Chapter 3

REVIEW OF RELATED LITERATURE

In the present research paper, the attempt to present the review of related literature has been made in the light of the theoretical framework of correlates of academic achievement which are known to occur frequently in the relevant research studies. Such correlates are likely to have implications for high-, average-, and low-achievement and also for these discrepant academic achievement groups at different levels of intelligence.

The main focus of educational research in the recent time has been in the area of correlates of academic achievement. Outline of the theoretical correlates of academic achievement is diagrammatically represented thus:

Fig. 3 Correlates of Academic Achievement.

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Intelligence

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Out of the above correlates, review was made of only those variables which have been considered relevant in the present study, namely, styles of learning, locus of control, and achievement motivation. Intelligence has been included in the present study with respect to its different levels: (i) High-intelligence level, (ii) average-intelligence level, and (iii) low-intelligence level. A review of the research literature related to the problem under study has been grouped under four subheadings: Intelligence and academic achievement, styles of learning and academic achievement, locus of control and academic achievement, and achievement motivation and academic achievement. Besides, a review of research literature has also been undertaken on the relationships between styles of learning and faculty. It was thought that such review of literature would be of help in gaining insight into the problem and also in providing a basis for conceptual framework for the formulation of hypotheses (Puri, 1984)

Intelligence and Academic Achievement

Voluminous research undertaken in the past has established the fact that grades in schools depend, to a considerable extent, on intelligence. Studies by Hollingworth and Cobb (1923), Carroll (1930), Sanford (1952), Wedemeyer (1953), Gowan (1955), Hammond and Cox
(1967) Marjoribanks (1976), Carey (1978), Kumari (1979), Kaufman (1980), Basu (1982), Srivastiva (1987), and several others have reported that superior intelligence is associated with high academic achievement. High intelligence is accountable for superior problem-solving abilities, effective work habits, independent thinking, and desirable behavioural characteristics which enhance academic achievement.

As early as the 1930's, Pinter (1931) and Strang (1937) confirmed the significant role played by intelligence in educational attainment, while carrying out detailed reviews of research literature. Recent scientific enquiries in this field have buttressed the proposition that intelligence is a major influencing factor in the domain of academic achievement. A few studies have been cited below to testify this relationship.

Freeman (1942) carried out a study on the relationship between IQ and academic achievement, and reported correlation ranging between .40 and .60 with the approximate value of mean equal to .51. Crawford and Burnham (1946) reported correlation range of .60 to .65 between the two. Flaherty (1964) obtained a correlation of .63 between scholastic aptitude test score and GPA. Lennon (1950) found that at grade 4 and above, the correlations between intelligence and academic achievement were positive and ranged from .11 between IQ and
Arithmetic fundamentals at grade 2 to .86 between IQ and vocabulary score at grade 8.

Dibble (1967) recorded zero-order correlation of .48 between intelligence and the criterion variable of academic achievement. Cuppens (1967) investigated Dutch high school subjects with Dutch version of the DTA and CMA scales. Results indicated that there was a positive correlation between DAT intelligence and GPA (r=.28), between DAT intelligence and DAT achievement (r=.31). Lewis (1967) made a multivariate analysis of variables associated with academic success within a college environment and found that mental ability was most significantly related to academic achievement. Garms (1968), in his studies, found that one of the best predictors of academic achievement was the verbal version of the scholastic aptitude test. Rattan and MacArthur (1968) reported a highly significant correlation of .57 between scores on Progressive Matrices (Raven's, 1958) and achievement. Sampson (1970) showed that there was a 50.3% congruence between IQ and GPA ranking. Diwan (1970) obtained a correlation of .51 between Jalota's test of verbal mental ability scores and the annual marks of grade 9. Pandey and Singh (1970) obtained a correlation of .46 while Dhaliwal (1971) recorded a correlation of .52 between intelligence and academic achievement. However, Rao (1965) found low correlation of .23 between these two
variables. Chander (1975) found the correlation between intelligence (measured by Jalota's test of general mental ability) and different measures of achievement to be ranging from .13 to .46. Malik (1977) carried out a study on 230 science students (140 boys and 90 girls) of 10th class selected randomly from private and Government high schools of Ajmer to investigate the relationship between intelligence and achievement in chemistry. He found the correlation between the two to be .44 which was statistically significant. The correlations between intelligence and achievement in social studies and science were found by Kaur (1978) to be .60 and .48 respectively. Rogers (1979) studied the effect of intellectual and nonintellectual factors on achievement in subjects of English, Mathematics, Social studies, and science. He demonstrated that IQ scores surpassed global and academic self-concept scores in their value as predictors of achievement at high school level.

Masqud (1980) investigated the relationship between mental ability and academic achievement in different subjects offered by 60 children from a modern primary school and 60 children from a traditional primary school. He found a significant correlation of .49 to .65 between mental ability and academic achievement in different subjects for the modern primary school and correlation ranging from .19 to .38 for the traditional primary
school. Shah and Kishan (1982) carried out an investigation on the contribution of intelligence, adjustment, dependency, and classroom trust to academic achievement of 230 pupils of class 8 selected from English medium schools of Baroda city. They found correlation between intelligence and achievement to be .44 which was significant at .01 level.

Kaur (1983) showed that the correlations between verbal intelligence and achievement in social studies and science were .23 and .39 respectively. She also found correlations between nonverbal intelligence and achievement measures in social studies and science to be .33 and .31 respectively. Gakhar and Kaile (1983) found the correlations between verbal intelligence and achievement in English, Punjabi (first language), and Hindi (second language) to be .43, .32, and .44 respectively. All these values were significant at .01 level. Kaile (1985) studied the relationship of verbal and nonverbal intelligence with achievement in Punjabi and Hindi and showed the correlations between verbal intelligence and achievement in Punjabi and English to be .49 and .41 respectively which were significant at .01 level. The corresponding values of correlation between nonverbal intelligence and achievement were .32 and .22 which were significant at .01 level. Gakhar (1986) found the correlations between intelligence and achievement
measures in science, commerce, arts, and Home Science to be .52, .61, .50, and .54 respectively, which were significant at .01 level.

