CHAPTER-II

REVIEW OF THE RELATED LITERATURE

Review of related literature is an essential pre-requisite for actual planning and execution of any research work. It entails search for reference material which is a time-consuming exercise per se, yet a very fruitful phase in research. Familiarity with relevant literature in any problem area helps to discover what is already known, what others have attempted to find out, which methods of attack have been promising or disappointing and which problems remain to be solved (Best and Kahn, 1986). Careful review of available literature in encyclopedias, journals. Abstracts, books and other sources of information on similar problems or related to the one under investigation is one of the important steps in the planning of any piece of research. An attempt has been made here to examine the existing literature vis-à-vis the problem in hand, namely, “a study of the effectiveness of student team achievement division (STAD) and group investigation (GI) methods of cooperative learning on high school students”. The review of related literature and research studies has been divided into sections as the main variables under study, that is:

2.1 Cooperative Learning and Academic Achievement;
2.2 Cooperative Learning and Science and other School Subjects.

2.1 COOPERATIVE LEARNING AND ACHIEVEMENT

Devries and Edwards (1974) evaluated the effects of two teaching techniques—student teams and instructional games on the level of cross-race and cross-sex interaction in the classroom of 108 seventh grade students and found the placing students on heterogeneous four-member student teams created significantly greater cross-race and cross-sex helping and friendship. Team success did not have the predicted positive effect on cress-race and cross-sex interaction. Playing the instructional game had a marginal effect on cress-race helping only; however, the game-teams-combination considerably increased the incidence of cress-race and cross-sex interaction over that of games alone.
Anderson, Johnson, Johnson and Johnson (1976) conducted research on 30 fifth graders to know the effects of structuring classroom learning cooperatively and individualistically on student’s ability to appreciate the effective perspective of other’s altruism, attitudes towards classroom life and achievement.

The students were matched on previous achievements in language arts. The even-numbered students were assigned to individualized condition while the other, odd-numbered students were placed in the cooperative condition. No competition between groups or between persons was structured into the evaluation. The results indicated the cooperative learning as compared to individualized learning resulted in greater ability to take the effective perspective of others for more altruism, more positive attitude towards classroom life and higher achievement.

Skon (1979) compared the effects of cooperative, competitive and individualistic learning situations on students achievements and reasoning processes on the following tasks: categorization and retrieval, metaphor interpretation and story problems on 86 first grade students. The findings revealed that on the categorization and retrieval and the metaphor interpretation tasks, subjects in the cooperative condition had higher achievement scores than did subjects in the competitive and individualist conditions. High, medium and low ability subjects in the cooperative condition used higher quality reasoning processes than did high, medium and low ability subjects in the competitive and individualistic conditions on three of the tasks. On the free recall measure of the categorization and retrieval task, cooperation and individualism did not affect the relative performances of high, medium and low ability students whereas in case of competitive condition, high ability students maintained slightly poorer than the low ability students. Subjects in the cooperative condition perceived greater peer support than did subjects in competitive and individualistic situations.

Sharan, Ackerman and Hertz-Lazarowitz (1979) compared the academic achievement of 198 pupils of two through six grades taught in the small cooperative groups against that of 109 pupils taught in the traditional whole-class approach. The findings revealed that children of second, fourth and six grades who studied in cooperative small group received significantly higher scores on high level question than did pupils from traditional classrooms. Third and fifth grade pupils revealed a
trend in favour of small group classrooms but the trend did not reach statistical significantly excelled their counterparts, whereas in third through six grades, no significant difference was found between cooperative small group learning and whole call instruction.

Slavin (1980) studied the separate effects on student achievement and time on-task of three components of the team learning technique, STAD: Cooperative rewards, group tasks and a focused schedule of instructions. The sample comprised of 336 fourth and fifth grade students who studied language mechanics for nine weeks. Results revealed the following: (1) In case of academic achievement, reward and task interaction effects were found significant for curriculum-specific test. The reward effect was in favour of team reward and the task effect was in favour of the individual task. No effects were found for standardized effect; (2) The experimental classes learned significantly more than the comparison classes due to focused schedule of instruction; (3) Students in team reward conditions were found to be on-task significantly more than in the individual reward conditions. Students tutored significantly more in the team reward classes than they did in the individual reward class.

Webb (1984) investigated in the effects of small group gender composition on interaction and achievement in classroom settings and found that in groups in which gender and ability were balanced (i.e., high-medium-low ability groups being compared to other high-medium-low ability groups), the meals and female had similar interaction patterns and nearly identical achievement results. However, in groups in which gender was imbalanced (majority male or majority female but with similar ability means), the females’ experiences were detrimental to their achievement. In majority male groups, the females tended to be ignored as males focused their attention on other males and in the majority female groups, the females focused much of their attention on the males to whom they gave more help than they gave to other females.

Baldwin (1986) investigated the development and implementation of a model for accommodation of performances for alternative instructional environments with respect to sex, academic background, mathematics achievement, attitudes and communication apprehension. The three instructional modes were: individual mode
(IM), small group mode (SGM) and large group mode (LGM). 55 college students of mathematics were selected. The investigation revealed that:

1. Females and students with weak academic background tended to prefer the SGM environment.
2. Students with higher level of communication apprehension tended to avoid the SGM environment.
3. New college students and student with negative attitudes towards mathematics tended to avoid the IM environment.
4. Students with higher grades in high school tended to prefer the LGM environment.

Davis (1988) investigated the effects of using group process skills of “think aloud” and oral summaries in a series of cooperating learning lessons on attitudes and achievement of 104 seventh grade mathematics students of average ability in treatment and control groups using cooperative learning. Result indicated that there were no significant differences in student achievement of student attitude between the two conditions. The observational data revealed differences in student’s interaction pattern between the treatment and control groups. Students using the specified group process skills were more verbal, interacted more with other group members, demonstrated more concern for other group members, and had more process-oriented explanations for word problems being solved during group work that the other students functioning without the specified teachers directed group process-skills.

Hall, Lee Ellis (1988) worked on a meta-analysis of the effects of cooperative learning on achievement and presented a vote analysis of the effects of cooperative goal structures on academic achievement, based on some forty-four studies with 86 conclusions included in the vote analysis besides thirty-seven studies with 135 effects sizes included in the meta-analysis. The vote analysis indicated no statistically significant differences between cooperative and traditional goal structures. The meta-analysis indicated that the effect of cooperative learning on achievement differed in regard of study, grade level and subject.

