CHAPTER – I

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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 the factor which most strongly affects pupils’ progress in school.

1.1 CHANGING PARADIGM OF TEACHING

In the old paradigm of teaching, the teacher’s knowledge is transferred to passive learners. The absolute, necessary, and sufficient requirement for teachers in this content is complete mastery of the content. The classic classroom is the teacher lecturing and students listening. The students are silent, passive, and in competition with each other.

The new paradigm of teaching is based on the theory and research that have clear applications to instruction. In the new paradigm of teaching, knowledge is actively constructed, discovered, transformed, and extended by students.

The teacher’s effort is aimed at developing student’s competencies and talents; education is a personal transaction among students and between teacher and students as they work together. (Johnson, Johnson and Holubec, 1998).
Table 1.1
Comparisons of old and new paradigms of teaching

<table>
<thead>
<tr>
<th>Factor</th>
<th>Old Paradigm of teaching</th>
<th>New paradigm of teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Transferred from faculty to students</td>
<td>Jointly constructed by students and faculty</td>
</tr>
<tr>
<td>Students</td>
<td>Passive vessel to be filled by faculty’s knowledge</td>
<td>Active constructor, discoverer, transformer of own knowledge.</td>
</tr>
<tr>
<td>Faculty Purpose</td>
<td>Classify and sort students into categories</td>
<td>Develop students’ competencies and talents</td>
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<td>Relationships</td>
<td>Impersonal relationships among students and between faculty and students</td>
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<td>Content</td>
<td>Competitive/Individualistic</td>
<td>Cooperative learning in classroom and cooperative teams among faculty</td>
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<tr>
<td>Assumption</td>
<td>Any expert can teacher without training</td>
<td>Teaching is complex and requires considerable teacher training and continuous refinement of skills and procedures</td>
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The task of education is not to pour information into students' heads, but to engage student's minds with powerful and useful concepts. To facilitate this process students should be taught in ways that make information meaningful and relevant to students, by giving students opportunities to discover or apply ideas themselves. The quality of education at all levels, is strengthened by practicing student-centered activity based competency dependent cooperative approach for teaching which will make learning an enjoyable experience for pupils.

1.2 Cooperative Learning

(Together we stand, divided we fall)

Cooperation is working together to accomplish shared goals. Within cooperative situations individuals seek outcomes that are beneficial to themselves and beneficial to all other group members. Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning (Johnson, et. al., 1998).

Organizing students to work together in small group is an ancient practice in education throughout the world (Slavin, 1995). Today it is one of the most researched instructional strategies in education. Working in cooperative groups, students learn valuable social skills, use higher-order thinking and rehearse and practice new concepts, processes and information. Cooperative group learning does not happen successfully unless it is well orchestrated and certain considerations prevail. These
considerations increase the chances that the groups will work well together and achieve targeted standards (Gregory and Chapman, 2002).

Over the last two decades, cooperative learning has achieved broad-based support from researchers and classroom teachers (Slavin, 1999). According to Antil, Jenkins, Wayne and Vadasy (1998), “the frequency of references to cooperative learning in textbooks on instructional materials indicates that this approach to instruction is well suited in the educational mainstream.”

The acronym TASK (Robbins, Gregory and Herndon, 2000) can be used to remember the aspects of cooperative learning.

T Thinking is built into the process.
A Accountability is essential. Goal achievement: both individual and group.
S Social skills for team success.
K Keeping everyone on TASK: Roles, tasks, resources, novelty, simulations and clear expectations.

When we work in Groups (Johnson and Johnson, 1996), we

G Give Encouragement
R Respect others
O Stay on Task
U Use Quiet Voices
P Participate Actively
S Stay in our Group.

Without the cooperation of its members society cannot survive, and the society of man has survived because the cooperativeness of its members made survival possible....It was not an advantageous individual here and there who did so, but
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the group. In human societies the individuals who are most likely to survive are those who are best enabled to do so by their group (Montagu, 1965).

How students perceive each other and interact with one another is a neglected aspect of instruction. Much training time is devoted to helping teachers arrange appropriate interactions between students and materials (i.e. textbooks, curriculum programs) and some time is spent on how teachers should interact with students, but how students should interact with one another is relatively ignored. How teachers structure student-student interaction patterns has a lot to say about how they feel about each other, and how much self-esteem they have.

There are three basic ways students can interact with each other as they learn. They can compete to see who is “best”, they can work individualistically towards a goal without paying attention to other students or they can work cooperatively with a vested interest in each other’s learning as well as their own of the three interaction patterns, competition is presently the most dominant. A vast majority of students in our country view school as a competitive enterprise where one tries to do better than other students. This competitive expectation is already widespread when students enter school and grows stronger as they progress through school (Johnson & Johnson, 1991). Cooperation among students who celebrate each other’s successes, encourage each other to do homework, and learn to work together regardless of ethnic backgrounds or whether they are male or female, bright or struggling, disabled or not, is still rare.

Foyle and Lyman (1988) defined cooperative learning as a teaching strategy involving children’s participation in small group learning activities that promote positive interaction.
Cooperative learning is a process by which students work together in groups “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.