Okafor (1989) investigated the effect of fear of failure, need achievement, and intelligence on academic achievement measures of students of Panjab University, Chandigarh. He found the correlation between intelligence and academic achievement to be .64, significant at .01 level. All the quoted studies have shown positive and significant relationship between intelligence and academic achievement. But it is pertinent, here, to point out that these studies revealed a lot of variation in the correlations between the two variables. Super (1949), on the basis of summary of various literature reviews, concluded that correlation between intelligence and academic achievement ranged from .30 to .80 at school level. At college level, however, this range lowered from .20 to .70. Greater variations in correlations were even reported by Stephens (1960) to range from .01 to .90. In one of the studies conducted by Green and Farquhar (1965), the exceptionally low and nonsignificant negative correlation of -.01 between verbal aptitude and achievement of Negro males was amazing. With white males, however, they reported a highly significant correlation of .62, using the same tools. Pelechano (1972) had averred emphatically that intelligence was not systematically
related to academic performance. For this reason, Thorndike (1963) had repeatedly warned against holding the opinion that there is a priori justification for expecting an exact one-to-one correspondence between a scholastic aptitude measure and academic achievement. This established the fact that there are other important determinants such as the nonintellective and environmental variables studied by Green and Farquhar (1965), Taylor and Farquhar (1966), Cattell and Sealy (1965), Cattell and Sweney (1966), Entwistle and Welsh (1969), Entwistle and Wilson (1970), Entwistle and Brena (1971) and several others.

Intelligence-achievement relationship has also been studied through the comparison of high-and low-achievers. Sinha (1970) carried out an analysis of some factors associated with success and failure in University education. 185 students who had obtained more than 50% marks in the University examinations were identified as high-achievers and those who had obtained less than 47% marks as well as the failed candidates were regarded as low-achievers. The study revealed that the mean IQ of high-achievers was 112.98 whereas the mean IQ of the low-achievers was 102.49. The difference of 10 points in IQ was statistically significant. Moreover, it was found that the majority of high-achievers (57.83%) belonged to the categories of very superior and superior levels of
intelligence (IQ 111 and above) and only a negligible number of high-achievers (2.70%) was in the category of inferior level of intelligence (IQ 88 and below). Thus, the superiority of high-achievers with regard to their general intelligence was apparent. Sultane (1983) compared the intelligence of groups of high-achievers (those who had obtained 60% marks or more), and low-achievers (those with less than 45% marks) and inferred that high-achievers tend to possess higher intelligence. Sandhu (1985), in his study involving 100 boys and 100 girls of 10th class, also showed that the difference between the means of the achievement scores of high-and low-intelligence groups was significant, both in the case of boys and girls.

Based upon the review of studies, given in the preceding paragraphs, pertaining to intelligence-achievement relationship, following inferences could be drawn:

1. Intelligence is significantly correlated with total academic achievement as well as achievement in individual subjects, including achievement in languages. However, a few studies have also reported low and even negative, though nonsignificant relationship between intelligence and achievement.

2. A lot of inconsistency exists with respect to the degree of relationship between intelligence and
achievement which leads to the viewpoint that academic success cannot be predicted on the basis of intelligence alone and that factors other than intelligence also exercise considerable influence on achievement. Two approaches which may be adopted to identify the presence of such factors include: (a) Identification of cognitive variables other than intelligence. Kogan (1971) stressed that standardized intelligence tests fail to tap many of the forms and cognitive variations present in the repertoire of children. Thus variation in achievement is to be attributed to native endowments, not covered in the intelligence tests, such as cognitive abilities for which conventional thinking process may be necessary but not a prerequisite, and (b) attempts to search for noncognitive (nonintellective and environmental) variables.

Styles of Learning and Academic Achievement

Research in the area of Styles of learning has resulted in a large number of findings which have direct relevance to the needs of students who are experiencing a considerable amount of frustration and failure in the school system. A number of studies have revealed a positive and significant relationship between styles of learning and academic achievement.

Carter (1948) studied methods of learning as they contributed to the prediction of school success. Januar (1958), in his study involving 200 college students, found
the correlation between study methods and academic achievement to be .51. Bradley (1963) carried out an investigation on strategy selection and negative instances in concept learning, using 70 subjects. Exclusion solutions were studied by negative (nonreinforced) instances in a concept-learning task. Of the 70 exclusion-condition subjects, only 3 adopted exclusion strategy. Task performance was unrelated to conditions of reinforcement, instruction, and type of concept. It was also found that failure to use negative information was related to fundamental information-handling strategies such that limited memory storage induces trial-error search based on positive identification of reinforced instances with complex stimulus arrays. A reduction of cue space should favour use of strategies based on memory storage of what is not correct.

Entwistle and Entwistle (1970) carried out a study on the relationship between personality, study methods, and academic performance involving 139 university students and 1118 students of a college of education. They found out that a correlational analysis of these scores in relation to academic performance at the end of the first year showed the superiority of the introverts and the students with good study methods. Another major finding of this study was that introverts also tended to have better study methods but this only partially explained their high
academic performance. The results of this study confirmed that better study methods are positive correlates of better attainment. Entwistle and Wilson (1970), in another study, demonstrated that better study methods have significant positive correlations with higher academic achievement.

Entwistle and Brennan (1971) studied the academic performance of University students and found that high-attainment type of students exhibited a cluster of intellectual advantages, high motivation, study methods coupled with a few other factors. Entwistle and Parr examined 898 University students, 862 college of education students and 190 polytechnic students in an attempt to predict their academic performance from scales of motivation and study methods. Results of the study indicated that there was improvement on A-level grades through the use of these scales together with measures of academic aptitude and personality.