Mulryan (1989) investigated the behaviour and perceptions of high and low-achieving fifth and sixth-grade girls and boys. Student behaviour was observed in cooperative small-group mathematics, whole-class mathematics and reading-group
settings. Comparisons were made across settings. Interviews with students and teachers were also conducted. The findings revealed that students manifested more time-on-task in the cooperative small-group setting than in the whole-class mathematics and reading group settings. High achievers manifested more time-on-task and also more quality involvement than did low achievers in cooperative small groups. Students’ and teachers’ perceptions were related to student behaviour in cooperative small groups. High achievers were more active participants than low achievers were in the groups. The interview responses of low achievers indicated that these students has less complex and less differentiated understanding of the nature of cooperative small-group work.

Good, Reys, Grows and Mulryan (1989) studies the cooperative small-group process and found that the students working in cooperative small groups in mathematics tended to be more active learner and more highly motivated than students working in whole-class settings. However, many students tended to work independently and individually instead of cooperatively and needed particular kinds of tasks if cooperation was to take place. There was a tendency for some students to dominate group interaction or to manifest passive withdrawing behaviour in this setting.

Sheng (1990) investigated the effect of cooperative learning (with training and organized) and cooperative learning (without training and unorganized) on 117 sixth graders in science in three ability levels (high, middle and low). Results showed that cooperative learning (trained and organized) displayed a statistically significant difference when compared with the other two conditions (cooperative learning without training and organization and traditional teaching) in a test of process skill. No significant difference was found between scores obtained by students engaged in cooperative learning and participating in traditional teaching. Significant difference was found between ability levels. High ability student achieved higher than mixed ability students and mixed ability students achieved higher than low ability students.

Peck (1991) compared differences in spelling achievement among group of students who were high, average and low achievers. The study attempted to determine any treatment effects resulting from students being cooperatively grouped for spelling instruction on 135 intermediate grade elementary children. Normal curve equivalent
scores from an existing standardized achievement test were used to classify students as high, average or low achievers. STAD was implemented. The sessions provided activities designated to encourage the development of collaborate skills prior to initiating treatment. A bonus point system was used to reinforce the collaborative skills. The results indicated that intermediate children achieved equally well regardless of how they were grouped for spelling instruction. High, average and low achieving students achieved equally well regardless of how they were grouped for spelling instruction. Low achieving students achieved significantly different from high and average achieving students.

Bak, Byung-Gee (1993) worked on Meta-analytic integration of the relationship between co-operative learning and achievement. The purpose of this study was to re-evaluate the effect of cooperative learning (CL) on students achievement using Hedges’ meta-analytic approach, to extract the essential components of CL, and to identify the moderators of CL.

Major findings form 73 independent studies could be summarized as follows:

First, CL methods are effective for students’ achievement, i.e. the scores of the average individual in the cooperative learning group exceed that of over 60% of individuals in the control groups.

Second, analysis of essential components of CL showed that it would be desirable to implement cooperative learning using a moderate degree of individual accountability, a high degree of individualistic learning indicated that it is possible to improve pupils’ abilities to read news stories in an actual newspaper by instructing them in writing news stories for a class newspaper. The findings led this researcher to the major conclusions that this treatment may cause pupils to have (a) positive changes in their newspaper habits, (b) favourable perceptions about the effectiveness of instruction in writing news stories upon their ability to read news stories, and (c) improved ability to read news stories in an actual newspaper.

Cook (1993) examined verbal student interactions as a product of varying motivational patterns in small cooperative learning group in physics classes. Groups were classified by number of learned-helpless and mastery-oriented individuals who were identified by means of intellectual Achievement Responsibility Scale (IAR). Each group was observed by means of video taping and assessed by a coding system
for four variables on or off task, sender of receiver of the message, positive or negative nature of communication, attributions for effort or ability. Results showed significantly different relationship between scores on the positive half of IAR and the Attitude Towards Science in School Assessment (ATSSA) Scale but not between the negative half of the IAR and the ATSSA. Significant differences were found for the main effects of sending and receiving, on and off-task message. No significant relationships were found for being learned helpless and sending or receiving positive/negative comments or making attributions for effort or ability.

Ahuja (1994) studied the effectiveness of the use of a cooperative learning instructional strategy on academic achievement, attitudes towards science class and process skills of seventh graders. The sample consisted of 116 students (48 in control group and 68 in experimental group). Findings from the ANCOVA on post-test scores indicated that the use of cooperative learning instructional strategy results in greater academic achievement and better attitudes toward science class. The process skills were not influenced by the instructional strategy. Response from the interview of six students (who were purposefully selected on the basis of their responses on the attitudes checklist) corroborated the findings that a cooperative learning experience was looked upon more favourable by seventh class science students, who found that it improved their perceptions of science, made science learning more fun and improved their learning.

Berg, Kathleen Faith (1994) has undertaken to assess the feasibility and effectiveness of instruction that used a structured cooperative learning technique in an upper level high school mathematics class. Additionally, the study was designed to explore the nature of students’ verbal interaction within this cooperative structure, how that interaction changed over time and its relationship to achievement. The newly-devised paired-learning script was used as the primary instructional technique for 8 week, during which peer interaction and achievement were monitored. Achievement was also monitored before the implementation of scripted paired learning and after the cessation of its extended use. Results of statistical analysis of the short and long-term effectiveness of paired learning indicated that cooperative learners achieved more than comparable students taught using conventional methods in three of four comparisons; in one comparison there was no statistically significant
difference. The programme was at least as effective as a mere conventional one, as measured by chapter test scores, though there was an evidence of long-term effects.

McManus and Gettinger (1996) examined the teachers’ use and evaluation of cooperative group learning along with students’ reactions to working in groups and their verbal interactive behaviours during group activities and found positive academic, social and attitude outcomes in the classrooms. Majority of student interactions were directly related to teaching and learning. Behaviours such as listening to another students or watching a student demonstrate how to complete a task occurred most frequently during group activities.