Johnson, Johnson and Smith (1991) referred to cooperative learning as the instructional use of small groups so that students work together to maximize their own and each other’s learning. Cooperative learning produces higher achievement, more positive relationships among students, and healthier psychological adjustment than do competitive or individualistic experiences.

Flowers and Ritz (1994) viewed cooperative learning as a teaching strategy where teams of two or more work together on learning tasks. Each member of the team brings special talents to the group i.e. concrete or analytical abilities or others. Also other team members cooperate on the achievement of the tasks and learn from each other. It also means taking the talents of individuals and pooling these together to get the job done. As a result, students learn both academic and social skills from a cooperative learning environment.

Cooperation is working together to accomplish shared goals. Within cooperative situations, individuals seek outcomes that are beneficial to themselves and beneficial to all other group members. Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other’s learning (Johnson, Johnson and Holubec, 1998).

Cooperative learning is an arrangement in which students work in mixed ability groups and are rewarded on the basis of the success of the group (Woolfolk, 2001).
In cooperative learning, teams each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. Cooperative efforts result in participants striving for mutual benefit so that all group members:

- gain from each other’s efforts.
- recognize that all group members share a common fate.
- know that one’s performance is mutually caused by oneself and one’s team members.
- feel proud and jointly celebrate when a group member is recognized for achievement. (Johnson and Johnson, 2001).

**Differences Among Cooperative, Competitive and Individualistic Learning**

Cooperative learning may be contrasted with competitive learning, in which individuals seek outcomes that are beneficial to themselves and detrimental to others. The student effort is on performing faster and better than classmates. Students realize that “they can obtain their goals if and only if the other students in the class fail to obtain their goals.” (Johnson and Johnson, 1999). In individualistic learning, students work independently to achieve learning goals unrelated to those of other students.

**1.3 HISTORY OF COOPERATIVE LEARNING**

Three theoretical perspectives have guided research on cooperative learning: social interdependence, cognitive-developmental and behavioural.
Social Interdependence Theory

Interaction with other people is essential for human survival. In an education setting, social interdependence refers to students' efforts to achieve, develop positive relationships, adjust psychologically and show social competence.

The social interdependence perspective of cooperative learning presupposes that the way social interdependence is structured determines the way persons without with each other.

Moreover, outcomes are the consequence of persons' interactions. Therefore, one of the cooperative elements that has to be structured in the classroom is positive interdependence or cooperation. When this is done, cooperation results in promotive interaction as group members encourage and ease each other's efforts to learn (Johnson, Johnson and Holubec, 1998).

Cognitive Developmental Theory

The cognitive developmental perspective is grounded in the work of Piaget and Vygotsky. Piagetian perspectives suggest that when individuals work together, socio-cognitive conflict occurs and creates cognitive disequilibrium that stimulates perspective-taking ability and reasoning. Vygotsky’s theories present knowledge as a societal product (Johnson, Johnson and Holubec, 1998).

Behavioural Learning Theory

The behavioural-social perspective presupposes that cooperative efforts are fueled by extrinsic motivation to achieve group rewards (academic and/or non academic) (Johnson, Johnson and Holubec, 1998).
1.4 CHARACTERISTICS OF COOPERATIVE LEARNING

1. **Heterogeneity of group members**: Research has shown that effective cooperative learning groups include relatively equal proportions of males and females, students with diverse SES and academic skills (Dishon and O'Leary, 1984; Hilke, 1990; Johnson and Johnson, 1985; Slavin, 1991).

2. **Reward Structure**: According to Slavin (1983), the success of cooperative learning is highly dependent on the underlying incentive or reward structure. Three general types of reward structures are:

   (a) Individual rewards for individual achievement.

   (b) Group rewards for group achievement.

   (c) Group rewards for individual achievement.

   The third type which is called an interdependent reward structure, has proven to be most effective (Slavin, 1983). When student's success as individuals is dependent on the success of other group members, students are more likely to work to ensure that peers learn the material.

3. **Task structure**: Students may either participate in group study or be assigned specialized individual tasks. With group-study task structure, all group members work cooperatively to learn material or solve problems. When students are given specialized tasks, they are responsible for learning a particular section of material independently and then teaching it to the rest of their group. Both task structures have been more effective than competitive or individualistic methods, although there is a little evidence to suggest that one type of task structure is more beneficial than the other (Johnson and Johnson, 1985).
1.5 Elements of Cooperative Learning

It is only under certain conditions that cooperative efforts may be expected to be more productive than competitive and individualistic efforts. Johnson and Johnson (2001) includes five criteria that define true cooperative learning groups are:

- Positive Interdependence
- Face-to-Face Promotive Interaction
- Individual accountability
- Development of small-group interpersonal skills
- Group processing.

Positive Interdependence

*(Sink or Swim together)*

The first requirement for an effectively structured cooperative lesson is that students believe that they "sink or swim together". Within cooperative learning situations, students have two responsibilities:

- Learn the assigned material.
- Ensure that all members of the group learn the assigned material.