Pask (1976) studied styles of learning of 62 polytechnic students in two series of experiments, one in the laboratory and the other in the educational institutions. Both series were conversational systems which allow mental activities to be described in terms of dialogue and behaviour. This study revealed the following learning strategies: (a) Operation learners who are also
successful in deriving general properties, (b) operation learners who can recall details but cannot answer general questions, (c) comprehension learners who also successfully derive details, (d) comprehension learners who recall the overall scheme but cannot answer questions of each kind and apparently use several derivation methods. In a nutshell, what Pask found was simply extreme styles of learning, namely, comprehension learners and operation learners. The former had the tendency to jump to conclusions and to make impulsive links between ideas (globetrotting) and the latter failed to build up a general picture of what is to be left out and ignored important interrelationship (improvidence). In this way, the learning styles affected achievement.

Marton and Saljo (1976), in their study, attempted to identify different levels of processing of information among groups of Swedish University students. The University students were asked to read substantial passage of prose. Thereafter, they were asked questions about the meaning of the passages and also how they set about reading the passages, thus allowing for the examination of processes and strategies of learning and the outcome in term of what was understood. It was found that in each study, a number of categories containing basically different conceptions of the content of the learning task could be identified. The corresponding differences in
levels of processing described whether the learner was engaged in surface level or deep approach of processing.

Svensson (1977), in his study of learning process and strategies involving 80 first-year education students, found that the distinction between holistic and atomistic cognitive approaches was consistent over different occasions when the students were asked to read and to recall their knowledge of the two texts in the experiment. Furthermore, the study showed that this concept of cognitive approach also had a functional relationship with academic attainment helping to explain not only examination success but also other aspects of the students' approaches to studying.

Annis (1979) studied the effect of cognitive style and learning passage organization on study technique effectiveness. Field-independent and field-dependent college students were made to read only in book notes on a logically organized or scrambled 80 sentence article. It was found that field-independence students scored better than field-dependence students on completion items of high structural importance. However, the effect of cognitive style on material of low structural importance treatment condition indicated that notes taken on an organized learning passage were of higher average structural importance than notes taken on unorganized learning passage.
Aggarwal (1981) of Banaras Hindu University studied students' learning styles and contract activity package and concluded that students who are motivated and responsible may continue either academic or creative studies independently through contract-activity package. He also concluded that students who are academic achievers or who are interested in special areas of study may learn indepth, advanced, extended, or creative aspects of that area whether in school or at various other locations through a contract-activity package.

Ramsden and Entwistle (1981) investigated the effects of academic department on student's Approaches to studying, using a sample of 2208 students from 66 academic departments in 6 disciplines of British universities and polytechnics. They formulated three hypotheses for the study, including: (1) Departments which were evaluated positively by their students would have higher meaning orientation scores than department evaluated negatively, (2) Students in different departments perceive themselves as studying in very different contexts and tend to adopt different study strategies, (3) Positive attitudes to study and to strategic approach combined with high scores on deep approach and low scores on surface approach scales. The results of this study indicated that there was significant relationship between the variables among themselves, and that positive attitudes and deep
approaches were linked with academic progress.

Watkins and Hattie (1981) carried out an investigation of the learning processes of Australian University Students with emphasis on the contextual and personological factors. 518 students (282 males and 236 females) participated in this study. Following hypotheses were formulated for this study: (1) There is a significant relationship between approaches to studying and sex, faculty and academic year. (2) The more years of university study the less likely is a student to use deep-level approaches. (3) The "minimax" reproductive study methods are not likely to be sufficient for academic success in these faculties. The results of this study indicated that there were sex, faculty and academic year differences in the study processes adopted by the subjects. It was also found that organized study methods were particularly beneficial to Arts and Economics students while scores on Biggs'Utilising Motivation and Strategy scales correlated significantly negatively with the science-based faculties, suggesting that the "minimax" reproductive study methods were not likely to be sufficient for academic success in these faculties.

Tillema (1982) attempted to explore the relationship between sequencing of text material and information processing strategies in a study involving 95 subjects. Following hypotheses were formulated: (1) Interrelation
of known and unknown information is necessary for the acquisition of new information. (2) Information-processing strategy would influence the acquisition of newly learned concepts. Data analysis showed that the 'web' condition resulted in better performance on various dependent variables than the "linear" condition. For the second hypothesis, only a main effect on performance tests was found.

Caverly (1984) studied the effect of three study-reading strategies upon comprehension and recall using a sample of 59 students within the situational context of a freshmen sociology class. Following hypotheses were tested: (1) Elaborative manipulation of the information present in a page of text would aid literal comprehension and recall. (2) Direct transaction between the author's and the student-reader's knowledge bases would aid in inferential comprehension. (3) There are beneficial effects of the first two strategies through combined effect. Results indicated that none of the treatment conditions was found to be significantly different from each other or from a control condition, though some distinct trends emerged, and that it was not possible through the study to isolate the beneficial effects of each of the strategies upon short-and long-term comprehension and recall. Conclusion was, therefore, reached that while no legitimate statement could be made.
regarding study-reading strategies in general, some parameters were identified which could benefit future investigations.

Thomson (1985) carried out a study on achievement as a function of learning style preference in beginning computer programming courses. The general area of concern of this study was: Is there a relationship between learning style and achievement in beginning computer programming course? The purpose of this study was two-fold (1) To determine if achievement in beginning computer programming classes is a function of learning style as well as other selected factors. (2) To determine if students' learning style changes or is modified after experiencing beginning programming instruction and where such changes occur, whether they are related to achievement. 314 students in four beginning programming classes during the Winter Quarter, 1984 at Montana State University in Bozeman, Montana took part in this study. The data were collected with the help of two instrument, namely, Gragorc style delineator and a questionnaire in which the participants were asked questions regarding various achievement history, selected course history and other demographic factors. It was concluded from this study that achievement in beginning computer programming classes was not a function of learning style and that last week learning style was significantly dependent on
first week learning style. Where a change in learning style occurred, the change seemed to be related to course content or achievement.