Prinz (1998) studied the conditions in college students of various ability levels. They learn best when they are assigned randomly to one of three cooperative learning conditions: homogenous (where all students in a small group were of same ability level); heterogeneous (where high, medium, and low ability students were placed into small groups together); and narrow-range groups and medium/low ability students’ group placed in small groups). Findings revealed: (i) No significant difference in performance outcomes for students in the three grouping conditions (narrow range, heterogeneous and homogeneous); (ii) No significant difference for attitude towards learning and students’ perception that the presence of others in the group enhanced their learning; (iii) A significant interaction effect was noted for student’s preference for learning alone, with low and high ability students in the narrow-range grouping conditions less interested in working individually; and (iv) students in the narrow-range grouping condition who perceived the group process to be helpful experienced higher post-test scores than did those students in the narrow-range grouping condition who did not believe in the group process to be helpful.

Wilson (1998) investigated the ability of general education middle school students to prompt and reinforce the functional academic skill acquisition of peers with moderate to severe disabilities in the context of content area cooperative learning instructional setting and found that the general education students learned to provide the identified opportunities, prompt sequences and reinforcement to their peer with disabilities after a brief training session and ongoing in classroom feedback. Analysis of the grades achieved by the tutors indicated that the tutoring responsibilities had little or no negative impact on their attainment of classroom skills.
Williamson (1999) studied whether the presence of embedded meta-cognitive cues facilitates learner interactions and improves attitudes towards cooperative learning during the cooperative computer based lesson and studied the effects of ability grouping and group interactions on the sample of 120 sixth-grade students assigned by ability to one of three group compositions homogeneous high-ability, low-ability or heterogeneous. Verbal interaction were audio taped while social and management interactions were recorded AMNOVA and univariate ANOVA related that learners in the cued treatment had significantly different achievement post-test scores, exhibited more on task behaviour, and socialized less than learners in the non-cued treatment. Significant differences for ability groups were found only on the achievement post-test and for management interactions. Homogeneously grouped low-ability tended to have lower achievement post-test scores. In addition homogeneously grouped low ability learners and the heterogeneously high ability group. There was no significant difference in attitude towards cooperative computer based instruction for either treatment or group composition.

Gillies (1999) conducted a 1-year investigation on whether children, who had been trained in the previous year to cooperate, were able to use the skills they had been taught in reconstituted groups without additional training on 64 fourth graders, who had participated in training in cooperative group behaviours in previous year, were assigned to the trained condition, 84 fourth graders, who had not received any training, were assigned to the untrained condition. Results indicated that the children in the trained groups were consistently more cooperative and helpful than their peers in the untrained groups, although they had not received ‘refresher’ training in cooperative group behaviours.

Stepka (1998) examined the difference in academic achievement among students under two teaching methods: Jigsaw cooperative learning method and the lecture method at a rural community college and found that overall, the Jigsaw cooperative and section scored higher than the lecture section when compared academically.

Gillies (2002) investigated the effect of training in small-group and interpersonal behaviours on children’s behaviours and interactions as they worked in small groups 2 year later, 52 fifth-graders who had been trained 2 years previously in
cooperative group behaviour were assigned to the trained condition and 36 fifty
graders, who not previously been trained were assigned to the untrained condition.
The results showed a residual training effect, with the children in the trained groups
being more cooperative and helpful than their untrained peers.

Collins and Elbedour (2003) investigated the role of group composition
ranging on size fro 2 to 7 cooperative learning groups. The sample consisted of 275
graduate students of introductory level education research course. The analysis
revealed : (1) Positive relationship between degree of group heterogeneity at the mid-
term level and scores on the research proposed; (2) Relationship was found between
group size and performance on the article critique : however, no relationship emerged
involving scores on the research proposal scores on the research proposal; (3)
Significant interaction was found between treatment (group heterogeneity level ) and
aptitude interaction (mean mid-term group performance) with respect to the article
critiques although no interaction emerged for research proposal scores.

Ronadinaro (2004) studied the relationship between interpersonal multiple
intelligence and the usage of cooperative learning teaching methods on the sample of
103 teachers and revealed the following :

(i) No significant relationship between interpersonal multiple intelligence and the
usage of cooperative learning teaching methods;

(ii) Elementary school teachers had s significantly more positive attitude towards
cooperative learning than high school teachers; and

(iii) The longer one teaches, the more negative he/she is regarding cooperative
learning and the lesser he/she uses this teaching method.

Tripathy (2004) investigated cooperative learning as a method of promoting
learning through student cooperation rather than competition and considered it as a
method of effectively using student group in a classroom. The primary elements
involved in this strategy of teaching science were positive interdependence, individual
accountability, face-to-face interaction with peers, use of pro-social skill and group
processing of a given academic task by the learners; the role of teacher being that of
an academic consultant. Teaching-learning of differences between metal and non-
meals by modified cooperative learning method was suggested after a tryout in real
classroom situation. In a cooperative learning system, students were divided into
groups and they worked together to master an assigned lesson. Groups were heterogeneous, with one high level child, one or more children identified as with special educational needs and other of various abilities. Each group member was assigned a role for that member was assigned a role for that lesson. The findings of the study revealed that students who were working in groups were more likely to stay on task and remain motivated because of peer support and encouragement. Working together is good as it does a lot to increase self-esteem and reduce normal peers rejection, which is so important for our students. Cooperative group learning induces cooperative attitude in the learners, which in the long run, has the potential of carry over into other areas of the competitive world.


Students in cooperative learning groups showed more altruism (Anderson, Johnson, Johnson and Johnson, 1976), increased self-confidence (Nederhoo, 1986), higher self-esteem (Ali, 1999), increase in intrinsic motivation and beliefs about success (Lin, 1997; Good, Reys, Grows and Mulryan, 1989), higher self-appraisal of their performance and higher perceived efficacy (Chang, 1998). More students in cooperative condition perceived themselves as giving help to and receiving help from peers (Cooper, Johnson, Johnson and Wilderson, 1980, Gillies (1999-2002).

Students in cooperative learning groups showed increase in number of friends, liking of others (Slavin, 1980 and Nederhood, 1986), increase in interactive behaviours (Newak, 1996; McManus and Gettinger, 1996) and increase in group effectiveness and interpersonal interactions (Earley, 1997).

A number of other scholars have also given their findings, e.g. Hersberger (1983) reported that computer problem solving enhanced students’ understanding of mathematical topics to an advanced level and computer programming aided in the development of problem-solving methods.

Chitriv (1983) found both Bruner’s and Ausubel’s methods equally effective for teaching mathematical concepts to eleventh graders so far as students’ ability to acquire knowledge of the concepts were concerned.
Mevarech (1985) found that students’ teams without mastery learning strategy significantly surpassed the control group only on the computation sub-test whereas the students teams using mastery learning strategy and group using mastery learning strategy only significantly surpassed the control group both on computation and comprehension sub-test scores.