The technical term for that dual responsibility is positive interdependence.
Positive interdependence promotes a situation in which students:

- See that their work benefits group mates and their group mates' work benefits them. Each group member’s efforts are required and indispensable for group success; and

- Work together in small groups to maximize the learning of all members by sharing their resources to provide mutual support and encouragement and to celebrate their joint success.

There are number of ways of structuring positive interdependence within a learning group, such as the learning of all members by sharing their resources to provide mutual support and encouragement and to celebrate their joint success. When positive interdependence is clearly understood, it establishes that:

1. Each group member’s efforts are required and indispensable for group success (i.e., there can be no “free-riders”).

2. Each group member has a unique contribution to make to the joint effort because of his or her resources and/or role and task responsibilities.

There are number of ways of structuring positive interdependence within a learning group, such as:

1. **Positive Goal Interdependence**: Students perceive that they can achieve their learning goals if and only if all the members of their group also attain their goals. The group is united around a common goal – a concrete reason for being.

2. **Positive Reward (Celebrate Interdependence)**: Each group member receives the same reward when the group achieves its goals. To supplement goal interdependence, teachers may give
students: (i) a group grade for the overall production of their group, (ii) an individual grade resulting from tests and (iii) bonus points if all members of the group achieve the criterion on tests. Regular celebrations of group efforts and success enhance the quality of cooperation.

3. **Positive Resource Interdependence**: Each group member has only a portion of the resources, information or materials necessary for the task to be completed; the members’ resources have to be combined for the group to achieve its goals.

4. **Positive Role Interdependence**: Each member is assigned complimentary and interconnected roles that specify responsibilities that the group needs in order to complete the joint task. Role interdependence among students when they are assigned roles such as reader, recorder, checker of understanding, encourager of participation and elaborator of knowledge. Although the teacher cannot continually check the understanding of every student, the teacher can engineer such checking by having students work in cooperative groups and assigning one member the role of checker.

5. **Positive Task Interdependence**: It exists when a division of labour is created so that the actions of one group member have to be completed if the next member is to complete his or her responsibility. Outside threat interdependence exists when groups are placed in competition with each other. Fantasy interdependence exists when a task is given that requires group members to imagine that they are in a hypothetical situation.

Research indicates that positive interdependence provides the context within which promotive interaction takes place. Group membership and interpersonal interaction among students do not
produce higher achievement unless positive interdependence is clearly structured.

**Face to Face promotive Interaction**

Positive interdependence results in promotive interaction. Promotive interaction may be defined as individuals encouraging and facilitating each other’s efforts to achieve, complete tasks, and produce in order to reach the group’s goals. Promotive interaction is characterized by individuals providing each other with efficient and effective help and assistance, exchanging needed resources, such as information and materials.

- Processing information more efficiently and effectively;
- Providing each other with feedback in order to improve their subsequent performance;
- Challenging each other’s conclusions and reasoning in order to promote higher quality decision making and greater insight into the problems being considered;
- Advocating the exertion of effort to achieve mutual goals;
- Influencing each other’s efforts to achieve the group’s goals;
- Acting in trusting and trustworthy ways;
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• Being motivated to strive for mutual benefit;
• Maintaining a moderate level of arousal characterized by low anxiety and stress.

Individual Accountability/Personal Responsibility

(no hitchhiking! no social loafing)

What children can do together today, they can do alone tomorrow (Vyotsky, 1962).

• Everyone has to do their fair share of the work. Individual accountability exists when the performance of individual students is assessed, the results are given back to the individual and the group, and the student is held responsible by group mates for contributing his or her fair share to the group’s success.

• It is important that the group knows who needs more assistance, support, and encouragement in completing the assignment.

• It is also important that group members know they cannot ‘hitchhike’ on the work of others. When it is difficult to
identify members’ contributions, when members’ contributions are redundant, and when members are not responsible for the final group outcome, they may be seeking a free ride (Harkins and Petty, 1982; Kerr and Brunn, 1981; Williams, Harkins and Latane, 1981).

The purpose of cooperative learning groups is to make each member a stronger individual in his or her own right. Individual accountability is the key to ensuring that all group members are, in fact, strengthened by learning cooperatively.

After participating in a cooperative lesson, group members should be better prepared to complete similar Tasks by themselves. Common ways to structure individual accountability include:

- Keeping the size of the group small.
- Giving an individual test to each student.
- Randomly examining students orally by calling on one student to present his or her group’s work to the teacher (in the presence of the group) or to the entire class.
- Observing each group and recording the frequency with which each member contributes to the group’s work.
- Assigning one student in each group the role of checker. The checker asks other group members to explain the reasoning and rationale underlying group answers.
- Having students teach what they learned to someone else. When all students do this, it is called simultaneous explaining.
The fourth essential element of cooperative learning is the appropriate use of interpersonal and small-group skills. In order to coordinate efforts to achieve mutual goals, students must: (1) get to know and trust each other, (2) communicate accurately and unambiguously, (3) accept and support each other, and (4) resolve conflict constructively (Johnson and Johnson, 1991). Placing socially unskilled student in a group and telling them to cooperate does not guarantee that they have the ability to do so effectively. Interpersonal and small-group skills do not magically appear when they are needed. Students must be taught the social skills required for high quality collaboration and be motivated to use them of cooperative group are to be productive. The whole field of group dynamics is based on the premise that social skills are the key to group productivity (Johnson and Johnson, 1991).