Peterson (1985) conducted a study on the classification and comparison of learning style preference of learning disabled students and gifted students. The problem addressed to by this study was the classification and comparison of learning style preferences of learning disabled students and gifted students in order to provide an additional diagnostic and prescriptive practices for such students. The data were analyzed using descriptive and multivariate statistics to determine the relationship between learning style preferences and the three groups namely, learning disabled (Group D), gifted (Group G), and not so identified (Group N). The variables included in the analysis were the 22 elements of learning styles as identified by Dunn, Dunn and Price, the group themselves and the background variables of age, sex, and grade level. Based on the findings of the study, the following conclusions were formed:

1. There were distinct learning style preferences common to the groups of students.
2. Five of the 22 learning style elements discriminated among the groups: Requires intake, authority figures present, learning alone, responsibility and mobility.
3. There was no relationship between the independent variables of age, sex
and age level, and the three groups. (4) Information obtained on learning style preferences of the three groups of students could become a sound basis for making administrative decisions.

Ristow and Edeburn (1984) replicated a 1983 study investigating whether the Renzulli and Smith (1978) learning style inventory (RSLSI) could identify the learning style differences of college undergraduates. The 65-item RSLSI assesses children's preferred learning styles in nine areas: Projects, simulations, drill and recitation, peer teaching, discussion, teaching games, independent study, programmed instruction and lecture. Administered to 150 sophomores and junior educational psychology students, RSLSI data were analyzed for reliability and for relationship with the independent variables, sex and self-reported grade point average (GPA). Results indicated overall patterns consistent with the 1983 study findings. (1) Females preferred to engage in more independent, individual learning activities and discussions than males, (2) high GPA students preferred lecture and peer-teaching, and (3) low GPA students preferred lecture, teaching games and peer teaching. Both high- and low- GPA students in the 1984 study showed a significant increase in preference for discussion and simulation over the 1983 study.

Clyne (1985) studied the learning style preference
The purpose of this study was four-fold: (1) To determine the learning styles of native students, (2) to compare the native students with their white classmates (3) to determine whether or not sex differences exist, and (4) to ascertain the relationship between learning styles and reading achievement. The data were analyzed with the help of one- and two-way analyses of variance (ethnic group and sex) as well as Pearson Product Moment correlation coefficient (ethnic group and reading achievement).

Lembke (1985), in his study, reviewed literature about individual differences in learning styles. Four related topics were investigated: (1) Learning style as the factor constituting individual differences among students, (2) the necessity of diagnosis to the learning style paradigm, (3) elements making up individual learning style differences, and (4) the relationship between academic achievement and matching instruction to students' learning styles. Three principal points stood out in the review of the literature. First, learning styles do exist. Second, learning styles are not difficult to identify and diagnose. Third, when students are taught through their preferred learning styles, academic achievement is enhanced. Leman (1985), in his review, noted that when teachers at Roosevelt Elementary School in Hutchinson, Kansas, used the learning style inventory to determine the
best learning conditions for each student, then allowed students to study and take standardized tests under their preferred conditions, there was improved behaviour and achievement at all ability and grade levels.

Blagg, Jr. (1985) conducted a study to determine whether cognitive style and learning style variables were predictive of success in a graduate allied health education program. The results indicated that there was no significant relationship between academic success and style variables. Ford (1985) undertook a study to explore extent to which postgraduate students were able to learn from holist and serialist learning materials and extent to which such competence was predictable by questionnaires. Results indicated that 2 of 26 students scored equally well on holist and serialist competence tests.

Chessell (1986) studied learning styles in first year medical students at Aberdeen University in England. The results of his study indicated that these students scored higher than other students in achievement (including study methods and competitiveness) and prediction for success.

Okebukola (1986) investigated the influence of preferred learning styles on cooperative learning in science. He described a study in Nigeria which compared achievement in Biology with a student's performance for cooperative or competitive learning situation. It was
proposed that rural children preferred cooperative ones. This study also presented data suggesting that learning preference (Cooperative Vs Competitive) directly influences achievement.

Petruzillo and Scheinbart (1986), in their study titled "Principal as curriculum leader: Chase Manhattan Project", described a program initiated at a high school in New York city that identified learning styles of special education students in an effort to increase their achievement. This study concluded that the program led to gains in motivation as well as achievement.

Miller (1987) studied the effect of learning styles and strategies on academic success. He developed inventory of learning processes to assess students' learning styles and strategies. Results showed that students with high grade point average fared significantly better on deep processing (critical analysis of relationships).

Smith and Holiday (1987), investigated differences in learning styles as measured by the learning style inventory in 4th, 5th, and 6th grade students achieving at high-, low-, and average-levels. Results indicated that these students did not learn in the same manner and that they manifested significant variations in how they preferred to learn.

Dunn and Dunn (1987), in their study titled
'Dispelling the Outmoded Beliefs about student learning'
'challenged 15 popular beliefs about students' and optimal
learning styles. They demonstrated that individual
learning styles vary and that academic achievement could
be improved by providing flexible teaching styles and
classroom environments where students can match their
learning styles.

Phillips (1987) studied the effects of learning
styles on progress towards literacy and numeracy. Children
entering public school in an English Industrial urban area
were identified for inappropriate learning behaviour on
the Guide to the Child's Learning Skills. A follow-up
study of the subjects at age 7 revealed that progress in
basic skills was strongly associated with pupil's'
learning styles.

Leino (1989) conducted a study to help clarify the
definitions and mutual relationships of cognitive styles
and learning styles and to find a feasible instrument to
be used for diagnostic purposes to help students with
learning difficulties. Samples consisted of 81 9th grade
suburban Finnish comprehensive school students in five
classrooms who were administered the Knowledge Assessing
Modes Inventory (KAMI) and the Learning Style Profile
(LSP). The relationship between subscales of the
instruments and between styles profile and school
achievement were analyzed. Results indicated that (1)
hardly any subject-related differences could be discovered between the LSP and school achievement and (2) the cognitive style profile subscale of the LSP correlated highly with school achievement, but that only a few subscales of other sectors of the LSP did the same. Findings suggested that parts of the LSP could be used by the teachers to help identify students with learning difficulties and that the LSP could be used in preservice teacher education to familiarize students with the controversy over learning styles.

Vondrell and Sweeney (1989) undertook a study to determine if identification of learning styles would assist in predicting adult student success in an independent study program. Results indicated that regardless of learning styles, students could expect to complete the experience successfully.