Rudy (1990), studying the effect of reciprocal teaching (meta-cognitive methods comprised one treatment variable and the use of cooperative learning by students was the second treatment variable of social interaction), reported that social interaction positively affected students’ performance both on the criterion referenced and norm-referenced geometry measures. Meta-cognitive methods had a positive effect both on the measures of ability and affect.

Shankara Narayanan (1990) found that girl students taught by guided discovery learning method performed significantly better than the girl students taught by the reception learning method. The low-trait anxiety students were significantly better on measures of delayed achievement, immediate achievement, retention and delayed transfer irrespective of methods of instruction employed.

Todd (1994) reported that the group taught with computer management system (CMS) had an overall higher achievement mean scores and achievement rates than the control group both in the computational and in the concepts and application areas.

Singletary (1997) found no significant difference between mathematics achievement of females in single-sex cooperative learning groups and females in mixed (male and female) cooperative learning groups.

Mainzer (1999) reported that students in cooperative learning with Team view group had significantly higher scores in mathematics achievement than students in control group over 14 week period.

Simpson (1999) reported that intelligence and motivation were the significant predictors of mathematics and reading achievement whereas creativity was not. In case of gender, masculinity was the significant predictor of mathematics achievement but not of reading achievement whereas feminity was not a significant predictor of mathematics and reading achievement.

Alrwais (2000) found that the best predictor of the achievement in mathematics was the students’ attitude towards learning mathematics; the second
predictor was students’ mathematical creativity and finally, the least predictor was student’s school grades.

Hanich and Jordan (2004) reported that children with difficulties in mathematics (MD only) group viewed their mathematics competence more negatively than bid children with normal achievement (NA) and children with difficulties in reading (RD-only) but not in mathematics group. In contrast, children with difficulties in mathematics and reading (MD-RD) group did not significantly differ from children in NA and RD-only group regarding their perceptions of mathematics competence. No achievement-group differences were found for children’s ratings to their intellectual ability.

Klugman (1994) gave arithmetic problems to small groups of children under a cooperative contingency in contrast to the situation in which children worked for individual rewards. The group under the cooperative conditions got significantly more problems right. Literally, several studies have shown that two or more individuals working together can perform better than individuals working alone.

Hauins and Mckeachie (1967) found that psychology students in large discussion groups covered a large number of questions under cooperative incentive than under competitive ones, but the groups did not differ in examination performance.

Smith, Madden and Sobel (1957) found more ideas expressed in a cooperative discussion group than in a competitively structure group but there were no differences in recall of the material discussed.

Workie (1974) found that great majority of the studies compared group productivity to individual productivity on tasks on which group productivity was obviously more effective such as solving mazes, number problems, scrambled words, and so on. In one study, the dependent variable was scores in a card game, in which cooperative individuals could share cards to get a higher score.

Slavin (1975) found that students in cooperative groups who gained in academic performance also gained in socio metric status in cooperative groups, while they lost status in competitive groups.

Brookover, Beady, Load, Schwitzer and Wisenbaker (1979) found student support for academic goals to be strong predictor of student achievement. Bur the fact
that group tasks and group norms favour the student achievement and have positive or neutral effects on performance, the diffusion of responsibility in one of the aspects of cooperative incentives which decreases performance sometimes, a group member is rewarded without much individual performance and at other times, even the best performing member of a group is deprived of the award because of unsuccess of the group.

Salvin (1983) advanced the following hypotheses concerning the effects of major characteristics of cooperative learning on achievement:

Specific Group Rewards Based on Member’s Learning are likely to increase the effects of cooperative learning on student achievement.

1. Task Specialization is likely to have a positive effect on student learning of basic skills in cooperative learning methods, but only if there are incentive for students to learn from each other and only in subjects (such as social studies) that lead themselves to being broken into sub topics.

2. Group competition is likely to increase the effect of cooperative learning on student achievement but any method of providing specific group rewards based on members learning is likely to have the same effect.

3. Equal opportunity scoring systems are likely to increase the effects of cooperative learning on achievement.

In short, research into student-learning and achievement shows that classroom teaching is at the heart of the process of schooling. What teachers do in the classroom is a crucial factor which strongly affects pupils’ progress in the school.

### 2.2 COOPERATIVE LEARNING AND OTHER SCHOOL SUBJECT

Johnson and others (1976) found that pupils in cooperative small group learning settings respond more pro-socially on altruistic versus individualistic choice tasks than do pupils in individual learning situations. In another study, based on the social studies curriculum, it was found that students who had studied cooperatively made more cooperative and helpful decisions in a subsequent simulation game than did students who had studied competitively (Ryan and Wheeler 1977). In this study, fifth and sixth grade students played the simulation “Seal Hunt” a component of MAN: A COURSE OF STUDY. The cooperative subjects manifested significantly
more cooperative behaviour, such as instituting and implementing group methods and rendering assistance to one another.

Slavin (1978) investigated the independent effects of level of reward (recognition based on the performance of a four-to-five member cooperative learning team vs. comparison with entire class) on student achievement and attitudes on 205 seventh graders in English (grammar and punctuation) classes. Results indicated reward level effects in favour of team reward and comparison group effects in favour of the comparison with equals on percentage of time on task, positive interpersonal perceptions. In case of attitudes, reward effect favouring team rewards were supported for perceived probability of success, motivation, dependence of outcome on performance, liking of others, peer support for academic performance. Comparison group effect in favour of comparison with equals were supported for feeling of being liked, liking of others, peer support for academic performance and number of friends named. No academic achievement effect were found for either factor.

Slavin and Madden (1979), in a secondary analysis of data collected in a national sample of high schools by the Education Testing Service found that teacher, workshop, multi-ethnic texts, minority history, heterogeneous groups and classroom discussions of race relations had very limited effects on students social attitudes and behaviour. On the other hand, the assignment of students of different races to work with each other and the participation of students in multi-racial sports teams had strong, consistent, positive effects on race relations.