The more socially skillful students are and the more attention teachers pay to teaching and rewarding the use of social skills, the higher the achievement that can be expected within cooperative learning groups. Lew. et al., 1986 and Mesch et al., 1988 investigated the impact of a reward contingency for academic achievement on performance within cooperative learning groups. The results indicate that the combination of positive interdependence, an academic contingency for high performance
by all group members, and a social skills contingency promoted the highest achievement.

**Group Processing**

The fifth essential component of cooperative learning is group processing. Effective group work is influenced by whether or not groups reflect on (i.e., process) how well they are functioning.

Group processing may be defined as reflecting on a group session to:

1. describe what member actions were helpful and unhelpful, and
2. make decisions about what actions to continue or change.

The purpose of group processing is to clarify and improve the effectiveness of the members in contributing to the collaborative efforts to achieve the group’s goals. Groups need to describe what member actions were helpful and not helpful in completing the group’s work and make decisions about what behaviours to continue or change. Such processing:

1. enables learning groups to focus on maintaining god working relationships among members,
2. facilitates the learning of cooperative skills,
3. ensures that members receive feedback on their participation.
(4) ensures that students think on the metacognitive as well as cognitive level, and

(5) provides the means to celebrate the success of the group and reinforce the positive behaviours of group members.

Some of the keys to successful small-group processing are allowing sufficient time for it to take place, providing a structure for processing, emphasizing positive feedback, making the processing specific rather than general, maintaining students to use their cooperative skills while they process, and communicating clear expectations as to the purpose of processing.

**Source of all the above figures**: Johnson & Johnson (2001)
1.6 COOPERATIVE LEARNING METHODS

Social Psychological research on cooperative learning dates back to the 1920s (Slavin, 1995) systematic cooperative learning programs that could be used as the principal means of delivering instruction were developed in the early 1970's. The rationale for this new emphasis on cooperation in the classroom was a profound dissatisfaction with traditional classroom system in particular, traditional grading. It was felt that the competitive nature of grading was counterproductive, as it led students to discourage their classmates from doing well academically. Individual tasks have been criticized for isolating students and for being boring. For these reasons, several independent group of researchers developed programs designed to make the principles of cooperation applicable to the classroom setting (Slavin, 1995).

Slavin (1995) summarized the most extensively researched and widely used cooperative learning techniques as:

The methods are described in the following sections.
1.6.1 Student Team Learning

Student team learning methods are cooperative learning techniques developed and studied at Johns Hopkins University.

All cooperative learning methods share the idea that students work together to learn and are responsible for one another’s learning methods. These methods emphasize the use of team goals and team success which can only be achieved if all members of the team learn the objectives being taught. In student team learning, therefore, the students’ tasks are not to do something as a team but to learn something as a team. Three concepts are central to all student team learning methods: “team rewards”, “individual accountability” and “equal opportunity for success”. In these techniques, teams may earn team rewards if they achieve at or above a designated standard. Individual accountability means that the team’s success depends on the individual learning of all team members. Thus, the activity of the team members is focused on tutoring one another and making sure that everyone in the team is ready for a quiz or other assessment which will be expected to complete without teammate help. Equal opportunity for success means that students contribute to their teams by improving over their own past performance. This ensures that high, average and low achievers are equally challenged to do their best, and the contributions of all team members will be valued.

It is not enough simply to tell students to work together. They must have a reason to take one another’s achievement seriously. Further, research indicates that if students are rewarded for doing better than they have in the past, they will be more motivated to achieve than if they are rewarded based on their performance in comparison to others, because rewards for
improvement makes success neither too difficult nor too easy for students to achieve (Slavin, 1980).

There are four principal student team learning methods that have been extensively developed and researched.

1. **Student Teams-Achievement Divisions (STAD)**. In STAD (Slavin, 1986), students are assigned to four-member learning teams that are mixed in performance level, sex and ethnicity. The teacher presents a lesson, and then students work within their teams to make sure that all team members have mastered the lesson. Finally, all students take individual quizzes on the material, at which time they may not help one another.

   Students’ quiz scores are compared to their own past averages, and points are awarded based on the degree to which students can meet or exceed their own earlier performance. These points are then summed to form team scores, and teams which achieve certain standards may earn rewards.

   This method has been used in a wide variety of subjects, from mathematics to language arts to social studies, from Grade 2 through college. It is most appropriate for teaching well-defined objectives with single right answers, such as mathematical computations and applications, language usage and mechanics, geography and map skills, and science facts and concepts.

2. **Teams-Games-Tournament (TGT)**: (Devries and Slavin, 1978; Slavin, 1986). This method uses the same teacher presentations and teamwork as in STAD, but replaces the quizzes with weekly tournaments in which students compete, with members of other teams to contribute points to their team scores. The winner at each tournament table brings the same number of points to his or her team, regardless of which table it is. Thus, low achievers
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(Competing with other low achievers) and high achievers (competing with other high achievers) have equal opportunity for success. As in STAD, high performing teams earn rewards.