Review of studies on learning styles as related to academic achievement led to the conclusion that it is very likely that there would be significant relationship between learning style variables and academic achievement. However, it would be too much to expect that there would be a remarkable consistency in this relationship as a matter of rule. It has to be noted carefully that the results of some of the studies under review indicated that the relationship between learning styles and academic achievement might not always be significant.
Learning Styles and Culture

The relationship between learning and culture has been a subject of research for quite sometime. Investigations in this area are not new (Cole, Joy, Glick, & Sharp, 1971), and they grow unabated. However, it is pertinent, here, to state that the investigations in this area have placed emphasis on ability rather than process (e.g., Jacob & Jordan, 1987; Irvine & Berry, 1988).

Evidence certainly abounds of the relationships between culture and learning style. But it must be pointed out that researchers are faced with numerous problems while attempting to define and measure the extent of those relationships.

Cole, et al. (1971), in their experimental anthropological work demonstrated strong relationships between culture and the way people think. They used cognitive task analyses in manner which comes very close to learning styles analysis.

Berry (1976) studied the relationship between culture and cognitive style, as conceptualized by Witkin. He found that some consistencies emerged from various cultural groups including Mexican-Americans, Native-Americans, Blacks, and Jewish Americans (Vernon, Jackson & Messick 1981). But a very cautious interpretation of results was necessary to explain the within group variation. Moreover, some major measurement problems were
notable; the measure is always almost confined to a perceptual task and is, therefore, a measure of proficiency or strength of processing rather than a measure of usual or characteristic processing.

Cooper (1980) investigated the relationship between learning styles and culture. He found that a strong link exists between culture and learning styles.

Cole and Mean (1981), also carried out an experimental anthropological work to demonstrate relationship between culture and learning styles. The results of their experiment suggested that culture influences styles of learning to a considerable extent.

Eison and Pollio (1985) undertook a factor analysis of college students' learning styles adopting a multidimensional approach to the definition of their learning styles. Factor analysis of six relevant measures indicated that three factors define students learning styles: (a) learning skills (b) personal reactions to life experiences and (c) academic work skills.

Saliman and Torrace (1986) conducted a study titled "Styles of learning and thinking of College Students in the Japanese, United States and Kuwait Cultures". Responses to a questionnaire suggested that Japanese college students (N+200) scored highest on the right hemisphere scale, preferring intuitive and creative learning styles, while Kuwaiti students (N+400) scored
More (1987), in his study, reviewed four areas of research that provided evidence for important differences in learning style between Indian students and non-Indian students: Internal cognitive process or learner characteristics, external or environmental conditions, teaching and communication styles, and traditional learning styles. Findings suggested important implications for teachers, stressing the need for matching learning styles with teaching styles. More (1990) conducted a study on the learning styles of Native Indian Students. The learning style of Native Indian students was discussed in terms of internal cognitive processes (global/analytic, imagery/verbal, impulsive/reflective, trial-and error/abstract); External conditions: teaching and communication styles, and traditional learning. A four step process to help teachers use these findings was proposed.

Reid (1987) carried out an investigation into learning style preferences of ESL students. Through a questionnaire, 1,388 students were asked to identify their perceptual learning style preferences. Analysis of the questionnaires showed that non-native speakers' learning style preferences often differ significantly from those of native speakers. Many variables were found to be related to the differences in learning style among English-second-language (ESL) students.
Anderson (1988), also focusing on Black-Americans, concluded that cultural aspects of cognitive/learning style, as "cultural assets" were important for more effective educational service delivery.

Bank (1988) focused on minority groups in the U.S., most especially Black Americans. The powerful effect of ethnicity on behaviour related to learning highlighted by many a researcher was confirmed by the results of this study.

Roundtree-Wyly (1988) investigated learning styles appropriate for traditional and non-traditional students. Indication of learning styles that contribute to the learning process in the classroom for students is important for educators in assisting them to achieve their professional goals. The learning styles measured were print, aural, interactive, visual, haptic, kinesthetic and olfactory. The sample for this study consisted of 135 undergraduate and graduate students enrolled in classes in education department of a medium-sized, Midwestern University. The perceptual learning style inventory was used to determine learning style preferences. Results indicated that the hypothesis of a significant difference between traditional and non-traditional students was not supported by between-group analysis. However, when rank ordered, the kinesthetic style was higher in the traditional group than the non-traditional group.
Farquharson (1989) explored the learning styles of Arab Students in ESL classrooms. In a paper presented at the annual meeting of the teachers of English to speakers of other languages programs at San Antonio, the learning styles and strategies of Arab students in intensive language programs in the U.S. were discussed. Theory on the role of culture in learning and in the development of cognitive style was reviewed. Related aspects of Arab culture were examined, including the roles of oral and written language use, child rearing, student behaviour, and importance of respect in the classroom. Characteristics of classroom instructions and attitudes towards achievement in the Middle East were described. In conclusion, it was asserted that English-as-a-second-language teachers must recognize and respect the cultural differences of Arab students and meet these differences in a constructive manner.

Swisher and Deyhle (1989) undertook a study on the relationship between learning styles and culture. Qualitative observations of learners in their own cultural milieu suggested that there is a strong link between culture and learning styles.

Perusal of related literature on the study of relationships between learning styles and culture revealed that there is consistency in the significant relationship between these variables.
Nevertheless, as most of the quoted studies were conducted outside India, a research under Indian condition would be expedient.

**Learning Styles, Gender, and Faculty**

The present study also aimed at investigating the relationships among learning styles, gender, and faculty. Therefore, the related studies on these variables have also been reviewed and presented as under:

Pettigrew (1958) reported results from a study which sought to measure learning preferences and identify variations and gender differences associated with the learning styles of a sample of 213 junior high school students. The study found a wide range of learning styles with significant gender differences present.

Mariash (1983), in his study involving 422 students, found that 18 learning style variables were preferred by 25% or more of the students. Significant differences in learning styles were found among students in the three study sample schools: (i) Between males and females among students at different grade levels, (2) among excellent-, average-, and below average-students, and (3) among students with high-, medium-, and low-school attendance rates.