Cooper, Johnson, Johnson and Wilderson (1980) studied the effects of cooperative, competitive and individualistic experiences on cross-ethnic, cross-sex and cross-ability interpersonal attraction on 60 seventh graders during English, geography and science classes and found that more students in the cooperative learning receive help from peers of the other ethnic group and sex than in the competitive and individualistic condition. More normal-progress students in the cooperative conditions perceive themselves as giving help to learning-disabled peers than in the competitive or individualistic conditions. More students in the cooperative and competitive conditions than in the individualistic condition chose friends from the other ethnic group and learning disabled peers.
Webb (1982) investigated the relationships among student and group characteristics, group interaction and achievement in cooperative small groups (mixed on ability or uniform-ability) on 77 students of grades 7 and 8 in mathematics. The findings revealed that three categories of interaction were related to achievement: receiving no explanation in response to a question or error (receiving no response or receiving only the correct answer) was negatively related to achievement; giving explanations and receiving explanations were positively related to achievement. Achievement and interaction in the group were related to group composition, sex, ability and personality, medium-ability students in uniform-ability groups showed higher achievement and received more explanations than medium-ability students in mixed-ability group. Boys showed higher achievement than girls. There was a curvilinear relationship between ability and achievement in mixed group: highs performed best, and mediums and lows showed similar achievement. High ability students gave more explanations than low-ability students. Introvert students outperformed extrovert students, but extrovert students received more explanations.

Webb (1982a) investigated interaction and achievement in cooperative small group: mixed ability or uniform ability of 96 students in Grades 7, 8 and 9 of average and general ability in mathematics. The group interaction variables were: student gives help, student receives help, student if off-task. Results indicated that students who worked in mixed ability groups tended to score higher on achievement test than student who worked in uniform-ability groups but the difference was not significant for group composition. The interaction variable that related most strongly to achievement was asking a question and receiving no response was higher among uniform ability groups than among mixed-ability groups. This interaction variable was negatively related to achievement. Students who received no answers to their questions obtained lower achievement test scores than students who did not experience this problem, whereas when asking a question, and receiving a response was taken into account, it did not predict achievement. The correlation between extroversion scale and the number of times students asked questions and received no response confirmed that extrovert student tended to be ignored less often than were introverts.

Lang (1983) investigated the use of a cooperative learning technique, Teams-Games-Tournament (TGT), on academic achievement and improve attitude towards
economics among college students in different ability levels. On 60 students of microeconomics class, 30 each in experimental (TGT) and control group it was found that TGT had no statistically significant treatment effect on academic achievement nor were there are any statistically significant distributional effects of TGT among students in three ability groups TGT had no statistically significant treatment effects on attitude toward economics.

Natthy, A (1986), studied the effects of three types of cooperative learning instructional methods vis-à-vis traditional learning structures on student achievement, using a Combination of jigsaw-II and cooperative methods on sample of 129 sixth grade students in four middle school classes who studied social studies for three consecutive nine week quarters. In three out of four treatment conditions, students were randomly assigned to classes. Each of the four teachers rotated through three of the four conditions, teaching the same material by different methods. Teachers received twenty four hours of initial in service training plus periodic on-site visits throughout the study. Results of the curriculum-specific tests indicated significantly greater performance in two of the three Cooperative Learning Methods compared to the control group.

Nederhood (1986) investigated the effects of cooperative learning technique on achievement and attitude outcomes of 1145 seventh graders in five experimental teaching teams of mathematics, language, arts and social studies and found significant positive results linking a teacher’s use of student team learning with positive classroom involvement, increased number of friends, higher academic expectation and increased self-confidence. No significant differences were found for achievement.

Scanlan (1998) examined the patterns of student talk in one fifth grade mathematics class. Cooperating learning groups provide an alternative means for structuring classroom activities and give students further opportunities to use language to learn. Although research has reported compelling evidence that use of cooperative group promotes academic achievement, positive attitudes towards school, higher levels of collaboration, positive relationships among students and increases self-esteem, little is known about how students actually talk with one another in these settings. Results indicated that student talk in cooperative groups was significantly different from the typical patterns of classroom discourse. Students used talk in the
following ways: 60% was related to the *mathematics* they had been assigned to do; 30% was used to regulate their group processes; and 7% was for social/personal purpose. Only 2% of the students’ talk was unloadable. Group assignment, that is, who is working with whom and the kind of tasks assigned influenced the way in which the students used oral language.

Conwell et al (1988) interviewed 28 students who worked in cooperative learning group in intermediate Social Science classroom in an urban system. The researchers reported several findings. Students perceived their social science achievement positively. Nearly two-thirds rated their level of self-esteem as high. White students, particularly white females felt positive about themselves when working in groups. More than three-fourth of the students interviewed enjoyed working with everyone in their group. Students had no preferences based on race of sex for team mates. However, the overall response of black students of group work was not so positive as that of white students. White females, regardless of achievement level, felt better about themselves when working in a group, compared to working alone in social science.

Watson, Scott B. (1988) studied the effects of the Group Educational Modules (GEM) Materials and cooperative learning techniques on the achievement of high school biology students, GEM materials are self-instructional packets designed for use with groups of high school biology students Cooperative learning is classroom learning environment in which students work in small, mixed ability groups toward a common goal and are rewarded for doing well as a group. A total of 11 teachers with 36 classes and 175 students were included in this study. All teachers involved covered the same general subject matter during the study period. An analysis of co-variance (ANCOVA) was used as the data analysis procedure. Significant differences were found in the achievement of student using GEM materials and those using traditional instructional approaches. The use of cooperative learning produced significant differences when compared to traditional classroom structures.

Williams (1988) investigated the effect of cooperative learning methods on student achievement in Algebra. The sample consisted of 165 Algebra students in two senior high schools and one junior high school. The experimental classes were taught by combining STAD and TGT methods. Results showed a significant difference
between experimental students and control students in the average gain scores on the Algebra I test but no significant changes in attitudes.

Kinney (1989) studied the effects of cooperative learning on the achievement of ninth-grade students in a multicultural general biology class. Kinney’s cooperative learning model involved two days of specifically designed cooperative learning activities followed by individual chapter tests on the third day. Day one involved the use of STAD. One day, two students were given their graded tests and worksheets for 10 to 15 minutes of study and then played Team-Game-Tournaments (TGT) for the rest of the period. Laboratory activities took place between the three-day cycles. Black students of both sexes showed significant increase in achievement over their counterparts in the control group for short-term effects (1989:5). Both black and white students in the experimental group had significant increase on chapter test scores.

