items used to determine teachers' perceptions of the secondary science proficiency test. A significant difference in the teachers' perceptions existed between the two groups. Some of the ranked items on the form include teachers' opinion of: (1) Teaching to the tests; (2) School administrators' priority placed on improving average test scores; (3) Teacher incentive for improving average test scores; (4) Teacher teaching style change as a result of the testing mandate; (5) Teacher knowledge of State curriculum model; (6) Student stress as a result of the high-stakes test; (7) Test cultural bias; (8) The tests in general.
Guy (2001) studied "Student Achievement and School Conditions: Examining The Relationship in West Virginia's High Schools".

The purpose of this study was to determine what relationship, if any, existed between building condition and student achievement in West Virginia's high schools. Since every West Virginia school district was required to submit a Comprehensive Education Facility Plan (CEFP) for the next ten years to the State School Building Authority in January of 2000, the research used the facility evolution instruments that were a part of this document. Building condition comprised the three facility evaluation that are part of the CEFP as well as the age of the building, the density of the student population, and the size of the school.

The population of the study was 119 of the 126 high schools operating in West Virginia during 1998-1999 school year. Student achievement involved the April 1999 results on the Stanford Nine Achievement Tests. It is well established that the biggest predictor of student achievement is socioeconomic status (SES). Therefore, once building condition was determined (below average, average, and above average) an analysis of covariance was conducted between building condition and student achievement, with SES as a covariate.
The results of this analysis were mixed, with the general conclusion that there is little significance in the relationship between building condition and student achievement as constituted in this study. It is interesting to note that reading scores and the site evaluation were strongly correlated; that mathematics achievement and the building component evaluation were strongly correlated; and, that science achievement and the facility space evaluation were strongly correlated, albeit as building condition improved, science achievement went down.

Of some interest is the conclusion that the best buildings in the state contained students with a higher level of poverty as measured. Further, it is interesting to note that the work of the School Building Authority seems to be leveling the playing field for students of poverty. There is little variation among test scores of students with high rates of poverty in above average buildings and more affluent students in below average or average buildings.


For decades, educators and researchers have attempted to design educational interventions and programmes that narrow the academic achievement gap between African-American and White students. Historically, much of their work has been based on comparable racial studies. This type of
research, although excellent for identifying racial similarities and differences, does not address the disparity of academic achievement demonstrated within the African-American population.

The focus of this investigation was to determine if urban, low-socioeconomic status, African-American students who were classified as academic achievers demonstrated higher levels of achievement motivation than students from a similar background who were classified as academic underachievers. Gender and grade levels were explored to determine their impact on the students reported levels of achievement motivation as measured by Schultz’s Achievement Motivation Inventory (AMI). The study’s 277 participants were elementary school students (intermediate grade levels 5–6, upper grade levels 7–8) from one large urban, inner city, low-income community.

This study revealed that urban, low-socioeconomic status, African-American students classified as academic achievers attained significantly higher total AMI scores than students who were not classified as academic achievers. Female students attained significantly higher total AMI scores compared to male students. However, gender interacted with grade levels. Intermediate grade level males scored significantly lower total AMI score than intermediate females, whereas in the upper grades, there was no significant
difference between male and female students on total AMI scores. Intermediate female students scored significantly higher on total AMI scores than upper grade female students. There was no significant difference between male students in the grade levels.

The finding of this investigation illustrates that intra-group similarities and differences on achievement motivation exist in low income, inner-city African-American elementary-school students and are linked to academic achievement. Further research is needed to fully understand this phenomenon.

Melenson and Faith (2001) studied "Achievement in and Attitudes Toward the Science of Sound, by Middle School Students, Grades Five Through Eight, Both Overall and by Gender.

This study explores the relationship, among middle school students, between the understanding of a physical science topic, sound, and expressed attitudes toward topics with a strong sound component. Further, it assesses these differences in achievement and attitude by grade level and by gender. An attitude inventory, comprised of 30 Likert-type questions, and a concepts-of-sound achievement instrument, comprised of 30 multiple-choice questions, were administered to approximately 1,300 students in grades five, six, seven, and eight, the middle school grades, in a variety of locations within a single school district in the Intermountain West.
Results indicate that during the middle school years there is no significant difference between males and females in physical science achievement on the topic of sound energy. Results additionally indicate that, contrary to researched literature, throughout the middle school years females, as a group, do not have poorer attitudes than males toward the physical sciences; indeed, in grades five and eight female attitude responses were significantly more positive than male attitude responses.

Overall, attitude correlates with knowledge. When positive attitude toward learning about sound diminishes, incremental knowledge about sound diminishes.

Results of this study may be utilized in determining whether instructional and further research efforts should be directed toward methods for improving achievement in and attitudes toward the physical sciences. It is anticipated that improved methods for instilling positive attitudes and imparting greater knowledge would result in more students, especially females, pursuing advanced physical science studies and related occupations.

Nowak (2001) studied "The Implications and Outcomes of Using Problem-Based Learning to Teach Middle School Science".
Problem-based learning (PBL) is an educational approach where a purposefully ill-structured problem initiates learning and the teacher serves as a coach instead of an information repository (Gallagher and Stepien, 1996). This approach is becoming a very popular curricular innovation, especially at the middle and secondary levels. PBL is necessarily interdisciplinary: By modeling real-world problems, which are seldom unidisciplinary, students are required to cross the traditional disciplinary boundaries in their quest.

Schrage and Gregg (2001) studied "The Impact of Block Scheduling on Student Achievement, School Climate, and Curriculum: A Survey of Midwestern High Schools".

This dissertation examined the perceptions of Midwestern high school principals or their designees regarding the impact of block scheduling on achievement, student behaviour, school climate, specific subject areas, and curriculum and instruction. The study also looked at the types of information respondents used to formulate their opinions. The purpose of the study was to find out how schools evaluated their block scheduling and recorded their assessments.

A systematically stratified sample of 90 block-scheduled high schools was drawn based on information supplied by the state education agencies.
The states included in the study were Wisconsin, Illinois, Iowa, Indiana, Minnesota, South Dakota, and Missouri.

The instrument used to collect the data was a self-constructed survey based on 43 success indicators, with requests for estimation of impact and identification of data used to estimate impact. The analysis included descriptive statistics as well as $t$ tests and ANOVAs to explore differential effects of school size, socioeconomic status, type of block, and years of block experience.

Reports about achievement were positive for classroom achievement with fewer claims of improvement in standardized testing. Improvement was also noted in student behaviour, school climate, and certain subject areas as well. For most curriculum and instruction indicators, the block was perceived as positive.

Considering the achievement and behaviour indicators, at least 70% of the reporters used formally collected data to estimate impact. The percentage lowered to about 50% for the other types of indicators.

Results of $t$ tests and ANOVAs showed a number of significant results. Generally, significant differences favored the $4 \times 4$ schedule over the A/B schedule, high socioeconomic states over low socioeconomic status, and larger
schools over smaller schools. Large schools also reported higher socioeconomic status than small schools.

The results of the research suggest that given the positive perceptions from respondents in all types of schools, educators have little to fear regarding block schedules. Educators not satisfied with their own block scheduling efforts might consider looking at schools that have had success. While the reports were predominantly positive, large schools in higher socioeconomic status areas reported greater positive impact that smaller schools in lower socioeconomic status areas.

Stein and Grant (2001) made "A Comparative Study of Public School and Christian School Classroom Environments".

The study of classroom environments in the public schools have been well established in the tradition of high-quality, quantitative studies over the last several decades and have been complemented by recent qualitative studies. Although the research base for Christian schools continues to expand, studies on classroom environments in Christian schools remain scanty. This dissertation builds upon the research in Christian schools by investigating two questions. First, does the private Christian high schools have a classroom environment that differs from the public schools? and second, are the actual
classroom environments of the Christian schools and public schools congruent with parent beliefs regarding classroom environments?

Examination of the data available for the aggregate sample as well as the data on social studies and mathematics classes revealed differences. There is sufficient statistical evidence that the Christian schools do have a classroom environment that differs from that of the public high schools.

Furthermore, parental perceptions about the Christian school classrooms seem to be supported by the results of this study. The aggregate data and the data collected from social studies classroom support this conclusion. Results are mixed, however, regarding mathematics classrooms.

This study examined whether any differences existed between school types by comparing 30 classrooms in public schools with 30 classrooms in Christian schools. The primary dependent variables were the nine subscales of the Classroom Environment Scale, and the primary independent variable was school type. A MANOVA was used to analyze the data; and follow-up testing was performed using an ANOVA. Effect sizes were calculated as well.

Weishaar and Bridget (2001) studied "The Effects of Various Modes of Parental Involvement on Secondary Students' Motivation and Academic Achievement".
The purpose of the study was to examine the effects of various types of parental involvement on student motivation and achievement. The results answered three questions. First, what is the effect of parental involvement on achievement? Secondly, what is the perceived impact of these involvements on a student's motivation to excel academically? Finally, what are parents' opinions of parental involvement? The subjects were 410 high school students and their parents at a private school in Chicago. Measures of parental parenting, communicating, volunteering, learning at home, and decision-making were obtained from parents. Measures of student motivation were collected from students. GPA and achievement test scores were compiled from school records. Parental involvement and achievement were correlated using a multivariate backward regression analysis.

Results showed that parental involvement did not exhibit a great effect on student achievement. This effect frequently was in the negative direction. Parental involvement and motivation were also correlated using a multivariate backward regression analysis. Parental involvement was found to have a greater correlation with student motivation especially with ninth graders. In a qualitative analysis, parents expressed concern with knowing how to become involved in the school, having time to become involved in school activities, and balancing involvement with their children's need for
independence. Implications of the research and considerations for future research are discussed.

Coburn and Ellen (2001) studied "Making Sense of Reading: Logics of Reading in the Institutional Environment and the Classroom".

Since the early 1980s, California schools have been the site of tremendous reform energy focused on changing the way that children are taught to read. Three successive movements seeking to redefine what constitutes "good" reading instruction have gained prominence in the profession, become a part of state policy, and been carried into schools by professional development providers and instructional materials. How do teachers make sense of these changing ideas and how, if at all, do they change their teaching? This study uses early-grades reading instruction in California as a critical case to explore the relationship between changing ideas about appropriate instruction in the environment and teachers' classroom practice. It draws theoretically from organizational sociology, especially institutional and sense making theory. The study uses an embedded, cross-case design that focuses on the experiences of teachers in two elementary schools. It employs both historical and cross-sectional approaches, relying primarily on interviews, observations, and archival research.
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The study traces changing ideas about appropriate reading instruction in the environment since 1983, identifying four major “logics” of reading instruction. It shows that new logics emerged in the environment as actors from different sectors made physical and rhetorical connections with one another, mobilized resources, and interacted with governance structure to create legitimacy for particular sets of ideas and practices. The relationship between these logics and teachers’ classroom practice was mediated by the nature of teachers’ connections to the environment, teachers’ sense making, processes, and teachers’ location in their career trajectory. First, teachers’ connections to logics were related to the mechanisms by which a given logic moved though the environment and the way a given teacher was situated in the field. Second, teachers made sense of these messages by drawing on pre-existing beliefs and practices. This sense making process was shaped by teachers’ sense making about messages in the past, their interaction with colleagues, the conditions for sense making in their school, and the nature of the message itself. Finally, teachers’ patterns of response changed over time depending upon their place in the course of their career as they shifted from building their practice to refining and stabilizing it.

Edmondson and Herman (2001) studied “Effects of the Use of the Calculator-Based Laboratory Device on the Attitudes of Students towards Laboratory Work on Secondary Physics”.