Ricca (1984) conducted an investigation into the learning styles and preferred instructional strategies of
gifted students. The learning styles inventory of Dunn, Dunn and Price and the learning styles inventory of Renzulli and Smith (1978) were administered to 425 gifted and non-gifted pupils studying in grades 4-6. Results indicated there were significant differences between gifted students and general population students in terms of learning styles.

Heikkinen (1985) carried out an investigation into the learning style preferences of pre-service education majors at the University of Idaho. Results showed that differences existed between men and women on 8 of 16 variables, between preparing for elementary and secondary school careers on 7 variables and between students in different subject-matter majors on variables.

Choi and Washington (1988) studied the characteristic learning styles and other attributes of academic librarians in public and technical services. The subjects were administered Kolb's Learning Style Inventory (LSI), a system that conceptualizes the learning process as a four-stage cycle and identifies four different learning styles: Accommodator (gets things done, takes risk, leads); diverger (has imagination, understands people, can brainstorm); converger (problem solves, defines problems, reasons deductively); and assimilator (plans, defines problems, develops theories). Survey instruments were distributed to 200 librarians working in public and
technical services, 100 in each group, selected from 20 member libraries of the Association of Research Libraries (ARL). Out of 148 returns, 73 (52%) were from technical services and 67 (48%) were from public services. The most common learning style among the librarians examined was found to be the assimilator (38.6%), followed by the converger (27.1%), the diverger (19.3%) and the accommodator (15%). These findings suggest that academic librarians preferred or had strength in abstract conceptualization. Neither of the groups showed significant statistical differences in their learning style distributions, nor were differences found among learning styles in terms of gender, age group, length of experience or undergraduate major, although female respondents tended to have a more divergent learning style than male respondents.

Cox (1988) studied learning style variables among vocational agriculture students. The sample for the study consisted of 2,101 vocational agriculture high school students in Arizona who were administered the secondary learning styles inventory. Findings from the 1,994 respondents suggested that learning style characteristics varied by grade level, courses completed, and gender.

The research on learning styles in relation to gender and faculty is not expected to yield a consistent pattern over a long spectrum of time, evidently because learning
styles are subject to continuous change on the basis of grade level and age. For this reason, persistent efforts are required in this direction in order to identify current trends in this area for the purpose of proper guidance and counselling.

Locus of Control and Academic Achievement

With the ontogency of the concept of locus of control in 1954, a lot of studies have already been undertaken on its relationship with academic achievement. One of the major interests in locus of control-achievement relationship has centered around personality orientation of high-achievers. There are conflicting theoretical views on the predicted relationship between locus of control and academic achievement. The first investigation which sought to relate locus of control to achievement behaviour was reported by Crandall, Katkovsky and Preston (1960). These investigators employed several personality measures in the hope of predicting achievement behaviour, as they were reflected in free-play activities, the Stanford-Binet intelligence test, and the Californian achievement tests. McGhee and Crandall (1988) found that, generally, internals achieve higher grades than the externals. Hjelle (1970) did not find any significant differences between internals and externals on grades. Nowicki and Roundtree (1971) found a significant positive relationship between internality and achievement for men only. Brown and
Stickland (1972) have also found that internality was significantly related to academic achievement. Stephens (1973) has found externality to be related to achievement. Vogel (1976) conducted a study to determine the effects of perceived locus of control on the academic achievement of 673 fifth-and sixth-graders. Main effects of the locus of control reached significance on the analysis of covariance at \( p = .10 \) for reading, \( p = .65 \) for languages and \( p = .02 \) for mathematics. Even among more powerful predictors, locus of control stood its ground. There was no interaction among locus of control, intelligence quotient, sex, and socio-economic levels. Thus it would appear that the effects of locus of control on academic achievement are the same for both sexes, for various levels of intelligence and for different socio-economic levels. Occasionally, differences are found between sexes on locus of control (Feather, 1968; Darson & Schneider, 1974) and in the personality profiles associated with locus of control (Pugh, 1976). However, since sex differentials, if any, are usually small (Jullian & Katz, 1968; Ramanaiah, Ibich & Schmeck, 1975), researchers have not been adopting a consistent pattern of pooling or separately analysing the data for males and females (Phares, 1976).

Christner (1977), in his review of literature on locus of control, demonstrated that the internal males made better grades than did the external males. However,
strong sex differentials had been reported in this relationship. Internal males consistently achieved higher than the external males, but in the case of females, the results had been inconsistent and mixed.

Banreti-Fuchs (1975) examined the possibility of the relationship between locus of control and achievement being mediated by certain personal and situational characteristics. Two prime factors for mediators of locus of control-achievement relationship were sex of the interactors and cooperative versus competitive nature of achievement task. Results are shown under:

Female college students failed to show the expected theoretical relation between locus of control and achievement. Whereas internal males showed an enhanced performance on digit-symbol task regardless of the sex of the partner or competitive nature of task, internal females increased or decreased their performance on the basis of sex of their partner and the type of the competition.

The result suggested that locus of control-achievement relation was not a simple one for females. That Heilbrun, Piccola, and Kleemeier (1975) had supposed that female achievement behaviour might involve more complex models seems to have gained some support. Competition among males and females makes a difference to internal females. An internal-oriented female may show the greatest achievement potential depending on whether she is to compete or cooperate with a male or a female.
control-achievement relation does not take a straight course for females. Instead, the type of situation and the type of participants in that situation may have a significant effect on how an internal, in contrast to the external female, responds. Although the males responded in much more theoretically consistent manner than did females in this study, yet there might be these mediating characteristics which affected them similarly.