**Team Assisted Individualization (TAI)**

Team Assisted individualization (TAI) (Slavin et. al. 1986) combines cooperative learning with individualized instruction. It shares with STAD and TGT the use of four-member mixed ability learning teams and rewards for high performing teams. TAI is specifically designed to teach mathematics to students in Grades 3-6.

In TAI, student enters an individualized sequence according to a placement test and then proceeds at their own rates. In general, team members work on different units. Teammates check each others' work against answer sheets and help one another with any problems. Final unit tests are taken without teammate help and are scored by student monitors. Each week, teachers total the number of units completed by all team members and give certificates or other team rewards to teams which exceed a criterion score based on the number of final tests passed.

**Cooperative Integrated Reading and Composition (CIRC)**

Cooperative Integrated Reading and Composition, or CIRC is a comprehensive program for teaching reading and writing in the upper elementary grades from 3 to 5. (Stevens et. al. 1987). In CIRC, teachers use basal readers and reading groups. Students are assigned to teams composed of pairs of students from two different reading group, students in the other groups are working in their pairs on a series of cognitively engaging activities including reading to one another; making predictions about how narrative stories will come out, summarizing stories to one
another, writing responses to stories; and practicing spelling, decoding, and vocabulary. If the reading class is not divided into homogenous reading groups, all students in the teams work with one another. Students work as a total team to master main idea and other comprehension skills. Students followed a sequence of teacher instruction, team practice, team pre-assessment and quiz. Certificates are given to teams based on the average performance of all team members on all reading and writing activities.

1.6.2 Jigsaw

Jigsaw was designed by Aronson and his colleagues (Aronson et. al. 1978). In the original Jigsaw method, students are assigned to six-member teams to work on academic material which has been broken down into sections. Each team member reads his or her section. Members of different teams who have studied the same sections meet in 'expert groups' to discuss their sections.

Jigsaw – II

Slavin (1986) developed a modification of Jigsaw and then incorporated it in the student team learning program. In this method, called Jigsaw-II, students work in four-or-five member teams as in TGT and STAD. Instead of each student being assigned a unique section, all students read a common narrative such as a book chapter but each student receives a topic on which to become an expert. Students with the same topics meet with members of other groups who are ‘expert’ in the same part to discuss them, after which they return to their teams to teach what they have learned to their teammates. Then students take individual quizzes, which result in team scores based on the improvement score system of STAD.
1.6.3 Learning Together

Learning together model of cooperative learning was developed by Johnson and Johnson (Johnson and Johnson, 1987). It involves students working in four-or-five member heterogeneous groups on assignments. The groups complete a single assignment and receive praise and rewards based on the group product. The method emphasize team building activities before students begin working together and regular discussions within groups about how well they are working together.

1.6.4 Group Investigation

Group Investigation, developed by Shlomo Sharan at the University of Tel-Aviv (Sharan and Sharan, 1992), is structured to emphasize higher order thinking skills such as analysis and evaluation. It is a general classroom higher order thinking skills such as analysis and evaluation. Organization plan in which students work in small groups using cooperative inquiry, group discussion, and cooperative planning and projects. In this method, students form their own two to six member groups. After choosing subtopics from a unit being studied by the entire class, the groups further break their subtopics into individual tasks and carry out the activities necessary to prepare group reports. Each group then makes a presentation or display to communicate its findings to the entire class.

1.7 Benefits of Cooperative Learning

Society requires its members to exhibit cooperative behaviour. Success on a job often depends on one’s ability to work well with others. By fostering social skills, cooperative learning aims to fill this social need. Furthermore, cooperative learning
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techniques have numerous benefits to both the teacher and the learner.

1.7.1 Benefits to the Learner

Johnson, Johnson and Smith (1991) synthesized over 375 studies on the effect of cooperative, competitive and individualistic efforts on student achievement and productivity. They found that students in cooperative learning settings performed better than students in other competitive or individualistic settings and noted that cooperative learning "resulted in more higher-level reasoning, more frequent generation of new ideas and solutions (i.e., process gain) and greater transfer for what is learned within one situation to another (i.e. group to individual transfer) than did competitive or individualistic learning".

Hamm and Adams (1992) drew the following conclusions about the benefits of cooperative learning to the student:

- Cooperative learning improves academic performance among high and low-achieving students.
- Minority students have made consistently favourable achievement in cooperative classes.
- Working in mixed ability groups doesn't stifle individual initiative.
- Cooperative learning has positive effects on students' self-esteem, social relations, attitudes toward mainstreamed students, and race relations.
- By teaching others, all of the students actually come to understand the material better.
• Children’s cooperative behaviour skills were shown to transfer to interaction with peers who weren’t members of the same learning teams. It also transferred to their behaviour in social situations not structured by the teacher.

In general, cooperative learning, should be viewed in terms of its ability to both foster social skills and enhance academic learning.