Orlando, Joseph Edward (1991) conducted a study on Cooperative learning, student achievement and attitude in community college freshman English classes. Cooperative learning method, students Teams-Achievement Division, an instructional method designed and developed by Robert Slavin and his colleagues at The John Hopkins University was used for twelve weeks. A quasi-experimental design and a sample of 132 community college students were included in the study. The findings indicated a statistically significant difference in achievement between students who were involved and students who were not involved in the selected cooperative STAD method. A post-analysis of students’ attitude towards cooperative learning instructions indicated a positive direction.

Berg (1992) studied the effectiveness of structured cooperative learning technique in 11th grade mathematics class. The newly-devised paired-learning script was used as the primary instructional technique for 8 weeks, during which peer interactions and achievement were monitored. Results of analysis of short and long-term effectiveness of paired learning indicated that operative learners achieved more than comparable students taught using conventional methods in three or four comparisons; in one comparison there was no statistically significant difference, the programme was at least as effective as a mere conventional one as measured by chapter test scores, and there was evidence of long-term effects. Qualitative and quantitative analysis of tapes, field notes, student questionnaires and student
characteristic measures (prior mathematics achievement, study skills, mathematics anxiety and learning preference) reflected an overwhelmingly positive reaction to the paired learning experience.

Coston (1994) studied the effect of cooperative learning, graphics calculator enhanced instruction, and a combination of these approaches on students’ understanding of the function concept, mathematics achievement of algebraic skills and mathematics attitude of college Algebra students. Results indicated that cooperative learning significantly affect students’ understanding of functions and related topic, while the treatment that combined cooperative learning and calculator enhancement significantly affected students’ attitudes towards mathematics.

Hopp (1994) examined the influence of task on time spent in cooperative episodes and on cognitive and meta cognitive behaviours of 32 eighth graders as they worked cooperatively in groups of four on two routine and two non-routine mathematics tasks over a three-week period. Data was collected by audio and videotaping all students interactions as they completed the tasks. Findings suggested that time spent in cooperative episodes was related to the type of task and task may influence the quality of interactions as evidenced by problem-solving behaviours. Differences in time spent in cooperative episodes and in meta-cognitive and cognitive behaviours were found between routine and non-routine tasks and also within the two task types. Results offered strong support that for a task to be truly desirable as a group task, it needs to be non-routine for everyone in the group. Also, group members must need each other in order to complete it. Difference among groups may have occurred because of the ability composition of the group, the gender of the student, or the routineness or non-routineness of the task for individuals in each group. Tasks which required multiple abilities resulted in more and longer cooperative episodes.

Morgan (1994) studied the effects of cooperative learning with process-oriented individual accountability, cooperative learning without individual accountability and traditional instructions on pre-instructional achievement, post-instructional achievement, retention and attitude towards school and mathematics on three third grade classrooms. It reported a significant difference between traditional group and cooperative learning with individual accountability in post-test results; student of low ability experienced greater success in the cooperative learning with
process-oriented individual accountability than the students of low ability in the traditional group; cooperative learning without individual accountability did not reveal a significant difference when compared to the traditional group, cooperative learning with individual accountability had a significant effect on the achievement results, whereas, cooperative learning without individual accountability had significant effect on attitudes towards mathematics.

Nichols (1994) explored the effectiveness of a cooperative group learning structure (STAD) on achievement, goal orientation, self-efficacy, intrinsic and extrinsic valuing of the learning task and the use of cognitive methods of 81 students in high school geometry classes. STAD was used in 2 treatment situations: (1) as instruction for the first few weeks of school (2) as instruction for the second nine weeks of the school. Results indicated that both treatment group experienced significantly higher achievement scores and increase in learning goal orientation, self-efficacy, intrinsic valuing and reported uses of deep processing cognitive methods than did the control group. A decline in these effect was noticed when cooperative group instruction was replaced by traditional lecture instruction.

Karnasih (1995) investigated the effect of small-cooperative group learning on 160 tenth grade students’ achievement and affective behaviours in mathematics and developing a descriptive model of grouping patterns based on students’ interactions and interviews providing information concerning their feelings and reactions to the method and the group membership in small group cooperative learning. To develop the grouping patterns, small heterogeneous and homogeneous groups were formed by recording students’ mathematical ability, gender and field-dependency. The findings revealed that small group cooperative learning opportunities in mathematics classroom showed significant impact on students’ achievement and mathematics anxiety. Most students preferred small group learning, but some high achieving field-independent males did not prefer small groups. With respect to grouping patterns, this study found that either homogeneous or heterogeneous groups could be interactive but the most interactive groups were those in which there were no social and cognitive difference in problem of group members.

Nowak (1996) explored the effects of a cooperative learning programme on academic performance, cooperative interactions during lesions, and pro-social
behaviours during play activities in integrated kindergarten classrooms. Scores on curriculum based *mathematics* probes and direct observations of cooperative interactions during the intervention served as primary dependent measures. Pro-social behaviours were assessed by direct observation in a free play outside the classroom. Results indicated that the cooperative learning procedures lead to improved academic growth as measured both by the curriculum-based mathematics probes and the mathematics section of the standardized group readiness test. Levels of cooperative behaviours increased during the instructional period when cooperative learning was in effect. Pro-social skills learned and practiced during the intervention generalized to the free play settings in and outside of the classroom environments. An increase in interactive play behaviours was observed for all participants during these time periods. For cooperative behaviours, the generality of effects with respect to maintenance over time was not supported. Social validity data suggested that teachers, students and parent found the cooperative learning procedure to be effective and acceptable.

Watson (1996) investigated the use of cooperative learning and small-group instruction on sixty-four remedial college students in beginning Algebra and found increase in achievement, attitude and attribution; remedial students in cooperative learning group stay in school longer, take to succeed in more courses than traditional remediation group.

Armstrong (1997) studied the effect of Student Team Achievement Divisions (STAD) cooperative learning method on academic achievement and attitude toward *social studies* class on the sample of 47 twelfth-grade social studies students in two advanced progressive American classes and found that the application of STAD in the upper secondary social studies classroom exhibited no statistically significant difference in academic achievement on student attitude toward social studies class.

Lin (1997) studied effects of classroom goal structure (competitive, cooperative and individualistic) on beliefs about success/failure in mathematics environments on two hundred and forty fifth-grade Chinese children found significant difference in goal structure effects on mastery goal orientation, mathematics achievement, intrinsic motivation and beliefs about success; children in the cooperative and individualistic goal structures had higher mastery goal orientations...
than children in the competitive goal structure and scored higher in mathematics achievement and intrinsic motivations.