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Students exist in a technology-saturated milieu, and with this in mind, it was desirable to determine whether use of a technology specifically designed for use in the conduct of physical science laboratory work would affect student attitudes towards that laboratory work. This study employed a specific device, the Calculator-Based Laboratory device (CBL) and a product of the Vernier Corporation in conjunction with Texas Instruments.

Students in a high school setting in west central Georgia were the subjects in this study. Thirty-two students in two physics classes participated, with fifteen of the students in one class and seventeen in another class. The students were in non-AP Physics classes.

These were intact groups of students who were taught topics in motion during the course of the study. The study was carried out for six weeks, with one physics class using the CBL for the entire time (five laboratories) and the other class for only three weeks (three laboratories). All experiments were from the mechanics sections of physics, involving one- and two-dimensional motion. Graphical output was studied and produced and interpretation of physical phenomena was made from that output. Content related to laboratory work was also studied as appropriate in both classes, with both classes covering the same content. A pre- and post-survey of attitudes was carried out utilizing an attitude survey developed by the author.
Two students found that there was a significant, positive change in attitudes on the part of the students towards using the device and towards laboratory work in Physics. No significance was the class in which the student was enrolled. This supports earlier findings in the literature and in research that students have a positive attitude towards the use of appropriate technology in their physics classes.

Recommendations for further study include an examination of the CBL devices on actual learning in physics in these and other topics. Limitations were placed on the study that made the assessment of learning invalid, notably the amount of time missed by seniors towards the end of the school year.


Women remain under-represented in science career fields and this is especially evident in the physical sciences. Female students maintain equal science interest and achievement to male students in elementary school but by middle and high school they fall behind their male peers. Reasons cited for girls’ declining interest in science include battling traditional gender stereotypes, lack of encouragement, and lack of female role models. Four main science concerns related to girls/women as indicated by research literature.
were science access, career choices, achievement, and motivation. In Georgia, some girls have made a break from the research trends by demonstrating their fervor for science through participation in the academic activity, Science Olympiad.

The purpose of this study was to examine the science perceptions of girls who demonstrated science success by their participation in Science Olympiad. Utilizing phenomenological and feminist perspectives, the qualitative research method of focus group interviewing was used to address the research questions comprising the four science concerns of female science access, career choices, achievement, and motivation. The study participants were all girls/women who participated in Science Olympiad. A total of five focus groups were studied. One of the focus groups had current college undergraduates, former Science Olympians, in it while the others were composed of high school girls. Through the description of their science experiences, the participants shared their perceptions of the four science concerns. When addressing these science concerns, the participants revealed four factors that had most affected their science perceptions: the importance of support, science needs Serious Fun, teachers matter, and the bonuses of extracurricular involvement. In their experiences, the participants found success in science because they had teachers, parents, and peers who supported their academic interests, including science, and made science
enjoyable. This study offered insight to the factors boosting the science success as perceived by a small group of female students. The application of these factors to other girls may provide a method of drawing more girls towards science instead of pushing them away from it.

Bennett and Moore (2001) studied "The Relationship Between Classroom Climate and Student Achievement."

The purpose of this study was to determine the relationship between sixth grade students' academic achievement levels in mathematics and their perceptions of school climate. Student characteristics of socioeconomic status and gender were used to identify groups for the purpose of data analysis. Data was gathered using the five independent variables of the researcher class inventory (satisfaction, friction, competitiveness, difficulty, and cohesiveness) and the dependent variable of the Standard Achievement Total Mathematics Scores. The results of the data collection were tested using a Pearson product-moment analysis and a backward multiple regression analysis. A univariate analysis of variance was also used to compare the five independent variables of the researcher Class Inventory as well as to compare socioeconomic status and gender with the Stanford Achievement Total Mathematics Scores. The schools selected for this study were from a city in Texas with a population of 282.
approximately 100,000. The sample consisted of 262 sixth grade mathematics students.

The findings of this study are as follows: (a) The Pearson product-moment correlation analysis revealed little, if any, correlation for any of the five subscale predictor variables; (b) the multiple regression analysis revealed that all five classroom climate indicators combined together could explain only 10.5% of the variance in mathematics achievement; (c) the univariate analysis of variance revealed that there is a significant relationship between the climate factors of friction and difficulty when compared to mathematics achievement; and (d) the univariate analysis of variance also revealed that mathematics achievement scores vary significantly as a function of economic category membership, but there appears to be no relationship to gender.

Thaker (2001) studied the "Effectiveness of Mastery Learning Programme With Reference to Science Teaching"

The major objectives were: (1) To construct a ‘Mastery Learning Programme’ for the Science subject. (2) To test the influence of Mastery Learning Programme with reference to ‘General class teaching’ on students’ Science Learning Interest at the level of standard VIII and standard VI. (3) To test the influence of Mastery Learning Programme with reference to ‘General class teaching’ on students’ Test Anxiety at the level of standard VIII and
standard VI. (4) To test the influence of Mastery Learning Programme with reference to 'General class teaching' on students' Retention in the science subject at the level of standard VIII and standard VI. (5) To construct a Science Learning Interest Inventory

For the study Experimental method was used as a research method and 'Quasi' (Pretest - Posttest) Experimental Design was implemented. Two classes from one school of standard VIII and two classes of standard VI from another school were selected for the experiment. One class was taken as Experimental Group and another was taken as Control Group. 'Mastery Learning Programme' was developed and implemented as experiment-effect. 'Science Learning Interest Inventory was developed and standardised by the researcher. Test-Anxiety inventory of A.C.Trivedi was used. ANOVA and t-test were used as statistical method.

The major findings were: (1) Science Learning Interest was found higher among the students taught by the 'Mastery Learning Programme' than the students taught by the 'General class teaching' at the level of standard VIII and standard VI with reference to Science Teaching. (2) Test Anxiety was found lower among the students taught by the 'Mastery Learning Programme' than the students taught by the 'General class teaching' at the level of standard VIII and standard VI with reference to Science Teaching. (3) In
Retention no significant difference was found between the students taught by the 'Mastery Learning Programme' and the students taught by the 'General class teaching' at the level of standard VIII and standard VI with reference to Science Teaching.

Bowes and Kathleen (2002) studied "The Effects of an Interactive Television Environment on the Learning Preferences, Attitudes, and Academic Achievement of Fifth- and Seventh-Grade Students in a Social Studies and Science Classroom".

This study employed a quasi-experimental pretest-posttest design with nonequivalent groups. It explored the effect of using interactive television (ITV) as a learning tool in an elementary setting. The Self-Directed Learning Readiness Scale, which measures a student's learning preferences/attitudes toward learning, was used along with teacher mastery tests and an ITV evaluation survey. There were five research questions explored in the study: (1) What was the difference between the treatment and control groups with regards to learning preferences/attitudes as measured by the SDLRS-ABE? (2) What was the difference between the treatment and control groups with regards to academic achievement in science and in social studies as measured by teacher made mastery tests? (3) Was there a treatment-gender interaction for either the SDLRS-ABE or the science and social studies mastery tests? (4)
What interrelationships existed among the SDLRS-ABE, science mastery tests, and social studies tests? (5) What did teacher evaluations of the ITV reveal?

Forty V and thirty-seven VII grade students participated in the study. There were treatment and control groups at each grade level. Groups were randomly assigned as intact classes.

There were a number of noteworthy findings. There was a significant difference ($p = .025$) between males and females on the social studies mastery test and a treatment-control difference on the science mastery test ($p = .040$). Also a moderate relationship was found between the SDLRS-ABE pretest ($r = .433$) and the SDLRS-ABE posttest ($r = .420$) and the fifth grade treatment group science grades and a moderate correlation ($r = 0.546$) between the social studies grades, and the SDLRS-ABE posttest for the fifth grade treatment group. The teacher evaluation of the ITV sessions indicated the importance of interactivity between the sending and receiving sites. Teachers felt that this interactivity was key to holding the students' attention and fostering learning.

Barnes and Kenneth (2002) studied "Cognitive Constraints on High School Students' Representations of Real Environmental Problems".

One class of juniors and seniors was studied through one semester in the investigation of how students think about, learn from, and solve real
environmental problems. The intention was to listen to student voices while researching the features of their representations of these problems, the beliefs they held (tenets) the cognitive processes they employed, and the principles of science, ecology, problem solving, and ethics they held as tenets. The focus was upon two self-selected groups as they perceived, engaged, analyzed, and proposed solutions for problems.

Analysis of the student representations involved interpretation of the features to include both the perspective tenets and the envisioning processes. These processes included the intensive and attentive constraints as tenet acquisition and violative and agential constraints as tenet affirmation. The perspective tenets included a variety of conceptual (basic science, ecological, ethical and problem-solving) constraints as well as ontological, epistemological, and other cultural (role, status, power, and community) constraints.

The perspective tenets were interpreted thematically including the ways populations of people cause and care about environmental problems, the magnitude of environmental problems and the science involved, the expectations and limitations students perceive for themselves, and the importance of community awareness and cooperation to addressing these problems. Some of these tenets were interpreted to the principles in that they
were rules that were accepted by some people as true. The perspective tenets, along with the envisioning processes, were perceived to be the constraints that determined the environmental problems and limited the solution possibilities.

The students thought about environmental problems in mature and principled ways using a repertoire of cognitive process. They learned from them as they acquired and affirmed tenets. They solved them through personal choices and efforts to increase community awareness. The ways students think about, learn from, and solve real environmental problems were all constrained by the perspective tenets (including cultural tenets of role, status, and power) and envisioning processes. It was concluded that students need help from the community to go further in solving these real environmental problems.

Britner and Lynn (2002) analysed “Science Self-Efficacy of African American Middle School Students: Relationship to Motivation Self-Beliefs, Achievement, Gender, and Gender Orientation”.

Motivation researchers have established that students' self-efficacy beliefs, the confidence they have in their academic capabilities, are related to academic outcomes. Self-efficacy has been amply researched in mathematics and language arts and nearly exclusively with White students. African
American students and the area of science have each received scant attention. Typically, gender differences favour boys in mathematics and girls in language arts. Researchers have also found that these differences may be a function of gender orientation belief.

The purpose of this study was to extend findings in science self-efficacy and to African American middle school students. researcher sought to determine whether self-efficacy assessed at differing levels of specificity (lab skills versus science grades) would each predict science achievement assessed at corresponding levels, to discover whether mean scores in academic motivation and achievement would differ by gender, and to determine whether these differences are a function of gender orientation (N = 268). Science grade self-efficacy was positively associated with the grades obtained by boys and by girls. For girls, grades were also associated positively with science self-concept and negatively with value of science. For reasons resulting from problematic instructional practices, lab skills self-efficacy was not associated with lab grades. Girls reported stronger science self-efficacy and received higher grades in science class. Gender orientation beliefs did not account for these differences, but masculinity and femininity were each associated with science grade self-efficacy, suggesting that androgyny is an adaptive orientation for the science self-efficacy beliefs of African American
students. Findings are interpreted within the framework of A. Bandura’s (1986) social cognitive theory.


Girls are often found to drop of science in greater numbers and sooner than boys. Because previous research has focused on gender differences, rather than examining differences and similarities among girls, little is known about why some girls choose to pursue science, particularly the physical sciences, rather than drop it. Specifically, little is known about how and why girls make their decisions to persist or not in specific science careers and the courses leading up to them.

Through the use of semi-structured, in-depth, qualitative, interviews conducted over the span of a year, this thesis explored the choice of classes and career decisions of twelve elementary through high school girls who participated in an engineering camp. The purpose was to gain an understanding of why these girls chose to persist or not in a science and engineering career over time.
Age-related differences were found in the reasons the girls gave for wanting to take future classes. The elementary school girls believed that interest would be their only reason while the high school girls gave multiple reasons, including interest, utility, perceptions of ability, and who would be teaching the class. The implications of these findings for Eccles' model of academic choice are discussed.