Cooperative group learning not only helps students learn content and competencies but also helps them develop their emotional intelligence in five domains (Goldman, 1995):

• Self-awareness: through reflection
• Self-motivation: developing persistence and a positive work ethic.
• Managing emotions: Learning strategies for conflict resolution and consensus building.
• Empathy: listening, reflecting feelings, behaving in a supportive manner.
• Social Skills: Opportunities to identify practice and reflect on social skills.

1.7.2 Benefits to the Teacher

Hamm and Adams (1992) noted that teachers who began using cooperative learning “became more cooperative in their own professional interactions and more willing to collaborate with their peers”.

• Dividing the class into groups means the teacher has ten or eleven groups instead of 50 to 55 individuals to make good contact with each day. In addition there are 50 to 55 aides
in the classroom. Pupils monitor each other and while creating a spirit of cooperation and helpfulness.

- Teaching and classroom management become easier for the teacher as teams are guided by the active and capable members present in each team.

- Cooperative learning can help teachers spend less time as students learn that they are capable of validating their own values and ideas. Teachers are free to move about, work with small groups and interact in a more personal manner with students.

- The teacher might feel less stress. Although the teacher is still responsible for the learning in the classroom, some of the authority is delegated to the students. Even if a teacher uses cooperative learning on only a few occasions, it might give a welcomed relief (to both the teacher and the students) from the traditional instructional format.

1.8 ROLES IN COOPERATIVE LEARNING

The roles of the teacher and the learner are different in cooperative learning than they are in traditional classroom.

1.8.1 Role of the Cooperative Learner

By using cooperative learning techniques, a teacher can delegate authority to groups of students. Each member of a cooperative learning group has following responsibilities.

- Each group member should make constructive contributions to the group’s efforts.

- Group members should encourage their fellow group members to contribute.
• Group members should keep each other on task working toward their shared goal.
• Compromise is required from all cooperative learners.
• Those in a cooperative learning group should treat each other with care and respect. They should do their best to teach and learn from each other. They should adopt the anxious: “All for one and one for all”, and “The whole is greater than the sum of the parts”.

1.8.2 Role of the Teacher/Facilitator

A teacher who uses cooperative learning assumes a number of responsibilities.

These include the following:

• Planning lessons, activities and evaluation.
• Grouping students
• Physical placement of students
• Presenting and explaining the task to the students
• Monitoring group activities and intervening when necessary.
• Helping students with social skills
• Evaluating students.

1.9 LEARNING OUTCOMES PROMOTED BY COOPERATIVE LEARNING (Johnson and Johnson, 1989)

• Higher achievement and increased retention
• More frequent higher level reasoning, deeper-level understanding, and critical thinking.
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- Greater achievement motivation and intrinsic motivation to learn.
- Greater ability to view situations from other perspectives.
- More positive, accepting and supportive relationship with peers regardless of ethnic, sex, ability, social class or handicap differences.
- Greater Social Support.
- More positive attitudes towards teachers.
- More positive attitudes toward subject areas, learning and school.
- Greater psychological health and well-being.
- More positive self-esteem based on basic self-acceptance.
- Greater Social Competencies.

If the people in a group get along socially they will usually get the job done! Students learn social skills as well as cognitive skills and most often use higher levels of thinking as they discuss and clarify information. When using cooperative learning, the group comes to a consensus on a common goal or a specific assignment. Those in the group are assigned specific roles to play for a particular task. Both individual and group accountability is built in as an important part of a cooperative learning experience. Experts in cooperative group learning recommend that groups be structured heterogeneously.

1.10 ATTITUDES

All individuals have some feelings towards the objects in their environment: positive or negative; favourable or unfavourable. These feelings may range from very mild responses
which barely affect a person, to strong emotional reactions which exert a marked directive effect on the individual and his behaviour (Laycock and Munro, 1966).

The predominant role of attitude in determining thought, memory and learning processes has been recognized by psychologists. Whatever is learned depends to some degree on the attitudes of the learner, which means that children's learning depends on their feeling (favourable or unfavourable) towards teachers, courses of study and school in general (Travers, 1963).

"Attitude" is a broad term covering almost all the important fields of human knowledge, is especially prominent in the field of education. It is the guiding force behind all human actions.

Good (1945) in the Dictionary of Education calls it a state of mental and emotional readiness to react to situations, persons or thought in a manner in harmony with a habitual pattern of response previously conditioned to or associated with these stimuli.

Thurstone (1946) states that an attitude is a generalized reaction for or against specific psychological object. By a psychological object, Thurstone means any symbol, phrase, slogan, person, institution, ideal or ideas towards which people can differ with respect to positive or negative effect.

Cronbach (1954) viewed that an attitude consists of the meanings that one associates with a certain object (or abstraction) and that influences his acceptance of it.

Hilgard (1956) described attitude as an orientation toward or away from some object, concept or situation and a readiness to
respond in a predetermined manner to related objects, concepts or situations.

McDonald (1962) defined attitude as a predisposition to action, a state of readiness to act in a particular way. They are generalized states of the individual, which lead to or result in a wide variety of particular ways of behaving.