Clinger (1980), in a study titled "Relationship between motivation, locus of control, knowledge of study skills and achievements" examined if addition of certain controlled affective variables could improve significantly the predicting power of cognitive variable for academic achievement of college freshmen. Controlled variable was intelligence and the dependent variable was academic achievement. Locus of control, motivation, and study habits were the affective variables investigated. Findings include: (i) Individual affective variables and locus of control were not significant contributive factors of academic achievements when sex and intelligence were controlled, (2) when taken as a unit, the affective variables accounted for a small amount of variance in academic achievement. Since the first and basic finding contradicted many previous studies quoted and the relationships in the second finding had their Achilles' heels, further research was recommended.
Moyer (1980) carried out a research on "Academic Achievement, self concept, and locus of control - A causal analysis of the longitudinal study". He concluded that locus of control-academic achievement causal analysis suggested the probability of reciprocal causality. The cross-legged panel correlation analysis showed that locus of control-achievement causal relation was slightly stronger than the causal effect of achievement on locus of control. On the other hand, Path Analysis showed a slightly stronger causal impact of academic achievement on locus of control. However, the Path Analysis also argued strongly for the causal relation from locus of control to achievement. The cross-legged correlation (r=.20) showed that causal relations between constructs were generally quite weak. This suggested that there is a need to include other affective variables (achievement value, academic aspiration, achievement motivation) into causal analysis of academic achievement. Since the causal relations were rather weak, it does not appear likely that change in one construct or two will be significant. Perhaps, the limited success could be attributed to this very reason.

Fry and Coe (1980) found that internal subjects had significantly higher academic achievements than the externals ($F = 10.31$, for $1-143$ df, $p>.01$).

Bar-Tal, et al (1980), in their study, found that internal subjects had higher academic achievements, lower
level of anxiety and higher level of aspirations and socio-economic status.

Gruzynski (1981) investigated factors affecting academic achievements in high-ability Junior high school with varying self-concept. Factors studied include locus of control, vocational aspirations, perception of physical appearance and perception of interpersonal adequacy, paternal occupation and sex of the student beside intellectual ability and self-concept of the student. Results indicated that locus of control was not contributing significantly to reading achievement in junior high school sample. Beyond that, it was explained by intellectual ability and self-concept of the student.

Allen (1982) conducted a study in which he reported that: (i) Internal-control subjects achieved higher scores on Mathematics and language than external subjects, (2) internal-control subjects scored higher on reading and language than external subjects, and (3) no differences were found between internals and externals on any achievement tests. Puri (1984) showed that the internals were superior to externals in academic achievement. He found the correlation between locus of control and academic achievement to be -.34. The high score on locus of control was negatively and significantly related to achievement at .01 level, suggesting that external orientation on the part of pupils was negatively
related to academic achievement.

On the whole, it may be rightly inferred on the basis of the findings of the above-quoted studies that the locus of control-academic achievement relationships are often fraught with inconsistent and varied results and therefore, need to be investigated further.

Achievement Motivation and Academic Achievement

It is intended also in the present study to investigate the relationship between achievement motivation and academic achievement. So, it is expedient to review the related studies in this area, as well.

A study by Rosen (1955) found a positively significant relationship between achievement motivation and grades (performance). Pottharst (1955) found that students who were high in achievement motivation were inclined to state higher levels of expectation for performing task for which they have had no previous experience than students who were low in achievement motivation.

Atkinson and Reitman (1956) found that in the achievement orientation conditions, the level of performance of high-achievement motivation group was significantly higher than that of low-achievement motivation on both the number of solutions attempted and the number of correct solutions. In the multi-incentive conditions, there was no significant difference between the
performance levels of the two motivation groups. Furthermore, it was contended that the relationship between achievement motive and arithmetic performance was eliminated by engaging systematically other motives (affiliation and money) in same performance. Atkinson (1958) found that very little difference between performance levels of high - and low - achievement motivation groups was discernible when monetary incentive was high.

Heckhausen (1967) found average correlation between scholastic achievement and achievement motivation to be .40. Lakshmi (1967), attempting a new theme, demonstrated experimentally that there was a significant relationship between the rate of learning and achievement motive in high school boys. It was further established that fast learners had higher achievement motivation than slow learners. Khan (1968) observed that achievement motivation had statistically significant correlation (p<.01) with achievements for males and females but most of the correlations were less than .20. Mehta (1968), in his study conducted under the aegis of the National Council of Educational Research and Training (N.C.E.R.T), New Delhi, found that achievement motivation was positively correlated with total performance at school annual examination and also with the subject - wise performance. Entwistle and Welsh (1969), while studying
high - and low - ability groups of 2538 school children, arrived at the conclusion that academic motivation was positively related with achievement. It was significantly higher for the high - ability groups of both gender. De B. and Khan (1969) found that two groups of Science - and Arts - students differed in N - Ach. Science students were found to be more motivated than Arts Students.

Cattell, Barton and Dielman (1972) investigated fourth - and sixth - grade students, administering to them culture - faire intelligence test, HSPQ and motivational analysis tests. They found that motivation contributed independently and significantly in the prediction of school achievement. Dutt and Sabharwal (1973) carried out a study in which they administered Mukherjee's sentence completion test on a group of adolescent students. They found the product - moment correlation between academic achievement and achievement motivation to be .45, highly significant at .01 level. No sex differences were recorded.

Chadwick, Bahr and Strauss (1976) found achievement motivation to be the best predictor of academic achievement for Indian high school students. Malik (1977) found achievement motivation to be slightly related to achievement in Chemistry. Achievement motivation was helpful in academic achievement only to a limited extent.

Christian (1980), in a study with 500 female students
of Sardar Patel University sampled from pre-university to postgraduate classes in all streams including arts, science, commerce, engineering, home science, and education, found that high achievement motivation had no effect on students performance. In this study, Christian found that the mean scores of the first class and failures were more or less the same while those of the third-class students were highest. Therefore, he concluded that there was no relationship between achievement motivation and academic performance.

Deutsch (1982) studied the relationship between achievement motive and achievement task performance, using a sample of low socio-economic status Black and Hispanic youths. It was concluded that the relationship between achievement motive and achievement task performance was weak, and that the teacher-written comments, which stimulated effort attribution for achievement task outcome, did not lead to an enhancement of such students' performance compared with comments that did not stimulate this attribution. Rajput (1984) studied the achievement motivation of 435 students of class 5 from the Kendriya Vidyalayas and found that in the natural classroom condition, the achievement of pupils in Mathematics was not affected by their achievement motivation.