Overall, the girls in this study liked their science classes because they involved hands-on activities. By high school they showed a preference for and a greater knowledge of biology rather than physics. All the girls were unsure about what kinds of science information they would need to know for future jobs. Half of the girls were considering biology-based careers, such as doctors and veterinarians, because they wanted to help and take care of people and animals. Only one girl was considering engineering, a physics-based career, and only because her parents required it. Despite believing that they were doing well in school in general, at least half of the girls believed they were doing poorly in mathematics because they found the concepts difficult to understand. The implications of these findings for promoting all girls' interest in the sciences, and particularly the physical sciences, are discussed.
Martinez and Alina (2002) studied “Student Achievement in Science: A Longitudinal Look at Individual and School Differences”.

The importance of science in today’s technology society necessitates continued attention to students’ experiences in science and specifically their achievement in science. There is a need to look at gender and race/ethnicity simultaneously when studying students’ experiences in science and to explore factors related to higher achievement among students.

Using data from the Longitudinal Study of American Youth, this study contributes to existing literature on student achievement in science by simultaneously exploring the effects of race/ethnicity and gender. Capitalizing on the availability of yearly science achievement scores, research presents trajectories of student achievement from VII to XII grade. This study also includes an exploration of school effects.

Overall, student achievement in science increases from VII to XII grade, although some leveling is seen in later grades. Growth in achievement differs by both gender and race/ethnicity, but racial/ethnic differences are larger than gender differences. Hispanic, Black, Asian, and White males score higher, on an average, throughout the secondary grades than their female counterparts. Achievement scores of Asian students are consistently higher than White students, who in turn score higher than Hispanic and finally Black students.
Both background and science-related factors help explain variation in achievement status and growth in achievement. Parental education is positively associated with achievement status among all groups except Black students for whom there is no effect of parental education. Science related resources in the home are positively associated with student achievement and the effect of these resources increases in later grades. Student achievement in science is also positively related to student course taking and attitude toward science. Furthermore, both the negative effect of viewing science as a male domain, which exists for males and females, and the positive effect of parental support for science increase in magnitude in later grades.

Thirteen per cent of the variation in achievement was found to occur between schools. At the school level student/teacher ratio is positively related to student achievement in VII grade and the per cent of students who receive free lunch in a school is negatively related to achievement, but neither of these is related to growth in achievement over time.


For decades after independence many African nations have invested a significant portion of their national budget into education development. Global
enrollment rates however, are still low in many Sub-Saharan countries. Moreover, the enrollment rate hides gender disparity and constitutes but one indicator of educational efficiency. Additional indicators include persistence and achievement rates. Despite a history of advocacy for women's rights, and policies to address gender inequity in education worldwide, various barriers in may developing countries slow down gender parity in education and hinder policy effectiveness. Most efforts to promote girls' schooling are limited to basic education.

The purpose of this study was to examine gender disparity in secondary education in Niger, with the primary goal of identifying factors that affect girls' educational participation in terms of access, persistence, and achievement. This study was carried out within the theoretical framework of feminist critical policy analysis. Both qualitative methods and archival research were utilized to collect data in two regions. A purposive sample of ten academically successful secondary school girls from both poor rural and educated urban, as well as multi-ethnic backgrounds served as the primary data source. These girls' parents, teachers, male classmates, as well as educational authorities and policymakers were interviewed. Data were analyzed through descriptive statistics, content analysis, and narrative descriptions. Results of the study indicated that while both supply and demand factors affect secondary school girls' educational outcomes in Niger, strategies and interventions should focus
on significantly increasing girls' access rate in order to narrow gender gap at
the secondary level.

May and David (2002) studied "How Are Learning Physics and Student
Beliefs About Learning Physics Connected? Measuring Epistemological Self-
Reflection in an Introductory Course and Investigating Its Relationship to
Conceptual Learning".

To explore students' epistemological beliefs in a variety of conceptual
domains in physics, and in a specific and novel context of measurement, this
Dissertation makes use of Weekly Report, a class assignment in which
students reflect in writing on what they learn each week and how they learn
it. Reports were assigned to students in the introductory physics course for
honours engineering majors at The Ohio State University in two successive
years.

The Weekly Reports of several students from the first year were
analyzed for the kinds of epistemological beliefs exhibited therein, called
epistemological self-reflection, and a coding scheme was developed for
categorizing and quantifying this reflection.

The connection between epistemological self-reflection and conceptual
learning in physics seen in a pilot study was replicated in a larger study, in
which the coded reflections from the Weekly Reports of thirty students were correlated with their conceptual learning gains. Although the total amount of epistemological self-reflection was not found to be related to conceptual gain, different kinds of epistemological self-reflection were. Describing learning physics concepts in terms of logical reasoning and making personal connections were positively correlated with gains; describing learning from authority figures or by observing phenomena without making inferences was negatively correlated. Linear regression equations were determined in order to quantify the effects on conceptual gain of specific ways of describing learning.

In an experimental test of this model, the regression equations and the Weekly Report coding scheme developed from the first year's data were used to predict the conceptual gains of thirty students from the second year. The prediction was unsuccessful, possibly because these students were not given as much feedback on their reflections as were the first-year students.

These results show that epistemological beliefs are important factors affecting the conceptual learning of physics students. Also, getting students to reflect meaningfully on their knowledge and learning is difficult and requires consistent feedback. Research into the epistemological beliefs of physics students in different contexts and from different populations can help us
develop more complete models of epistemological beliefs, and ultimately improve the conceptual and epistemological knowledge of all students.


This study purports to investigate relationships among cognitive ability, learning behaviour, and academic achievement across different gender and ethnicity groups, so that the understanding of achievement prediction can be enhanced.

The structural equation modeling (SEM) method was adopted to investigate how and to what extent cognitive ability and learning behaviour accounted for academic achievement. The across gender and across-ethnicity tenability of those relationships was evaluated by multiple group SEM. A series of nested SEM model reflecting different hypotheses, were specified a priori and tested against nationally representative sample of school-age students in the United States [N=1304].

The predictive validity of cognitive ability and learning behaviour of academic achievement were supported in this study. The unique contribution of learning behaviour in achievement prediction, over and above cognitive ability was also demonstrated. Accordingly, cognitive ability and learning
behaviour could serve as effective predictors of academic achievement. The non-directional relationship between learning behaviour and cognitive ability was supported, however, the directionality of the relationship remained unknown because of the scarcity of research and theory in this area. All relationships among constructs of interest in this study remained invariant across genders and ethnicity. The results provided the evidence for the external validity of findings in this study with respect to gender and ethnicity. Therefore, findings of the current study were generalizable to children from different gender and ethnicity groups.


With the renewed interest in science performance assessments (laboratory practicals) comes the responsibility of investigating what knowledge and reasoning these tasks evoke in students as they complete them – cognitive validity (Messick, 1994; Pellegrino, Chudowsky, and Glaser, 2001; Ruiz-Primo, Shavelson, Li, and Schultz, 2001; Shavelson and Ruiz-Primo, 2000).

The purpose of this dissertation was to examine the trustworthiness of the cognitive inferences investigator make from student performance scores to the knowledge and reasoning investigator are interested in measuring (for
example, science content knowledge and reasoning) that correspond to three constructs: Snow's Reasoning Dimensions and Shavelson's Task Types and Knowledge Types. Based on reasoning dimensions underlying students' performance on large-scale science achievement tests (Hamilton, et.al. 1995; Nussbaum and et al., 1997; Snow, 1992) Snow postulated the presence of three reasoning dimensions in alternative assessments. Research on performance assessments led Shavelson and his students to a task type classification system that distinguished among assessment tasks (Shavelson, Solano-Flores, and Ruiz-Primo, 1998). They conjectured that performance assessments of different task types might elicit from students different kinds of procedural knowledge. Finally, research on cognition and assessment has led to a knowledge type classification that includes declarative, procedural, schematic and strategic knowledge (de Jong and Ferguson-Hessler, 1996; Li and Shavelson, 2001; Ruiz-Primo, Schultz, Li and Shavelson, 1998a). Performance assessments were believed to tap, predominantly, into procedural and schematic knowledge (Shavelson and Ruiz-Primo, 2000).

Using 34 student performance assessment scores and think alouds with concurrent verbalizations, researcher examined the trustworthiness of the inferences that three performance assessments evoked in students reasoning and knowledge that corresponds to the three constructs. Using Ruiz-Primo, Shavelson, Li and Schultz's (2001) cognitive validity framework, researcher
found that performance assessments nominally assigned to different reasoning dimensions evoked differences in reasoning and knowledge that reflected the reasoning dimensions.

Researcher found that performance assessments nominally assigned to different task types evoked differences that corresponded to the task type classification system and that performance assessments elicited all four knowledge types. Furthermore, the evidence collected here suggests that some performance assessments were more predictable in what they evoked from students than others, analysis of performance assessments subtasks revealed important differences in student knowledge and reasoning, and that students used broad-based knowledge and reasoned in ingenious and innovated ways to complete these science performance assessments.

Gallop and Graham (2002) studied "The Effect of Student-Centered and Teacher-Centered Instruction with and Without Conceptual Advocacy on Biology Students' Misconceptions, Achievement, Attitudes toward Science, and Cognitive Retention".

The purpose of this study was to investigate the effect of student-centered and teacher-centered instructional strategies with and without conceptual advocacy (CA) on ninth-grade biology students' misconceptions (MIS), biology achievement (ACH), studied attitudes toward science (ATT), and
cognitive retention of scientific method and measurement, spontaneous
generation, and characteristics of living things.

Students were purposively selected using intact classes and assigned to
one of four treatment groups (i.e., student-centered instruction without CA,
student-centered instruction with CA, teacher-centered instruction with CA,
and teacher-centered instruction without CA). A modified quasi-experimental
design was used in which students were not matched in the conventional
sense but instead; groups were shown to be equivalent on the dependent
measure via a pretest.

A 5-day treatment implementation period addressed science conception
under investigation. The treatment period was based on the number of class
periods teachers at the target school actually spend teaching the biological
concepts under investigation using traditional instruction. At the end of the
treatment period, students were post-tested using the Concepts in Biology
instrument and Science Questionnaire. Eight weeks after the post-test, these
instruments were administered again as a delayed post-test to determine
cognitive retention of the correct biological conceptions and attitudes toward
science.

MANCOVA and follow-up univariate ANCOVA results indicated that
student-centered instruction without CA (i.e., Group 1) did not have a
significant effect on students' MIS, ACH and ATT (F = .029, p = .8658; F = .002, p = .9688; F = .292, p = .5897, respectively). On the other hand, student-centered instruction with CA (i.e., Group 2) had a significant effect on students' MIS and ACH (F = 10.33, p = .0016 and F = 10.17, p = .0017, respectively) but did not on ATT (F = .433, p = .5117). Teacher-centered instruction with CA (i.e., Group 3) had a significant effect on students' MIS in favor of Group 4 (i.e., control group) (F = 4.11, p = .0444) and did not have a significant effect on ACH and ATT (F = 1.83, p = .1777 and F = 1.89, p = .1709, respectively). Student gender and teacher gender did not have a significant effect on students' MIS, ACH, and ATT. In the cognitive retention model, there was no significant difference among the research factors relative to the 3 dependent measures.