Whicker, Bol and Nunnery (1997) investigated the effects of cooperative learning on student achievement and attitudes on the mathematics students of secondary class. One group studied in cooperative learning group and another group studied the material independently. Results revealed that students in the cooperative learning group had increasingly higher test scores than students in the comparison group and survey results revealed primarily favourable responses toward the cooperative learning procedure. Most students indicated that they liked working in groups and appreciated getting help from other students, especially for learning difficult concepts.

Chang (1998) investigated the acquisition and development of self-efficacy through cooperative learning on the sample of one hundred twenty-three sixth grade students from two traditional classes and two cooperative classes found that there was no relationship between the self-efficacy measure and the requisite skill (i.e. mathematics aptitude), the cooperative learning method yielded higher perceived efficacy, students in cooperative method exerted more effort in solving word problems and showed higher self-appraisal of their performance.

Minakshi (1998) studied the effect of Team Games Tournaments of Hindi Grammar on students’ achievement, intergroup relatives and self-concept under cooperative learning. In this study pre-test, post-test control group design was employed. Seventy students of IX standard studying in Saini Senior Secondary School, Rohtak were assigned to experimental and control group randomly. The student’s achievement, inter-group relation and self-concept were the dependent variables. Teaching of six units of Hindi grammar syllabus for a period of six months through cooperative learning method (TGT) was the experimental treatment and traditional method was followed for teaching the control group. The Socio-Economic Status (SES) and intelligence were adjusted by applying analysis of co-variance. For testing the significance of difference between the means of students’ achievement, self concept and intergroup relations t’ test was used. The results implied that the students, who were taught Hindi Grammar through Team-Games-Tournaments under Cooperative learning, showed significant improvement in their v in Hindi Grammar
than the students who received instructions through traditional method. This suggests that Team-Games Tournament of students in Hindi Grammar.

Suyanto (1998) investigated the impact of the student Teams-Achievement Division (STAD) cooperative learning, model on students’ mathematics achievement and their perceptions of classroom environments in rural primary schools. The sample consisted of 664 third, fourth and fifth-grade student and their teacher who were trained in the use of STAD. The findings indicated that the STAD classes in third and fifth-grades performed significantly higher on tests of mathematics knowledge than the traditionally instructed classes. No significant differences in mathematics achievement were found between the fourth-grade students in the STAD group and those who were in the control group. Student in STAD group had significantly higher attitudes towards classroom environment.

Earley (1999) investigated the effect of cooperative learning on the group work and social skills interaction of 64 social studies student from grade 9 to 11 during a twelve-week period. The self report group function survey was used to assess the significance of whether instruction of social skills is important in the cooperative learning setting. The student choice form was used to establish the significance of social skills being taught and to determine the effects on increasing friendship among group member. Results of the survey indicated that social skills taught through cooperative learning methodology increased group effectiveness as well as interpersonal interaction.

Lucas (1999) studied the effects on the use of cooperative learning on the academic performance and self-efficacy of students controlled in college Algebra at a large mid-western university with gender as a co-factor, 307 students were taught with formal cooperative learning and 427 students were taught using the traditional lecture format when grades were used as the measure of academic achievement. Students in the cooperative learning sections performed significantly better than those in the traditional sections. There was no significant difference in students’ self-efficacy scores between the cooperative and traditional sections and the effects of using cooperative learning did not significantly differ when gender was considered.

Sparks (1999) studied the effectiveness of a short-term remediation/cooperative learning programme on a sample of 450 first semester general chemistry
course. Increase in achievement on examination 2 was found which was over topics discussed in the session. The session participants also increased their achievement on later examinations over material that was not discussed in the session.

Barett (2000) investigated the effects of two cooperative learning methods: Performed And Coach Earn Rewards (PACER) and Jigsaw-II-PE on academic learning time in physical education (ALT-PE), the percentage of correct trials and the social behaviour of eight sixth graders (2 males and 2 females in each study). The study revealed the following: (i) No functional relationship was found between the independent variable and ALT-PE, therefore, neither PACER and Jigsaw III-PE was more time-consuming than traditional instructions: (ii) PACER and Jigsaw III-PE each showed gender effects, in that low skilled students performed as well as their average and high skilled counterparts; and (iii) A functional relationship was found for both the methods with social duration, but with no frequency of social interaction.

Karch (2001) studied the effect of group training on cooperative learning teams of 105 ninth-graders in four heterogeneously mixed social studies classes in a sub-urban high school. Results showed that students in the trained condition did feel more personally supported in their groups than did their counterparts in the untrained conditions. In general, students in the trained condition had a more positive experience engaging in cooperative learning activities, and a more positive attitude towards their particular group. No significant difference was shown between the two conditions in the area of student achievement.

Neyshabour (2001) studied the effect of individual and cooperative learning in computer education on performance at knowledge, skill and application categories in relation to cognitive styles on a sample of 124 class X students and reported the following finding:

(i) No difference was found between knowledge mean scores, application mean scores and skill mean scores yielded through individual and cooperative learning mode. Both modes were found to be equally effective.

(ii) No difference was found between the total performance mean scores yielded through individual and cooperative learning mode.

(iii) Mode of learning was found to interact with cognitive style in respect of knowledge scores. Performance of field-independent group was higher with
cooperative learning than that of field-independent group with individual learning.

(iv) Mode of learning was not found to interact with cognitive style in respect of application and skill scores.

(v) There was no differences between the mean scores attained on knowledge, application and skill categories in respect of the interaction among learning mode and cognitive style.

Vaughan (2002) examined the effects of cooperative learning on the achievement and attitudes towards mathematics of a group of 5th grade students of color in a culture different from the United States (i.e. Bermuda) and found significant differences among the pre and post-test scores, suggesting that there were positive gains in attitudes and achievement levels of students of color.

Geed, Passi and Dube (2003) compared the overall achievement students of the cooperative learning environmental group with those of the traditional learning environment group in English. The samples comprised of 70 students of class IX (35 in each group). The achievement test included four sections namely – reading, writing, grammar and literature. Result indicated the following:

(1) Experimental group scored better in the Reading section than the control group.

(2) No significant difference was found between experimental and control group in Writing section.

(3) No significant difference was found between experimental and control group in Grammar section.

(4) Experimental group showed better understanding and retaining in literature when compared to the control group.