Okafor (1989) conducted a study on the effect of fear
of failure, need achievement, and intelligence on academic achievement of postgraduate students of Panjab University, Chandigarh. He found need achievement to be positively and significantly correlated with academic achievement.

Succinctly stated, achievement motivation plays an important role in boosting academic achievement. This is clearly evident from the results of several studies. However, certain studies have revealed a weak relationship between achievement motivation and academic achievement. But it is noteworthy that negative relationship has not been registered in any of the studies. The effect of achievement motivation on academic achievement is so pronounced that many investigators among whom are McClelland (1955) and Kolb (1965) had suggested programmes for developing n-Ach among low - achievers. Further research may deepen our understanding of the relationship between achievement motivation and academic achievement.

The Problem

The review of related literature has underlined the dire need to explore the very intricate phenomenon of academic achievement in relation to styles of learning, locus of control, achievement motivation, and intelligence. Therefore, the present study which reads as "Styles of Learning, Locus of Control, and Achievement Motivation of High-, Average-, and Low-Achieving College
Delimiting the Scope of the Problem

After defining the research problem, the next important step was that of taking decision on 'who', 'where', and 'how many' in the investigation.

The answer to 'who' and 'where' of the problem was obtained by having a dekko at the subtitle of the main problem. Here, the sample of the problem, denoted by the 'who', was limited to B.A./BSc. Parts 2 and 3 students. The 'where' of the problem delimited the scope of the investigation all the more as it was decided that the research would be conducted only on the B.A/B.Sc. Parts 2 and 3 students in colleges affiliated to the Panjab University, Chandigarh.

Now, in the present study, not all the affiliated colleges in Chandigarh have been studied. Rather, out of the 10 colleges in Chandigarh, only 7 colleges were randomly selected.

Answer to 'how many' further delimited the sample of study which depended entirely on the design of the study. The details of the sample have been given in Chapter 4.

Hyptheses

Scanning of related research literature and intuitive appreciation of the problem for investigation has led the
researcher to make some underlying assumptions to serve as a guide to indepth exploratory survey of styles of learning, locus of control, and achievement motivation of high-, average-, and low-achieving college students at different levels of intelligence. Therefore, the present study revolved around the testing of the following hypotheses:

1. Differentials would exist with regard to the styles of learning for the total group, high-, average-, and low-achievers.

2. Differentials would exist with regard to the locus of control for the total group, high-, average-, and low-achievers.

3. Differentials would exist with regard to the achievement motivation for the total group, high-, average-, and low-achievers.

4. Differentials would exist with regard to the IQ for the total group, high-, average-, and low-achievers.

5. Differentials would exist with regard to the styles of learning of Science and Arts Students belonging to high-, average-, and low-achieving groups.

6. Differentials would exist with regard to the locus of control of Science and Arts Students belonging to high-, average-, and low-achieving groups.

7. Differentials would exist with regard to the achievement motivation of Science and Arts Students belonging to high-, average-, and low-achieving groups.

8. Differentials would exist with regard to the IQ of
Science and Arts students belonging to high-, average-, and low-achieving groups.

9. Sex differentials would exist with regard to the academic achievement of students belonging to high-, average-, and low-achieving groups.

10. Sex differentials would exist with regard to the styles of learning of students belonging to high-, average-, and low-achieving groups.

11. Sex differentials would exist with regard to the locus control of students belonging to high-, average-, and low-achieving groups.

12. Sex differentials would exist with regard to the achievement motivation of students belonging to high-, average-, and low-achieving groups.

13. Sex differentials would exist with regard to the IQ of students belonging to high-, average-, and low-achieving groups.

14. Differentials would exist with regard to the styles of learning of Indian and African students belonging to high-, average-, and low-achieving groups.

15. Differentials would exist with regard to the locus of control of Indian and African students belonging to high-, average-, and low-achieving groups.

16. Differentials would exist with regard to the achievement motivation of Indian and African students belonging to high-, average-, and low-achieving groups.

17. Differentials would exist with regard to the IQ of Indian and African students belonging to high-, average-,
and low-achieving groups.

18. Significant mean differences would exist among high-, average-, and low-achievers when compared at the same level of intelligence in respect of styles of learning.

19. Significant mean differences would exist among high-, average-, and low-achievers when compared at the same level of intelligence in respect of locus of control.

20. Significant mean differences would exist among high-, average-, and low-achievers when compared at the same level of intelligence in respect of achievement motivation.

21. Significant mean differences would exist among high-, average-, and low-achievers when compared at different levels of intelligence in respect of styles of learning.

22. Significant mean differences would exist among high-, average-, and low-achievers when compared at different levels of intelligence in respect of locus of control.

23. Significant mean differences would exist among high-, average-, and low-achievers when compared at different levels of intelligence in respect of achievement motivation.

24. Certain styles of learning, locus of control achievement motivation, and intelligence which correlate significantly with academic achievement would be 'common' to (a) the total group, high-, average-, and low-achievers, or (b) at least two of these groups.
25. Certain learning styles correlates of academic achievement would be specific to the total group, high-, average-, or low-achievers.

26. Significant variance towards academic achievement would be contributed by styles of learning, locus of control, achievement motivation, and intelligence for the total sample, high-, average-, and low-achievers.

27. Styles of learning, locus of control, achievement motivation, and intelligence would contribute differentially to the prediction of academic achievement of the total group, high-, average-, and low-achievers individually within the group, and from group to group.

28. Certain psychological traits present in the various independent variables would combine in specific constellations to yield common factor or factors with academic achievement of the total group.

29. The constellation of all the psychological traits measured by the independent variables of the three contrasting groups of discrepant academic achievement, i.e. high-, average-, and low-achievement would differ from each other as well as from total group.

30. Certain learning style correlates of academic achievement would be 'common' to (a) the total group, Indian and African samples, or at least two of the three groups.

31. Certain learning style correlates of academic achievement would be specific to the total group, Indian or African samples.