Eccles et al. (1993) claimed that adolescent students experience a decline in motivation to learn during the transition from elementary to middle school. Reasons for this include peer pressure, differences in subject matter and the teacher-student relationship, and loss of student-autonomy.

Research for this dissertation was conducted at a metropolitan science museum and included adolescents who were motivated to learn. Two
questions were posed in this study: What motivates middle grade students to study science at a science museum on Saturday? and How would knowing what motivates these students benefit the filed of science education?

The research paradigm that formed the basis for this investigation was a modified phenomenological paradigm. A phenomenology was conducted as proposed by Denton (1974) and Vandenberg (1971). Phenomenology was then combined with a case study approach as proposed by Merriam (1988) Stake (1994) and Yin (1989). Participants were eighth grade students enrolled in a NASA (National Aeronautics and Space Administration) funded science programme called SEMAA (Science, Engineering, Mathematics, and Aerospace Academy). Qualitative methodological techniques used in this study included semi-structured interviews, open-and close-ended surveys, and classroom observation field-notes. Data were analyzed using the phenomenological approach as described by Colaizzi (1978).

Themes that emerged from the data were (a) studying science because it is fun, (b) studying science because it is competitive, (c) studying science because it is career oriented, and (d) studying science because it is hands-on.

Data were analyzed holistically and individually to describe the phenomena of studying science on Saturday. Participants experienced SEMAA in different ways. For example, Jill and Millie participated in SEMAA to learn
about careers. However, Jill wanted to be a lawyer and Millie wanted a science career.

Eleven conclusions were formed based on the results of this study. Adolescent students can be motivated to learn. Programmes like SEMAA offer students a variety of things and ways to learn. Therefore, a loss of motivation during adolescence does not have to be most likely outcome.

Kovach and Starr (2002) studied "The Influence of Ethnic Identification on Adolescent Achievement Motivation".

Research on ethnic and racial minority groups has increased in recent years as diverse populations have entered the United States. However, most of the research regarding educational and psychological constructs have been confined to a few minority populations. in particular, Arab Americans have been under represented in this research. The purpose of this study was to extend the current research on adolescents from diverse and under represented minority groups. Recognizing that a lifetime pattern of success or failure is set during adolescence, and that goals related to achievement are multidimensional, the present study focused on investigating the interactions between ethnic identification, attributional style, and self-esteem with regard to adolescent academic motivation and achievement.
Results of the current study regarding achievement motivation and academic achievement implied that within and among ethnic groups, differences exist in the criteria individuals use to evaluate their achievement. In addition, students who reported a strong ethnic identity were more motivated toward achieving academically than their peers. Ethnicity was also found to have a significant effect on school motivation with Arab and African American students having higher mastery, performance, general, and social motivation goals than European American students. Results also indicate that ethnic minority students are more motivated to achieve academically when they are in school and have higher self-concept than European American students. An inverse relationship between academic achievement, self-concept and school motivation was found among the ethnic minority students, suggesting that some criteria other than academic grades are used for self-evaluation. Gender differences in motivation and achievement were also found.

The use of self-protective attributions for success and failure was also explored. Results revealed that, Arab, American students employ more externalizing attributions and devalue the importance of a negative situation more frequently than their African American or European American peers. Both Arab American and African American adolescents endorsed the belief that prejudice plays an important role in negative outcomes. Future research should
increase our understanding of cultural and ethnic estimates of achievement and how the use of externalizing attributes and belief in prejudice effects academic performance and psychological interventions.

Leon and Isabel (2002) studied "Learning Styles, Varieties of Bachillerato and Academic Results".

The relationship between the styles of learning, the varieties of Bachillerato (non compulsory secondary education and academic fulfillment are studied aiming to establish the psychological and structural bases for a future individualized action in orientation and tutoring from the perspective of the learning styles.

In the bibliographical review investigator analyze the concept differences among the learning strategies, cognitive styles and learning styles, also studying the connection between learning and teaching styles and the pairing between them, as well as the relationship between these styles and the orientation. In the chapter dedicated to bachilleresos investigator do a review of the proceedings of the LOGSE (reform law) in the country, showing several comparative charts and schemes of its development in the Spanish nation and its autonomic communities and the European community, paying attention to its differences and similarities in contents, duration and requirements to finish the different stages. The theme of results has been
studied from two different perspectives: relationship with failure and evaluation and the diversity of factors related to it. The Styles of learning are placed among personal factors and learning strategies.

In the second part, investigator has made a statistical analysis of the different relationships among learning styles, diagnostic in the questionnaire Honey-Alone about learning styles. Varieties of Bachillerato and the academic results fulfilled. From the results, in figures and graphics investigator can confirm the existence of a learning profile in each learning stage, taking as a base the comparison established between the university students learning styles (Alonso 1992) and the bachiller students of La Rioja, paying attention to three of the four styles. It also confirms that the pupils that prefer the theoretical-reflexive method achieve a better academic result.

Finally, the proposal of pedagogical intervention is dedicated to easy the work of tutors, to give general suggestions for the diagnosis of learning styles and the creation of a tutored frame of thinking, individually or in small groups, to make the pupils think about their own way of learning according to their social and academic environment, not only related to marks but to a wider range of learning resources.
Capehart and Louise (2002) studied "Science Achievement as an Indicator of Educational Opportunity Available in Rural K-12 Districts in Texas".

This study examined Rural K-12 Texas districts to investigate whether science achievement could serve as a gauge to measure the availability and quality of rigorous educational opportunities in Rural Texas districts.

A case II criterion-group design was used; 2 groups of districts were selected based on their 3-year performances on the VIII grade Science Texas Assessment of Academic Skills (TAAS) – the statewide criterion-referenced test. The High Performing Group (HPG) was composed of 30 lowest performing districts; the Low Performing Group (LPG) was composed of 30 lowest performing districts. Data collection was limited to archived quantitative data from Texas Education Agency’s open records. Achievements variables were percent passing (1) Science TASS, (2) Biology End-of-Course (EoC) test and (3) the composite passing all Reading, Writing, and Mathematics TAAS. Academic variables were percent participating in (1) advanced courses, (2) rigorous graduation programmes, and (3) college entrance examinations.

District quality indicators also included 3 budget variables: (1) average teacher salary, (2) per pupil instructional expenditure, (3) percent allocated for instructional leadership; and 4 staff variables: (1) percent teachers fully certified, (2) percent teachers with advanced degrees, (3) average years
teacher experience, (4) average percent non-turnover of teachers. One score per variable was obtained for each district.

Hopkins and Thomas (2002) studied "Organizational Climate and Student Achievement in Middle Schools Within New York City".

Hoy, Hannum and Tschannen-Moran (1998) examined health and openness to develop measures of organizational climate. The researchers studied the effect of socioeconomic status (SES) and four, second-order climate variables, Collegial Leadership, Teacher Professionalism, Academic Press, and Environmental Press upon student achievement. They theorized that each of these variables makes significant, independent contributions to student achievement as measured by standardized test scores and that the predictor variables explain a substantial amount of variance in the hypothesized model. Further, the researcher used a parsimonious view of climate in their examination of important linkages at the institutional, managerial, and technical levels of schools. In response to their call for additional study of their theory, suggested in their conclusions, this researchers attempts to use the theory to replicate the findings using recent data from a large urban sample of middle schools within New York City. In addition, the researchers propose a revised path analysis model to better explain the effects of climate factors upon student achievement.
Abu-Sa’ad and Hasan (2002) studied "Genetic and Environmental Factors Associated with Cognitive Ability and Scholastic Achievement Among Arabs of The Negev Region in Southern Israel".

Cognitive ability data for 393 sixth grade Arab students from the Negev region in southern Israel were collected using a nonverbal test (Raven’s Progressive Matrices) and scores of scholastic achievement in three subjects: Arabic, English, and Mathematics. The study investigated the relationships between participant performances on these measures and the parental genetic relationship. The associations of participant performances on these measures with various environmental factors (residency, gender, parental level of education, number of siblings, and number of mothers in the family) were also assessed.

Results from data analysis indicated a significant effect of inbreeding on the Raven’s test among participants whose parents are second cousins to each other. The gender factor was significant with the females scoring, on the average, higher than males on Raven’s test and on the three measures of scholastic achievement. However, residency was significant only for English score differences among the participants with rural students scoring higher than urban students. No significant associations were found between the performance of the participants on the four measures and the number of
siblings or number of mothers in the family. The performances of the students on the cognitive ability and scholastic achievement measures were found to be significantly associated with the paternal level of education.

Chaerul and Andrie (2002) conducted “A Study of Student Attitudes toward Physics and Classroom Environment Based on Gender and Grade Level among Senior Secondary Education Students in Indonesia”.

The main purpose of the present study are to investigate the differences on student’s attitudes toward physics and their perceptions regarding classroom climate during physics classes based on gender and grade level. In addition, the study also explores female students’ opinions about physics, and examines to what extent this factor might influence their decision to choose or not to choose physics or physics-related fields for their career choices in the future.

A group of approximately 864 male and female students, equally proportioned by gender, were assigned to take part in this study. Two standardized instruments, namely the Individualized Classroom Environment Questionnaire (ICEQ) and the Test of Science Related Attitudes (TOSRA) have been employed to collect data. A combination of quantitative and qualitative methods was used to analyze the collected data resulting from the questionnaires as well as from the interviews.
The study found, first, regardless of their gender and grade level differences, students expected a more positive classroom climate during learning physics. Also, it has been found that male students experience a more positive classroom environment than female students. Second, the study found that male students do show more positive attitudes toward physics than their female counterparts. Meanwhile, twelfth-grade students show a more positive attitude toward physics than eleventh-graders. Third, the study found that most female students do not like physics based on several reasons such as physics is a hard, monotonous and boring subject. Although eleventh-grade female students do not like physics, most of them intended to choose science as their major in the next grade. Surprisingly, a majority of twelfth-grade female students who are majoring in science have no intention to choose physics-related subjects either for their prospective major at the university or for their career choices in the future.

Dethlefs and Marie (2002) studied "Relationship of Constructivist Learning Environment to Student Attitudes and Achievement in High School Mathematics and Science".

This study investigated the relationship of constructivist learning environment and standards-based teaching practices to student achievement and attitudes (self-efficacy, intrinsic value, and learning strategies) in Algebra
and Biology. Further, these relationships were examined as a function of student gender and prior achievement. A purposive sample of 804 high school students enrolled in Biology I, Algebra I, or Advanced Algebra was selected for inclusion in this study.

Although the dimensions of constructivist learning environment that contributed to predicting student achievement and attitudes varied by content area and criterion, the results of the present study generally provide strong support for a positive relationship between constructivist learning environment and student attitudes, but little support for a direct relationship to student achievement. Teacher reports of overall constructivist learning environment were not correlated with achievement or attitudes. Observer reports of constructivist learning environment were correlated with student intrinsic value and learning strategies. Student reports of constructivist learning environment were correlated with all three-attitude measures. Multiple regression findings showed that neither overall constructivist-learning environment nor standards-based teaching practices predicted achievement in any of the content areas. Overall constructivist learning environment and standards-based teaching practices were significant positive predictors of student intrinsic value and learning strategies in all three content areas, after controlling for student and classroom demographic variables. Overall constructivist learning environment and standards-based teaching practices
were also significant positive predictors of self-efficacy in Algebra I. In addition; a standards-based teaching practice was a significant positive predictor of student self-efficacy in Biology.

No specific dimensions of constructivists learning environment were consistently related to student achievement. However, several dimensions of constructivist learning environments emerged as significant predictors of student attitudes, including Personal Relevance, Shared Control, and Student Negotiation. The dimensions of Critical Voice and Uncertainty appeared to be less important in predicting student attitudes.