Fishbein and Ajzen (1975) identified three essential features of attitudes: attitude is learned, it predisposes action and such actions are consistently favourable and unfavourable toward the object.

Eagly and Chaiken (1993) defined attitudes as tendencies to evaluate an entity with some degree of favour or disfavour, ordinarily expressed in cognitive, affective and behaviour responses. The cognitive component involves a thought or belief about something that may be either true or false. The affective component involves liking or disliking. The behavioural component is the reaction tendency; one of the ways in which an individual can express evaluation of the individual can express evaluation of the attitude object.

Chaiken (2001) referred attitude as a psychological tendency that is expressed by evaluating a particular object or entity with some degree of favour or disfavour. An object or entity can be virtually any ‘thing’ in person’s internal or external social environment.

Scholl (2002) defined attitudes as a mental predisposition to act that is expressed by evaluating a particular entity with some degree of favour or disfavour individuals generally have attitudes that focus on objects people or institutions.
Thus attitude is more or less a stable set or disposition of feelings, opinions, preconceived notions, ideas, fears involving a certain kind of experience and readiness with an appropriate response. People can hold attitudes of varying degrees of favorability towards themselves and towards any discriminable aspect of their environment. From its inception, attitudes are considered behavioral disposition, they direct and determine the action of an individual in a particular manner towards certain objects, persons or ideas. Additionally, attitudes are relatively enduring evaluations stored in long-term memory rather than transitory psychological states.

1.10.1 Components of Attitudes

Attitudes are comprised of four components. (Scholl, 2002).

(1) **Cognitions (mental component)**: Cognitions are our beliefs, theories, expectancies, cause and effect beliefs, and perception relative to the focal object.

(2) **Affect (Emotional Component)**: The affective component refers to our feeling with respect to the focal object such as fear, liking or anger.

(3) **Behavioural Intentions (action component)**: Behavioural intentions are our goals, aspirations and our expected responses to the attitude object.

(4) **Evaluation**: Evaluations are often considered the central component of attitudes. Evaluations consist of the imputation of some degree of goodness and badness to an attitude object. When we speak of a positive or negative attitude toward an object, we are referring to the evaluative component. Evaluations are function of cognitive, affect and
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behavioural intentions of the object. It is most often the evaluation that is stored in memory, often without the corresponding cognitions and affect that were responsible for its formation.

1.10.2 Characteristics of Attitudes

An attitudes may be characteristics as one kind of an anticipatory response. Not all anticipatory responses are attitudes. The following characteristics differentiate attitudes from other kinds of states of readiness: (McDonald, 1962).

1. **Attitudes imply a subject-object relation**: Attitudes are related to objects, people, places, events, abstract ideas and concepts in the environment of the person. An individual differentiates himself from some aspect of his environment, and this differentiation is the basis for the subject-object relationship when the individual has feelings about the object, he has an attitude towards the object.

2. **Attitudes have direction**: Attitudes are directional orientations toward objects, whether the objects are persons, places or abstract ideas. We are ‘for’ or ‘against’ something, we like and dislike. All these ways of describing psychological movement toward or away from something suggest the directional character of an attitude.

3. **Attitudes are characterized by an intensity factor**: In describing people's attitudes, we can conceive of them as having varying degrees of strength or intensity. For example, one student may agree that mathematical work is hectic, but may not feel very strongly about how hectic this work is. Another student may feel very strongly about the hectic character of mathematical work.

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4. **Attitudes are acquired**: A child is not born with set of attitudes toward his environment. They are ways of interpreting the environment and reacting to environmental stimuli. Through the processes of discrimination and generalization over similar kind of objects, the individual develops a generalized pattern of response which we call an attitude.

5. **Attitudes are characterised by stability and consistency**: An attitude is said to exist when the individual has acquired a stabilized, consistent way of interpreting and responding to his environment. For example, the teacher may have an attitude towards her students, we do not speak of her feelings about those students as attitudes unless there is some consistency in her reactions.

Functional approach gives a clear idea that attitudes may be instrumental in achieving particular goals. Attitudes may also provide a simple set of rules for responding to a very complex world. They provide an avenue of self-expression through which the individual may find gratification and achieve new fulfillment.

To encourage pupils to adopt desirable rather than undesirable attitudes, attitudes are taught through the teacher's own behaviour in instances where he serves as a model or identifying figure. Attitudes may be developed directly or modified through a planned program of instruction in which the teacher has carefully thought through his objectives and prepared his lessons with definite attitude development in mind (McDonald, 1962).
1.11 ACHIEVEMENT AND RETENTION

Academic achievement is often referred to as the degree of level of success or proficiency attained in academic work.

Mehta (1969) described the wider term “performance” which included both the academic and co-curricular performance of an individual. Achievement is the learning outcome of a student. A level of academic achievement in the academic field of a student is included in the performance of an individual.

Good (1973) referred to academic achievement as the knowledge attained or skills developed in the school subjects, usually designated by test scores or marks assigned by the teacher.

Christian (1977) referred to the word achievement as the learning outcome of students. As a result of learning different subjects the behaviour pattern of the students changes. Learning affects three major areas of behaviour of the students. (1) cognitive (2) Affective and (3) Psychomotor.