(5) Presentation of group work was better in experimental group when compared to control group who were assigned groups only for the project.

(6) Overall achievement of experimental group was significantly higher than that of control group.

Chen (2004) investigated the effectiveness of cooperative learning methods in teaching English as a foreign language to a group of 110 college students (34 males
and 76 females). Two cooperative learning methods, Jigsaw and student teams – achievement Division (STAD) were implemented in the experimental group and control group was instructed through traditional Grammar-translation method. The study revealed that the experimental group outperformed the control group and that males performed better in a cooperative structure than in the traditional competitive structure.

Bosfield (2004) investigated mathematical computation (i.e. addition, subtraction, multiplication, division, algebraic algorithm, decimals and fractions) skills between students instructed through the traditional learning method compared to the students instructed through the cooperative learning method on 53 subject, 29 boys and 24 girls, from two fifth grade classrooms. Subjects were randomly assigned to the traditional mathematics learning and the cooperative mathematics learning conditions. Subjects were given the Math 65 Test Masters assessment as the pretest and post-test, which was used to assess the learning skills. Analysis of results revealed that students in the cooperative classroom had significantly higher growth skills in mathematical computation than students in the traditional classroom.

Siegel (2005) used qualitative research methods to explore on 8th grade mathematics teacher’s personal definition of cooperative learning and the enactment of cooperative learning in his classroom according to that definition. Data coded schemes and descriptive statistics for data reduction and analysis. Results revealed that while the teacher implemented a research-based model of cooperative-learning instruction, he adopted the model for use in his classroom. Results also identified the teacher’s prior experience and teaching context as factors that influenced his implementation of cooperative-learning instruction.

Thangarajathi and Viola’s (2007) study aimed at (a) finding the effectiveness of cooperative learning approach over conventional method in learning mathematics at high school level; (b) comparing the achievement of the High, Average and Loa achievers when taught through conventional method; (c) comparing the achievement of the High, Average and Low achievers when taught through Cooperative Learning methods; and (d) comparing the achievement of conventional method group and cooperative learning method group with respect to sex, locality of the house, tuition undergone and type of tuition. The study concluded, indicating : (a) a significant
difference between the post-test scores of students in cooperative learning method
group and conventional method group; (b) a significant difference between the post-
test scores of high, average and low achievers in the conventional method group; (c)
no significant difference between the post-test scores of High, Average and Low
achievers in the cooperative learning method group; and (d) a significant difference
between the pre-test and post-test scores of conventional method group and
cooperative learning method group students in terms of sex, locality of the house,
tuition undergone, type of tuition.

Sharma savita(2008) studied the impact of cooperative learning method on
learning outcomes, interpersonal relationships and self esteem of elemenry school
students and found that cooperative learning strategy STAD significantly improves
the achievement, interpersonal relationship and self-esteem of students.

Kalpana (2008) studied the effect of cooperative learning on attitudes,
achievement and social skills on a sample of 112 students of seventh graders with
different cognitive levels. The sample was divided into field-independent and field-
dependent student who attained comparably on achievement which show that
changing from a tradition competitive classroom to a cooperative one does not
diminish student’s achievement, it significantly improves achievement. In the study,
group were rewarded based on member’s learning and also students were made
individually accountable for their academic performance. Thus positive effect on
achievement and retention in *mathematics* was found. The research supports
usefulness of cooperative learning for improving students attitudes towards
mathematics. But social skills were not enhanced as a result of institutional treatment
for 62 days.

A perusal of research studies reveals that in cooperative learning settings
students have shown increase in academic achievement in mathematic at different
levels. This is supported by various studies Webb (1982) conducted study on seventh
and eighth graders, Williams (1988) with senior high school students taking algebra
course, Mulryan (1989) with fifth and sixth graders, Berg (1992) with eleventh
graders, Coston (1994) with college algebra students, Morgan (1994) with third
graders, Karnasih (1995) with tenth graders, Nowak (1996) with Kindergarteners,
Watson (1996) with college algebra students, Lin (1997) with fifth graders, Whicker,
Bol and Nunnery (1997) with secondary class, Chang (1998) with sixth graders, 
Lucas (1999) with college algebra class, Bosfield (2004) with fifth graders whereas 
Suyanto (1999) reported no increase in mathematics achievement of third, fourth and 
fifth graders.

Cooperative learning techniques showed significant increase in achievement in 
languages as supported by Slavin (1980) in language mechanics, Anderson, Johnson 
and Johnson (1976) in language arts, Sheng (1990) in spelling instruction, Adams 
performance in English of ninth graders, Chen (2004) in English of College students, 
Ahuja (1994) reported increase in science achievement and Stepka (1999) reported 
increase in achievement in chemistry. I case of social studies, Armstrong (1997) and 
Karasch (2001) reported no significant increase in achievement.

Neyashbour (2001) reported no significant increase in performance in 
computer education. Yaibua (2005) reported significant increase in achievement 
scores in Electronics in Diploma course students.

Research studies showed increase of favourable attitudes towards different 
subjects, cooperative learning and towards classroom environment.

Coston (1994), Morgan (1994), Vaughan (2002) reported higher attitudes 
towards mathematics, Karnasih (1995) reported that most students felt that they had 
more opportunity for learning mathematics in small groups. Cook (1993) and Ahuja 
(1994) reported increase in attitudes towards science, Armstrong (1997) reported 
higher attitudes towards social studies. Whicker, Bol and Nunnery (1997), Karach 
(2001) reported higher attitudes towards cooperative learning whereas Williamson 
(1999) reported no significant increase in attitudes towards cooperative learning. 
Rondinaro (2004) reported that elementary school teachers showed significantly 
positive attitudes towards cooperative learning than high school teachers.

2.3 OVERVIEW

Cooperative learning is a process by which students work together in goups 
“to master material initially presented by the teacher” (Slavin 1990). To be successful, 
all members in a group must achieve mastery of the material or contribute to the
completion of a group assignment. Cooperative-learning promoted academic achievement is relatively easy to implement and is not expensive. Children’s improved behaviour and attendance and increased liking of school are some of the benefits of cooperative learning (Slavin 1987). Although much of the research on cooperative learning has been done with older students, cooperative learning methods are effective with younger children in pre-school centres and primary classrooms. In addition to the positive outcomes just noted, cooperative learning promotes students’ motivation, encourages group process, fosters social and academic interaction among students and rewards successful group participation in the learning of school subjects.