A study of 103 parochial high school students, ages 14-18, found that a preferred time of day, morning versus evening, could be demonstrated in 69 of the students by using equivalent forms of the Watson-Glaser Thinking Skills Appraisal. Each student took Forms Ym and Zm of the test, and test forms were crossed so that about one-half took each form at the opposite time of day. Time of administration of the test on which each student did better was determined to be the student’s preferred time of day. In addition, students also tool Horne and Oestberg’s (1976) Morningness-Eveningness Questionnaire (MEQ). The MEQ detected a preferred time of day for only 37 students; 66
were categorized as "neither type". Other independent variables included in the analysis were motivation, gender, age, and GPA. Finally, those who demonstrated a preferred time of day were matched or mismatched for administration of the Raven's Standard Progressive Matrices, the dependent variable and a measure of test performance. An independent t test between the Watson-Glaser test and the Raven was non-significant; an independent t test between the MEQ and the Raven was significant. ANOVA revealed that the independent variables accounted for about 27% of the variance in the Raven scores. Significant positive correlations included sex and GPA (females held higher GPAs than males) GPA and motivation, age and scores on the Raven, and scores on the Watson-Glaser and scores on the Raven. Analysis of correlational data indicated that performance on the Raven was significantly related to categories on the morningness - eveningness scale.

Evelyn (2002) studied "The Impact of Parenting Styles on Adolescent Academic Achievement and Classroom Behaviour".

Educators often look to children's families in an effort to understand a child's academic achievement and classroom behaviour. This study explored the relationship between parenting styles and adolescent academic achievement, classroom work habits, and coping skills. The study surveyed the attitudes of 111 ninth grade students toward their own parents' style of
parenting. Students further identified their classroom behaviour s and grade point averages. Through the analysis of the survey questions used to test each research question, parenting style was found to affect academic achievement and work habits but not coping skills.


The importance of science and technology in the global economy has led to growing emphasis on mathematics and science achievement all over the world. In this study, researcher seeks to identify variables at the student-level and school-level that account for the variation in science achievement of the eighth graders in Malaysia. Using the Third International Mathematics and Science Study (TIMSS) 1999 for Malaysia, a series of HLM analysis was performed.

Results indicate that (1) variation in overall science achievement is greater between schools than within schools; (2) both the selected student-level and school-level factors are Important in explaining the variation in the eight graders' achievement in science; (3) the selected student-level variables explain about 13% of the variation in students' achievement within schools, but as an aggregate, they account for a much larger proportion of the
between-school variance; (4) the selected school-level variables account for about 55% of the variation between schools; (5) within schools, the effects of self-concept in science, awareness of the social implications of science, gender, and home educational resources are significantly related to achievement; (6) the effects of self-concept in science and awareness of social implications of science are significant even after controlling for the effects of SES; (7) between schools the effects of the mean of home educational resources, mean of parents' education, mean of awareness of the social implications of science, and emphasis on conducting experiments are significantly related to achievement; (8) the effects of SES variables explain about 50% of the variation in the school means achievement; and (9) the effects of emphasis on conducting experiments on achievement and significant even after controlling for the effects of SES.

Since it is hard to change the society, it is recommended that efforts to improve science achievement be focused more at the school-level, concentrating on variables that can be changed. This includes increasing students' awareness of the social implications of science and improving students' self-concepts. In science, strengthening evaluation systems, and finding ways to compensate for the lack of home educational resources among disadvantaged students.
The study further suggests that emphasis be given to proper implementations of science experiments. Besides, the prominent effects of SES variables on the school mean achievement is something worthwhile to be further researched.


The objectives were: (1) To study various theories of Self-concept development to develop Self-concept Enhancement Programme for secondary school students. (2) To develop Self-concept Enhancement Programme based on the “Systematic Feedback” technique of developing Self-concept for secondary school students. (3) To develop Self-concept Enhancement Programme based on the “Self perception based on individual self analysis” technique of developing Self-concept for secondary school students. (4) To tryout Self-concept Enhancement Programme based on the “Systematic Feedback” technique of developing Self-concept for secondary school students. (5) To tryout Self-concept Enhancement Programme based on the “Self perception based on individual self analysis” technique of developing Self-concept for secondary school students. (6) To compare the effectiveness of the programme based on two different techniques first the “Self-perception based on individual self analysis” & the second “Systematic Feedback” on secondary
school students. (7) To know the opinion of the students about Self-concept Enhancement Programme who participated in the programme. The hypotheses were: (1) There will be no significant difference in gain scores (difference between pretest & posttest scores) between two experimental groups treated through "Self-perception based on individual self analysis" & "Systematic Feedback". (2) There will be no significant difference in gain scores (difference between pretest & posttest scores) between two experimental groups treated through "Self-perception based on individual self analysis" & no treatment. (3) There will be no significant difference in gain scores (difference between pretest & posttest scores) between two experimental groups treated through "Systematic Feedback" & no treatment.

The sample comprised of 108 students of class IX. There were males as well as females. The study was designed on the lines of Non - Randomised Control Group Pretest-Posttest Design. The treatment continued for eleven days at the rate of one hour per day. Self-concept Inventory developed by J.H.Shah was used for collecting the data. The data were analyzed with the help of Chi-Square test and Mann-Whitney U test.

The findings were: (1) "Self-perception based on individual self analysis" & "Systematic Feedback" techniques were found to be equally effective & both these techniques were significantly more effective in
comparison to no Treatment. (2) The Opinions of students were that we have learnt to live in a better way with our friends, we enjoyed the training programme, we have been inspired to take interest in constructive & co-operative activities, we realized our qualities, one should not be disheartened in the most difficult situation, & we learnt new things.

Shah (2002) studied “Preparation and Try-Out of Programmed Learning Material based on the two units of Food and Nutrition of Xth standard Science textbook in Gujarat State”

The objectives of this study were: (1) To prepare Linear Programmed Learning Material (PLM) on ‘Balanced Diet and Deficiency Diseases’ based on the two units of Science textbook of Standard X. (2) To try-out and finalise the prepared PLM based on error rate. (3) To study the effectiveness of PLM as a method of teaching in comparison with Lecture Method (LM) in terms of students’ achievement on pre-test and criterion test. (4) To study the main and interaction effects of sex, intelligence and category of caste in terms of students’ achievement. (5) To study the effectiveness of PLM in comparison with Lecture Method in terms of students’ achievement on criterion test in the context of selected variables. (6) To study the effectiveness of PLM in terms of students’ reaction towards PLM.
The PLM was prepared on 'Balanced Diet and Deficiency Diseases' with the help of the Science textbook of Std. X, other reference material and the suggestions of subject experts. It underwent four stages of construction, namely, Planning, Writing the programme, Try-outs and Revision and Evaluation of the final draft. The sample comprised of 540 students of five co-education schools of Ahmedabad city. The schools were selected with purposive method. Two classes were randomly selected from each school. It was an experimental study based on Pretest - Posttest Non-equivalent Control Group Design. One class was randomly treated as Experimental Group (EG) and the other as Control Group (CG). The experiment was conducted during July-August 1998. Prior to the treatment, a pre-test and Desai Verbal - Nonverbal Group Intelligence Test were administered. The EG learned through the PLM in the presence of the investigator, while the CG was taught through the lecture method by the regular teachers. At the end of the experiment, a criterion test was administered to both the groups. The reliability of the test was established through test - retest method ($r = 0.76$). The content validity was established with the help of the experts. The EG was administered a reaction scale also. The data were analyzed applying t-test and $2 \times 2 \times 2 \times 2 \times 2$ Factorial Design ANOVA. Intensity Index on each statement was computed for testing students' reaction towards PLM.
The major findings were: (1) Both PLM and LM were found to be effective in terms of students' achievement on the criterion test yet, PLM was significantly superior to LM. (2) The main effect of each of the five variables – treatment, sex, intelligence, test and category of caste – was significant on students' achievement. (3) Majority of two-way, three-way and four-way interactions of variables did not produce any significant effect on students' achievement. (4) The interaction of all the five variables did not produce significant effect on students' achievement. (5) Intelligence and category of caste worked as influencing factors to determine students' achievement in both the groups. Sex was the determining factor in the LM but not in the PLM group. (6) PLM was significantly superior to LM in terms of all selected variables. (7) PLM was found to be very effective in terms of students' reaction towards it.


The objectives of the study were: (1) To study the educational achievement of students of Standards VIII, IX and X. (2) To study the effect of psychological variables on high, average and low educational achievement of the students. (3) To study the relationship between educational achievement
and SES of the students. (4) To study Main as well as various interaction effects of gender, Intelligence, N-ach. and self-concept on educational achievement of the students. (5) To study Main as well as various interaction effects of gender, Intelligence, N-ach. and self-concept on SES of the students. (6) To study the effect of the selected psychological variables on educational achievement of the students by controlling other independent variables. (7) To study the effect of the selected psychological variables on SES of the students by controlling other independent variables.

The Survey Method was employed. The sample of 1040 SC and Non-BC boys and girls of Standards VIII, IX and X was selected by Stratified Sampling Technique from the secondary schools of the Panchmahal District. The data were collected by administering SES scale developed by Patel & Vora, Desai-Bhatt Verbal-Nonverbal Group Intelligence Test, N-ach. Inventory by Prayag Mehta and Self-Concept Inventory by J.H. Shah. For the educational achievement of the students, their scores in the annual examination of April 1999 were collected. The data were analyzed with the help of Mean, SD, Normal Probability Curve, t-test, ANOVA and ANCOVA.

The major findings were: (1) The educational achievement of students of Standards VIII & IX and of Standards VIII & X differed significantly. (2) There was a significant difference among the IQs of the students of high, average
and low educational achievement. (3) The N-ach of the students of average
and low educational achievement differed significantly. (4) There was a
significant influence of gender on educational achievement. (5) The
interactions between the following variables had significant influence on
educational achievement: gender x intelligence; gender x self-concept; gender
x SES; gender x N-ach; intelligence x self-concept; intelligence x N-ach;
Standard x intelligence; and intelligence x self-concept x N-ach. (6) There was
a significant influence of intelligence, self-concept and N-ach. on SES of the
students. (7) The interactions between the following variables had significant
influence on SES: gender x intelligence; gender x self-concept; intelligence x
self-concept; and self-concept x N-ach. (8) The groups having high, average
and low N-ach. differed significantly with respect to educational achievement
when intelligence as well as self concept was taken as covariate. (9) The
groups having high, average and low self-concept differed significantly with
respect to educational achievement when intelligence as well as N-ach. were
taken as covariates.

Shukla (2003) studied "A Study of the Effectiveness of Video
Programmes With Discussion, Without Discussion and Traditional Methods on
the Achievement of Student Teacher in Context of Certain Variables"

The objectives of the study were: (1) To compare the effect of teaching
through video programmes with and without discussion and traditional method on the achievement of student teachers. (2) To compare the achievement of science and arts student teachers. (3) To compare the achievement of male and female student teachers. (4) To study the effect of interaction between method of teaching and the faculty on the achievement of the student teachers. (5) To study the effect of interaction between sex and the method of teaching on the achievement of the student teachers. (6) To study the effect of interaction between sex and the faculty on the achievement of the student teachers. (8) To study the effect of interaction of independent variables on the achievement of the student teachers. (9) To study the effect of video programmes on the attitude of the student teachers towards education through video programmes. The formulated hypotheses were: (1) There will be no significant difference among the mean achievement scores of the student teachers taught by video programmes with discussion, without discussion and traditional method. (2) Mean achievement scores of the student teachers belonging to science and arts faculties will not differ significantly. (3) Mean achievement scores of male and female student teachers will not differ significantly. (4) There will be no significant effect of interaction between method of teaching and faculty on the achievement of the student teachers. (5) There will be no significant effect of interaction between method of teaching and sex on the achievement of the student teachers. (6) Interaction between
faculty and sex will not affect the achievement of the student teachers. (7) There will be no significant effect of interaction among the independent variables on the achievement of student teachers. (8) There will be no significant difference between pre and post treatment mean attitude scores of the student teachers. (9) There will be no significant difference between pre and post treatment mean attitude scores of the science student teachers. (10) There will be no significant difference between pre and post treatment mean attitude scores of the arts student teachers. (11) There will be no significant difference between pre and post treatment mean attitude scores of the male student teachers. (12) There will be no significant difference between pre and post treatment mean attitude scores of the female student teachers.

Total three B. Ed. colleges situated in Ahmedabad were selected for the study using purposive sampling technique. Out of which one remained common as an experimental college in both the year of the study as the replication of the study was done in the second year of the study. Out of the remaining two colleges, one was selected in the first year of the study and the second in the second year of the study. The student teachers of these colleges were treated as control groups. The number of student teachers selected for the study was 163 in the first year and 205 in the second year of the study. These student teachers were divided in three groups keeping in mind their IQs, faculty and sex, out of which two groups were treated as experimental
groups and one as control group in both the years of study. $3 \times 2 \times 2$ factorial design was selected in both the years of study for the analysis of the achievement scores. Further the attitude towards the education through video programmes of the student teachers of the experiment groups were also measured before and after the treatment so pre test post test was also adopted to know the change, if any, in their attitude before and after they were exposed to the experiment. Method of teaching, faculty and the sex were the main independent variables and the achievement and attitude of the student teachers towards education through video programmes were the dependent variables. Desai Verbal Non-verbal Intelligence Test was used for dividing the student teachers in different groups. IQ test was assessed in both the years in all the colleges of study. Attitude Scale was used to know the attitude of student teachers regarding the usage of video programmes in teacher education programme. The investigator constructed an achievement test in Gujarati. A $3 \times 2 \times 2$ factorial design Analysis of Variance (ANOVA) was used for the analysis of achievement scores. Further to check the significance of mean difference of different groups Scheffe test was also used. To compare the attitude of the student teachers of experiment groups towards education through video programmes before and after the experiment the ‘t’ test was used.
The major findings of the study were: (1) The methods of teaching had significant effect on the achievement of the student teachers. (2) The student teachers who were taught through the video programmes with discussion were better in achievement than the student teachers who were taught through video programmes without discussion. (3) The student teachers who were taught through the video programmes with discussion were better than the student teachers who were taught through the traditional methods as far as their achievement was concerned. (3) The student teachers who were taught through the video programmes without discussion were better than the student teachers who were taught through the traditional method as far as their achievement was concerned. (4) It was also found that the student teachers belonged to the Science faculty were cleverer than those belonged to Arts faculty as far as their achievement was concerned. (5) Sex of the student teachers did not affect their achievement significantly. (6) Interaction between the methods of teaching and faculty had no significant effect on the achievement of the student teachers. (7) Interaction between the methods of teaching and sex had no significant effect on the achievement of the student teachers. (8) Interaction between the faculty and sex did not affect the achievement of the student teachers significantly. (9) Interaction among the methods of teaching, faculty and sex had no significant effect on the achievement of the student teachers. (10) Attitude of all the student teachers
towards the education through video programmes after the treatment was more positive than that was before the treatment. (11) Attitude of the male student teachers towards the education through video programmes after the treatment was more positive than that was before the treatment. (12) Attitude of the female student teachers towards the education through video programmes after the treatment was more positive than that was before the treatment. (13) Attitude of the science student teachers towards the education through video programmes after the treatment was more positive than that was before the treatment. (14) Attitude of the arts student teachers towards the education through video programmes after the treatment was more positive than that was before the treatment.


Africans Americans, Hispanics, Native Americans and women are under represented among the population of scientists and science teachers in the United States. Specifically, the shortage of African Americans teaching mathematics and science-related fields is manifested throughout the entire educational and career structure of our society. This shortage exists when
compared to the total population of African Americans in this country, the population of African American students, and to society's demand for more mathematics and science teachers and professionals of all races.

One suggestion to address this problem is to update curricular and instructional programmes to accommodate the learning styles of African Americans from elementary to graduate school. There is little in the published literature to help us understand the earning styles of African American middle school students and how they compare to African American adults who pursue science careers. There is also little published data to help in form about the relationship between learning styles of African American middle school students and their attitudes toward science.

The author used a learning styles inventory instrument to identify the learning style preferences of the African American students and adults. The preferences identified describe how African American students and African American adult science professional prefer to function, learn, concentrate, and perform in their educational and work activities in the areas of: (a) immediate environment, (b) emotionally, (c) sociological needs, and (d) physical needs. The learning style preferences for the students and adults were not significantly different in key areas of preference.
A Test of Science-Related Attitudes (TOSRA) was used to measure seven distinct science-related attitudes of the middle school students. A comparison of the profile of the mean scores for the students in this study to a national norm, comprised of students of all races, showed no significant differences. The attitudes that African American middle school students have toward science are influenced by science professionals (role models) their parents, and their teachers. This correlation directly with the high preference for Parent Motivated and Teacher Motivated learning style preferences.


This study reported on the motivational influence of the school environment on the resiliency of Native-American high school students in selected North Carolina public school districts. For its theoretical framework, the study relied on the Resiliency Theory of Henderson and Milstein (1996).

Historically and currently, the academic achievement of Native-American students lags behind all other students (Noley, 1992). A sample of 50 Native-American public school students in three school districts in North Carolina served as subjects of this study. The North Carolina End-of-Course test scores in English and mathematics served as indicators of success. The
students completed McInerney's (1995) Inventory of School Motivation, which the author modified for this study. The inventory measured students' motivation for doing well in school. Twenty-four students were interviewed in-group settings to clarify the resiliency characteristics of successful and less successful Native American high school students. The author hypothesized that Native-American high school students whose End-of-Course tests indicated resiliency had a greater sense of motivation, competence, recognition, and purpose, based on responses on the Inventory of School Motivation, than Native-American students whose End-of-Course test scores indicated less resiliency. The results of a west of independent samples, at the .05 level of statistical significance indicated no statistical difference between the students who passed the End-of-Course tests and those who did not pass the End-of-Course test. Group interviews resulted in similar findings. The findings of this study challenge educators to increase resiliency by fostering a more caring school environment and communicating high expectations for Native-American students.

Lau and Shun (2003) studied "Cognitive Abilities and Motivational Processes in High School Students' Science Achievement and Engagement".

The dissertation presents two analytic approaches, a variable-centered and person-centered approach, to investigating holistic patterns of the
cognitive, motivational, and affective correlates of science achievement and engagement in a sample of 491 X and XI grade high-school students. Building on Snow's (1989) idea of two pathways to achievement outcomes, Study 1 adopted a variable-centered approach to examining how cognitive and motivational factors associated with the performance and commitment pathways, respectively, contributed to the prediction of achievement outcomes in science. Results of hierarchical regression analyses showed that (a) students' cognitive abilities were the strongest predictors of their performance in science as measured by standardized test scores; (b) motivational processes enhanced the predictive validity for science test scores and grades beyond the variance accounted for by ability and demography; (c) motivational processes were the strongest predictors of students' commitment to science in the form of situational engagement and anticipate choices of science-related college majors and careers; and (d) competence beliefs served as a point of contact between the performance and commitment pathways. These results are consistent with Snow's (1989) conjecture that both performance and commitment pathway-related factors are necessary for understanding the full range of person-level inputs to achievements outcomes. Study 2 adopted a person-centered approach to examining holistic organizations of psychological factors within individuals and their relations to science achievement and engagement. Four types of students characterized by unique configurations of
cognitive, motivational, and affective attributes were identified in both the male and female sub samples using inverse factor analysis. Type membership was found to distinguish students in various indicators of science achievement and engagement. Two of the four types were also found to generalize across gender groups. These two generalizable types resembled the mastery-oriented and helpless patterns identified in motivational research and the resilient and over controlled patterns identified in personality research. Study 2 provides empirical evidence for the replicability, generalizability, and validity of the identified types in the domain of science. It also demonstrates the importance of examining holistic patterns of individual psychological profiles and the utility of inverse factor analysis in person-centered research.

Yang, Eun-Mi, (2003) studied "Developmental Changes and Gender Effects on Motivational Constructs Based on the Expectancy-Value Model in Czech And U.S. Students Regarding Learning of Science, Mathematics , and Other Subjects".

This study employed American and Czech student samples to investigate the motivational constructs used in Eccles and Wigfield's (1983) expectancy-value model. To predict achievement behaviour, the model specifies relationships among expectancy for-success and task value, task-specific self-concept, perception of task-difficulty, perceptions of social
environment, and interpretations and attributions for past events in relation to the social world. Czech and American students (n = 1,145) in grades IV – XII were the participants in this study. The causal relationships among the constructs were tested to investigate structural similarities and differences in the models for both countries. This study also explored developmental changes, gender, and national differences in the students' motivational beliefs for these motivational constructs: Expectancy for Success, Intrinsic Interest Value, Task-specific Self-concept, Perception of Task-difficulty, and Perceived Vocational Gender Dominance for science, mathematics, and other school subjects.

The findings indicated that, for both countries, with respect to changes over grade level, compared to the younger students, the older students showed lower motivational beliefs for most subject areas except reading. However, the Czeck students in grades VI and VIII showed more positive motivational beliefs in life science and social studies than did the Czech students in other grade levels. In comparing genders, the male students exhibited more positive motivational beliefs in physical science than did the female students, and female students showed more positive motivational beliefs in reading than did the male students. For life science, the Czech female students rated Intrinsic Interest Value and Task-specific Self-concept higher than did their peer male students. The American students' motivational
beliefs in reading were more positive than were Czech students', and the Czech students held more positive motivational beliefs in life science than did the American students. With minor variations for each country, the expectancy-value model provided a reasonable tool for understanding the causal relationships among the motivational beliefs. For the Czech sample, Perception of Task-difficulty was a strong negative predictor for Expectancy for Success for most school subjects except life science whereas, for the American sample, it was a week but significant negative predictor for Intrinsic Interest Value for most school subjects except social studies. Implications for science education are discussed.

Chrishon-Ford and Grace (2003) studied "Impact on Constructivist Pedagogy on Science Education".

This study focused on how constructivist pedagogy impacts science achievement of the fourth grade students in an elementary Department of Defense School. Constructivism is a learning or meaning-making theory that offers an explanation of the nature of knowledge and how human beings learn.

The population of this study was two fourth grade classes in an elementary Department of Defense District School. Data collection was accomplished in four ways: (1) focus group interviews of students, (2)
individual interviews of students selected from the focus groups, (3) interviews of teachers, and (4) unobtrusive observations of science instruction.

A six-step process was followed to gain entry for this study. The steps were researcher university dissertation committee, Department of Defense Education Activity Research Study Request, Endorsement and Agreement form to the Headquarters Office, school superintendent, school principal, teacher participants, and the final step was to seek parental approval of the fourth graders involved in the study.

The findings from this study were an increase of 47% test scores, 57% revealed experiments/projects and 64% working on the computers in groups were the fun things; 100% student interaction; 100% student attentativeness; and 70% using other resources.

Implications have demonstrated that the traditional classroom can be converted if the teachers and administrators would buy into the approach that this project demonstrated. As an advocate of the constructivist model the case study demonstrated students do indeed respond to the constructivist theory. If approached in a positive manner, it could be done in any kind of school setting.
Herring and Rita (2003) studied "The Effects of Kinesthetic Teaching Strategies on Student Academic Achievement in Science".

The purposes of this research study were to (a) compare the effectiveness of years of traditional textbook instruction with the effectiveness of kinesthetic-based instruction in science on student test scores on the IOWA: Test of Basic Skills (ITBS) (b) compare the effectiveness of traditional and kinesthetic science teaching on teacher and student experiences in science through interviews with teachers and students, and (c) assess the opinions of students receiving kinesthetic-based and text-based book instruction in science.

The study group involved students in fifth grade who had experienced kinesthetic-based instruction for 4 years, two classroom teachers per grade level who provided textbook-based instruction in science, and one classroom teacher per grade level who provided kinesthetic-based instruction in science. The same science curriculum was studied in all classrooms.

The IOWA Test of Basic Skills (ITBS) scores from 1999 to 2000 for second and third grade were analyzed to compare the effects of kinesthetic-based and textbook-based instruction on student academic achievement in science. No significant differences were found between study and control groups. In addition, interviews were conducted with students and teachers.
Themes that emerged from the data were (a) kinesthetic teaching of science is more fun for teachers and students than traditionally taught science, (b) there are differences in learning styles for students and teachers, and (c) experiences in science class can be rewarding. One recommendation for practice would include using a larger sample.


This study explores the cognitive mechanisms of problem solving in physics and the students' problem-solving strategies. Based on the review of prior research and on the author's own experience, a theory of problem-solving skills is proposed.

This theory suggests the existence of a meaningful dichotomy between the students' rigid knowledge and their bisociation skills. The goals of the study are to test the proposed theory and to gain further insight into the nature of students' difficulties and the strategies that help successful solvers to overcome those difficulties.

To conduct the study, a large group of AP Physics C students was given several physics tasks to solve. The participants' interactions with the tasks were observed and recorded in several different ways. The data collected are
analyzed in conjunction with the background information provided by the students. Correlation statistics and linear regression models are used to determine the factors relevant to individuals' success in problem solving. The written comments and the protocols of student interviews are analyzed qualitatively, using the narrative summary and the cluster methods.

The results support the idea of rigid knowledge and bisociation being two distinct sets of skills essential to problem solving; the notion of bisociation as the main factor limiting one's problem-solving success is also supported. In addition, specific behaviours associated with both successful and unsuccessful problem-solving processes were identified and analyzed. Based on the findings of the study, new approaches to teacher training, curriculum development, educational research and classroom practice are proposed.

Athman and Ann (2003) studied "The Effects of Environment-Based Education on Students' Critical Thinking and Achievement Motivation".

This study examined the relationship between environment-based education and high school students' critical thinking skills, disposition toward critical thinking, and achievement motivation. Twelve environment-based programmes in Florida high schools were selected through operational construct and maximum variation sampling, and 586 IX and XII grade students participated in the study. A Pretest-Posttest Nonequivalent Comparison Group
Design was used for the IX grade study, and a Posttest Only Nonequivalent Comparison Group Design was used for the XII grade study. Students' scores on the Cornell Critical Thinking Test (Level X) California Measure of Mental Motivation (Level II) and Achievement Motivation Inventory served as measures of the outcome variables. Interviews of students and teachers were used in the classic sense of triangulation and for extending the breadth of the inquiry. Data collection took place over the 2001-2002 school years.

Multiple linear regression, factorial ANCOVA, and SPSS 10.0 were used in the quantitative data analysis. When controlling for pretest scores, GPA, gender, and ethnicity, environment-based programmes had a positive effect on IX grade students' critical thinking skills \( (p = .002) \) and achievement motivation \( (p = .025) \). When controlling for GPA, gender, and ethnicity, environment-based programme s had a positive effect on XII grade students' critical thinking skills \( (p < .001) \) disposition toward critical thinking \( (p = <.001) \) and achievement motivation \( (p < .001) \); the effects on achievement motivation were moderated by ethnicity. The effects on students' achievement motivation appear to be generalizable beyond the schools in the study; a variety of programme formats and settings were effective in improving achievement motivation. The effects on students' critical thinking skills and disposition toward critical thinking do not appear to be generalizable beyond the schools in the study, at least at the XII grade level. Variation in programme
format and implementation resulted in inconsistent critical thinking outcomes. The results of this study support the use of environment-based education in achieving broad goals of education reform, specifically for improving critical thinking skills, disposition toward critical thinking, and achievement motivation, and can be used to justify the use of environment-based education programmes and guide future implementation of environment-based education.

Amirault and Ray (2003) conducted "A Study Examining the Effectiveness of Two Instructional Treatments on Student Achievement, Motivation, and Cognitive Reasoning Processes in A Complex Concept Domain".

The purpose of this study was to determine the effectiveness of a concept-focused and a procedures-focused instructional approach on adult learner concept acquisition in terms of performance, motivation, and concept usage in reasoning. The concepts in the study consisted of complex defined concepts from a highly technical domain. Eleven students in a graduate instructional design programme were assigned via stratified groups to one of two instructional treatment groups, one concept-focused and one procedures-focused. Learners in the Concept-Focused Group received conceptual relational database design instruction. Learners in the Procedures-Focused Group were presented the identical conceptual information, but embedded throughout an
instructional sequence that emphasized procedural knowledge. Significant positive differences were found for transfer performance and motivation levels in learners between the two groups. Verbal protocol analysis revealed no differences in time or trial and error strategies learners in the two groups took to solve a far transfer problem. These findings suggest that a concept-focused instructional strategy can have positive impact on student learning and motivation when learning complex defined concepts, and can assist learners in developing a more accurate mental model of these complex concepts. Suggestion for future research is presented.

Brentley and Mary (2003) studied "The Impact of Selected Academic, Familial, and Learners’ Characteristics on Motivation, Persistence and Academic Achievement".

Historically, colleges and universities are challenged to retain students in general and developmental students. Many students who come to college are ill prepared; they score below the national average on standardized tests and are placed in developmental courses. While colleges and universities are interested in retention and persistence, the ultimate goal is to graduate students without jeopardizing high standards of education.

The purpose of this study was to examine the relationships between selected predictive variables and academic achievement and persistence of all
learners and also at-risk learners. The predictive variables included National Educational Longitudinal Study (NELS) pretest scores (English, reading, mathematics, and social sciences cognitive tests) American College Test (ACT) composite scores, gender, ethnicity, socioeconomic status composite (parents' education, parents' occupation, and family income) and parents' expectations. The three dependent variables are motivation, academic achievement and persistence. This study employed data from the National Career for Education Statistics' NELS cohort study, which was begun in 1988 and continued through 2000. The participants in the study were Asians, Whites, Blacks, Hispanics, and American Indians in the national sample. The researcher used the weighted sample population of 14,915 participants in the general sample. There were also 1,371 at-risk participants.

The data were analyzed using multiple regression and path analysis. Results show that ACT scores, SES, parental expectation, race (Black, White, Asian, and Hispanic) and gender (male) are significant predictors of motivation for the general sample. For the at risk sample, it shows that parental expectation, race (White, Asian) and gender (male) are significant predictors of motivation.

For the achievement of the general sample, ACT scores, NELS scores, Parental expectation and race (Black, Asian, Hispanic, and White) are
significant predictors. For the at-risk students, only being Black is a significant predictor.

Lastly, ACT scores, NELS scores, motivation, and race (Black and Hispanic) are significant predictors of persistence. For the at-risk sample, ACT scores, parental expectation, and race (White) are significant predictors.

In the path model, the independent variables collectively accounted for 24.2% of the variance in the dependent variable. Hence, further studies are recommended to find other contributors to motivation, achievement, and persistence. The results also accentuate the importance of parents’ expectations on student achievement and persistence.

Hoare and Philip (2003) studied “Effective Teaching of Science through English in Hong Kong Secondary Schools”.

This study sought to identify how teachers of science in English medium secondary schools in Hong Kong make science content accessible to students through English, the students’ second language. The strong emphasis on language outcomes in much of the research on late immersion (of which English medium education in Hong Kong is considered an example) indicates that a study, which addresses classroom processes, may be timely.
The significance of language in immersion education suggested that an awareness by teachers of the part language plays in learning within the curriculum might provide a means by which qualitative differences in the teaching of content could be identified. The study, therefore, attempted to determine whether there are any differences between teachers who are strongly aware of the role of language in learning and those who are weakly aware in the ways they integrate language and content in their teaching to facilitate student learning. Further, it explored how those differences are realized.

A qualitative approach was adopted for the study. A theoretical framework was developed with which to analyze classroom data on the teaching of science through English. The framework was made up of six dimensions describing the integrated teaching of science and the English of science in an immersion context. It was developed from the literature and was further refined as a result of intensive reading and re-reading of lesson transcripts.

Six teachers of science were studied. A questionnaire was used to place each teacher on a language awareness continuum and four were thus classified as strongly language aware and two as weakly languages aware. The teachers were observed and recorded teaching the same science topic.
Following the lessons, the students were given a test of science, which required that they express their understanding in written English. The teachers and some students were also interviewed.

The science test results revealed that students of the more strongly language aware teachers were better able to express their understanding of the science they had been taught through English. The analysis of classroom data and the teacher and student interviews using the theoretical framework revealed qualitative differences between the language-related pedagogy of the teachers, which could have accounted for the differences in learning outcomes. These qualitative differences in teaching can be attributed to the teachers' awareness of the role of language in science learning and their pedagogical skills in operationalising their awareness as strategies to make the meaning of the science explicit to their students through English.

These findings have implications for late immersion content teaching and for teacher education for late immersion teachers.

Tsai and Li-Ling (2004) studied "Women in Physics? Identity and Discourse in Taiwan".

This dissertation argues that the deeply held hope for gender equity in science can no longer be simply realized as a project to increase women's
participation in science. Understanding women's vexed relations with science requires a reconceptualization of the terms women and science, not as given categories to signal how "women" are coping with their disadvantaged positions in "science", but rather as two discourses formed in relation to each other, in institutional practices and in particular social and historical contexts.

This dissertation investigates discourses of women and science by focusing on women in physics in Taiwan. This focus extends debates about gender and science by showing that the intervention of a particular discourse – in this case, the discourse of "women in physics" – into an existing discursive field exposed the contested terrain of the gender politics of physics and the identity politics of women physicists in Taiwan. "Women in physics" emerged as an internationally legitimate subject position in Taiwan in the year 1999 following a call to form a local working team on women in physics. The participants researcher interviewed utilized this internationally legitimate subject position to reconstruct, in different ways, their gendered identities in physics.

Scholarship in the filed of gender and science education studies has, over the past three decades, focused on equity and inclusion to address gender inequalities in science. This dissertation suggests, by contrast, that a focus on identity is necessary for understanding gendered career decisions in science. The term identity refers to how individuals perceive themselves and
how others respond to their claims; identity involves the purposes, interests and contexts of particular naming processes. In the structural inequalities of gender and science, focus on identity aims to track individual and collective forms of agency exercised in changing discursive fields. This dissertation concludes by viewing curriculum as a discursive field where various discourses provide subject positions and produce potential meanings through teaching and learning. Hope for social transformation can be situated in the interventionary power of new discourses and the subsequent reconfiguration of gendered identities in existing institutional practices.

Burns-Casey (2004) studied "The Relationship Between Learner-Centered Techniques and Student Motivation in an Extended-Time Schedule".

The purpose of this study was to determine if student motivation is increased in a learner-centered environment compared to a non-learner-centered environment under an extended-time schedule. This investigation reviews previous literature related to learner-centeredness, student motivation, and extended-time schedules. The data were collected at one suburban high school in the Chicago area. This study found support for the predictions that students' attendance, discipline, and self-efficacy would be significantly higher for students who perceive that their teachers use learner-centered practices. The major implication of this investigation was the concept
that teachers need to be aware of their students' perceptions of their instructional techniques. An accurate assessment of these perceptions is crucial to improving student motivation in an extended-time schedule.

Steakley and Capers (2004) studied "The Effects of a Science Intervention Programme on the Attitudes and Achievement of High School Girls in Science".

This study investigated the effects of a high school science intervention programme that included hands-on activities, science-related career information and exposure, and real-world experiences on girls' attitudes and achievement in science. Eighty-four girls, 44 ninth-graders and 40 tenth-graders, and 105 parents participated in the study. Survey data was collected to assess the girls' attitudes toward science in seven distinct areas: social implications of science, normality of scientists, attitude toward scientific inquiry, adoption of scientific attitudes, enjoyment of science lessons, leisure interest in science, and career interest in science. Additional questionnaires were used to determine the extent of the girls' participation in sports and the attitudes of their parents toward science. The girls' cumulative science semester grade point averages since the seventh grade were used to assess academic science achievement.
This study found no evidence that participation in the programme improved the girls’ attitudes or achievement in science. Parent attitudes and years of participation in sports were not accurate predictors of science achievement. Additionally, no significant relationship was detected between the girls’ and their parents’ perceptions of science. However, the study did suggest that extended participation in sports might positively affect science achievement for girls. This study holds implications for educational stakeholders who seek to implement intervention methods and programmes that may improve student attitudes and achievement in science and attract more youth to future science-related careers.


The gender gap in achievement in science continues to plague science educators (AAAS, 2001). Strategies to close this gap have defined the problem in terms of girls’ lack of interest or their inability to survive in science classrooms.

Recent feminist scholarship has re-centered this problem of gender inequity not on girls, but on the nature of science and how it is taught in schools (Birke, 1986; Parker, 1997). Parker (1997) argues that it is schools that need to change and recommends a gender-inclusive science curriculum for schools.
This dissertation argues for a new framework and research agenda for understanding the relationship between gender and science in schools. Researcher study examines the gender dynamics of how unequal gender relations are negotiated, resisted and sustained in the context of a second grade science classroom.

In examining the gender dynamics between the boys and the girls in a science classroom, researcher found that the boys positioned the girls as their assistants, as incompetent in science, as weak in contrast to the boys, and in need of the boys' help and protection. These discourses functioned to create and sustain unequal gender relations in the classroom. The girls responded in paradoxical ways to the boys' positioning of them. They resisted the boys by: (a) ignoring them; (b) using a domestic discourse to negotiate/gain more power; (c) appropriating teacher authority; or (d) using sexuality to embarrass and silence the boys. The girls also deferred to the boys as experts in science. In these ways, the girls themselves contributed to maintaining unequal gender relations in the classroom. Researcher found that the classroom context is a site of struggle for both boys and girls as they seek to secure a place in the social hierarchy of the classroom. For the boys, masculinity is strong and powerful yet fragile and vulnerable. The girls struggle in holding multiple images of femininity.
Examining gender dynamics through positioning and negotiation for power in a science classroom has implications for teaching science in elementary school.

Evera and William (2004) studied "Achievement and Motivation in the Middle School Science Classroom: The Effects of Formative Assessment Feedback".

Formative assessment feedback is increasingly viewed as essential to learning. Yet, existing studies on feedback have focused heavily on knowledge of results (KR) feedback rather than information-rich formative assessment feedback that is more commonly used to encourage and guide learning. This study was designed to investigate the effects of information-rich formative assessment feedback on performance and motivation of middle school science students. Using a within subjects crossover design, treatment students received written formative assessment feedback on all homework and classwork assignments. Control students received completion scores for their work but no feedback. Dependent measures included two multiple-choice unit tests and a multipart motivation survey, which assessed self-efficacy, goal orientation, affective responses, and preferences regarding feedback. Results indicated effects sizes of .7 for low achievers and A for middle level achievers on the performance measure as a result of the feedback intervention. These
students also experienced a significant increase in self-efficacy. High achievers experienced reduced performance following the feedback intervention with an effect size of -.7. Survey analysis revealed no improvement in motivation-related variables for high achievers.

Johnson and Denise (2004) studied "Girls and Science: A Qualitative Study on Factors Related to Success and Failure in Science".

This qualitative study sought to determine how girls perceived factors that contribute to their success in science programmes designed to maximize their achievement. The sample consisted of 20 students in IX and XII grades attending a school of choice. Respondents were interviewed using a structured interview protocol.

The National Council for Research on Women study (Thom, 2001) found that girls are more successful in mathematics and science programmes that incorporate a cooperative, hands-on approach than in programmes that stress competition and individual learning. This finding was supported by this study among 20 high school girls in a school whose mission is to improve the access of girls who study and choose careers in STEM (science, technology, engineering, and mathematics) disciplines. Related studies on the subject of the under representation of girls and women in science and related disciplines raise the question why so few girls choose STEM careers.
Qualitative inductive analysis was used to discover critical themes that emerged from the data. The initial results were presented within the context of the following five themes: (1) learning styles, (2) long-term goals, (3) subject matter, (4) classroom climate/environment, and (5) evaluation. After further analysis, the researcher found that factors cited by the girls as contributing to their success in science programmes specifically designed to maximize their achievement were: (a) cooperative learning, (b) a custom-tailored curriculum, and (c) positive influence of mentors.

Slykhuis and David (2004) studied "The Efficacy of World Wide Web-Mediated Microcomputer-Based Laboratory Activities in The High School Physics Classroom".

This research project examined the efficacy of an online microcomputer-based laboratory (MBL) physics unit. One hundred and fifty physics students from five high schools in North Carolina were divided into online and classroom groups. The classroom group completed the MBL unit in small groups with assistance from their teachers. The online groups completed the MBL unit in small groups using a website designed for this project for guidance. Pre- and post-unit content specific tests and surveys were given. Statistical analysis of the content tests showed significant development of conceptual understanding by the online group over the course of the unit.
There was not a significant difference between the classroom and online group with relation to the amount of conceptual understanding developed. Correlations with post-test achievement showed that pre-test scores and mathematics background were the most significant correlates with success. Computer related variables, such as computer comfort and online access, were only mildly correlated with the online group. Students' views about the nature of physics were not well developed prior to the unit and did not significantly change over the course of the unit. Examination of the students' physics conceptions after instruction revealed common alternative conceptions such as confusing position and velocity variables and incorrect interpretations of graphical features such as slope.


The purpose of this study was to simulate and evaluate a variety of computerized adaptive test (CAT) designs for the Verbal Battery of the Cognitive Abilities Test (CogAT) intended to overcome shortcomings of the current operational paper-and-pencil (P and P) version of the test. The CAT designs differed in terms of starting point (fixed versus variable) unit of adaptation (item versus cluster) and item/cluster selection method (unrestricted
maximum information and maximum information restricted to a probability for correct response of 60% or higher). These designs were compared to the P and P tests and to each other using several criteria: percent-correct scores, bias, standard errors of measurement (SEMs) relative efficiency (RE) and item pool usage. The comparisons were made at both full and reduced test lengths using overall indices and indices conditioned on examinees' true ability levels.

The results revealed that the CAT designs at both full and reduced lengths provided less bias, lower SEMs, and higher RE than the P and P tests. These improvements were especially noteworthy at the ability extremes. All CAT designs provided superior measurement quality and item pool usage than the P and P tests using 40 to 60% fewer items. Differences among the CAT designs served mostly to distinguish conditions that varied in terms of restricted versus unrestricted item/cluster selection. Restricted selection resulted in much higher percent-correct scores on average, but in lower levels of accuracy, precision, and relative efficiency. Although no single CAT design provided the best item pool usage at all test levels, designs that used variable starting points typically provided better usage than designs that used fixed starting points. Taken a whole, these results provide compelling evidence that either full- or reduced length CATS might be viable alternatives to P and P administration of the Cog AT Verbal battery. The CAT design that used fixed starting points, cluster adaptation, and restricted cluster selection was viewed
as a particularly appealing alternative due its practical advantages in retaining the content balanced, modular structure of the P and P tests, keeping starting points consistent within grade levels, and increasing examinees' average success rate on test items.

Heyer (2005) studied "The Effects of Gradually Incorporating Inquiry-based Science Instruction into Eighth Grade Physical Science Classes for Gifted Learners on Science Achievement and Student Attitudes toward Science".

This action research study was conducted to test the effects of gradual incorporation of inquiry-based science instruction, teaching students to ask and answer authentic science questions the way scientists do, into science classes for gifted students. Throughout one school year, students in the experimental class were gradually given some autonomy in the organization of laboratory investigations (creating data tables, changing procedures, and creating procedures), whereas the control group conducted the experiments with complete teacher direction. Post-test gain scores for each unit and the final exam scores were compared using $t$-tests. Students also completed a pre- and post-survey regarding their learning and interest preferences with respect to learning through traditional versus inquiry-based instruction. Several students were interviewed regarding these preferences also. Results indicate that inquiry students had higher scores and more
positive attitudes toward science class, although the differences showed little statistical significance.

Robert (2005) studied "Effect of Cognitive Load Conditions upon Performance, Anxiety and Self-efficacy in Computer Based Learning Environment"

The present study examined whether an extraneous cognitive load condition adversely affected participants performance, self efficacy and anxiety. The participants were sixty six pre-service teacher education students across two pre-service under-graduate teacher education courses who volunteered to take part in this study. The correlation coefficient was used for the content because Nolen (1995) found that self-efficacy for statistics was related to cognitive engagement. Participants were randomly assigned to either an extraneous cognitive load or non-extraneous cognitive load condition.

This study yielded a mixture of significant and non-significant findings regarding the effect of extraneous cognitive load upon motivation and performance. The results suggest two things, first, the correlation instruction improved participants' self efficacy. Second, that there were confounds such as processing time and content domain that may have affected the results. This suggests that extraneous cognitive load conditions can still adversely impact motivation and performance, but further research is needed to examine these issues.
Ellis (2006) studied "Drawing on Socio-cognitive Learning Theory".

This study compared achievement scores of 134 male and female high school biology students randomly assigned to groups which either used self-reflection, used self-reflection and received feedback, or did not self-reflect. Following a pretest, the teacher provided self-reflection strategy instruction to students in the two intervention groups and then subsequently provided in-class self-reflection time for these groups. The posttest concluded the unit; the retention measure was five weeks later. A quasi-experimental $3 \times 3 \times 2$ (time x intervention x gender) factorial repeated-measures control group design was used for this study; a repeated measures ANOVA and several one-way ANOVA's were used to answer the research questions. Results from the repeated-measures ANOVA revealed significant results for Time and Time x Intervention, with the reflection group demonstrating significantly lower gains from pretest to posttest than the other two groups. The ANOVA examining differences between those who reflected and those who reflected and received feedback provided significant results with similar results for the difference between the control group and the reflection group. For teachers and students this study provides several areas of practical significance. Primarily, teachers may find lower student achievement if students regularly self-reflect but do not receive feedback for their reflection.
3.3 Conclusion

An extensive review of related literature showed that there exists significant positive relationship between cognitive style and classroom environment on Academic Achievement of students. But some research findings indicate no relationship between cognitive style and academic achievement. Majority of the study on classroom environment indicates its contribution on achievement of students. In this context the investigator was interested to conduct the study on effect of cognitive style and classroom environment on achievement in physics (science) of secondary school students.