Christian (1983) revealed that all these three levels were not affected in equal measure at a time, a student may be at a higher level in one domain and lower in another.

Torres (1994) defined academic achievement as the attained ability or degree of competence in school task usually measured by standardized tests and expressed in grades or units based on norms derived from a wide sampling of pupils’ performance.

Achievement test is a standardized test that is designed to measure an individual’s level of knowledge in a particular area unlike an aptitude test which measures a person’s ability to learn something, an achievement test focuses specifically on how much
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A person knows about a specific topic or area such as math, geography or science. (Alley Dog. com, 1999).

Wideman (2002) defined achievement as a measure of performance or accomplishment to date.

Nordy (2004) defined achievement as accomplishment or performance; the realization of potential.

Artwork asu.edu (2005) defined ability to demonstrate accomplishment of some outcome for which learning experience were designed.

So achievement is the measurement of what a person knows or has learned from formal instruction, usually in school or what one can do after training. Academic achievement revealed by tests, does not correspond to ability. The student may show consistent success in some subjects, while doing poorly in another, despite comparable effort.

Factors Affecting Academic Achievement

Good and Nichols (2001) review several reasons of problems of achievement.

1) Problems with curriculum, Theory and Test Alignment: Aligning standardized achievement tests with curriculum implementation is vital for meaningful interpretation of student scores. Appropriately, achievement tests should assess the philosophical orientation of the curriculum. Then, other tests and research can be used to assess the utility of a curriculum for various purposes (i.e., do various curricula have different effects on long-term memory of the curriculum taught or on students ability to transfer ideas learned in a curriculum to solve new problems?).

2. Effective Teachers : Teachers definitely make a difference in student learning (Weinert and Helmke, 1995). Some teachers
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notably outperform other teachers in helping similar students to learn the type of material historically measured on standardized achievement tests. Research has illustrated that the practices of successful teachers could be taught to other teachers. Teachers can be educated in ways that allow them to achieve comparable effects on their students. But the research that helps teachers to expand and assess their capacity for impacting students thinking abilities has been inert.

3. Effective Schools: Schools (serving similar populations of students) have more effect on student achievement (as measured by conventional standardized achievement tests) than do other schools (Good and Weinstein, 1986). Teddlie and Stringfield’s (1993) longitudinal study in Louisiana has provided strong evidence that schools make a difference. There still have not been successful and replicated studies to show that factors associated with ‘effective’ schools can be implemented in other schools in ways that enhance student achievement.

4. Comprehensive School Programs: In recent years, intervention using components of previous teacher and school effects research and emerging ideas (e.g. cooperative student groups) have been combined in comprehensive school programs designed to transform all aspects of schooling at the same time (including governance, structure, instruction, home schooling, communication, curriculum and evaluation).

McCaslin and Good (1992) noted that some schools emphasize a behavioural approach to classroom management (do as you are told) and a constructivist approach to the curriculum (“think and argue your conception”).

5. Educators on Non-cognitive Factors: Wanlass (2000) unique strengths and talents of more students and the need to better develop the unique abilities of nonacademic areas as well as
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academic concerns (performing arts, social-interaction, leadership, civic-mindedness, social advocacy, etc.). Goodenow (1992) has argued that students who feel more connected to their schools are more likely to be academically and socially successful. Students who felt more personally valued and invested in were more likely to place higher value and have higher expectations for classroom success than were students who did not feel valued.

Assessment of Academic Achievement

The assessment of academic achievement has long been a routine part of all educational process. Assessment of academic achievement aims:

- to assist professional in specifying and verifying problems
- making decisions about students (Salvia and Ysseldyke, 1995).

Methods of assessing academic achievement can be categorized into one of four types:

1. **Standardized Norm-referenced tests**: These are designed to determine a student’s standing relative to similar age/grade peers. The results of the measure are usually reported in some form of standard scores and can be helpful in establishing a student’s performance against a sample drawn from a target population.

2. **Criterion-referenced tests**: These are designed to determine the acquisition of specific skills against a pre-established standard. Scores on these measures are usually reported in the percentage of skills mastered.

3. **Performance-based assessment**: Performance-based assessment measures are designed to provide indications of student’s learned skills as demonstrated through material that is produced under conditions that stimulate events occurring in the environment where the skills needs to be produced.
4. **Curriculum-based assessment**: It represents attempts to assess a student’s performance using expected curriculum objectives as the data for evaluation.

One of the objectives of schooling include changes in students' cognitive skills. Cognition deals with the processes like knowing, perceiving, recognizing, thinking, conceiving, judging and reasoning. (Gage and Berliner, 1984).

The most widely used model for identifying the cognitive processes used by examinees to solve test items is the taxonomy of Educational Objectives: Cognitive Domain (Bloom, et al., 1956). Taxonomy identified six major level (from simple to complex) within which cognitive objectives may be classified viz.,

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

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 strategies.

Chitriv (1983) found both Bruner and Ausubel strategies were 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 subtest whereas the students teams using mastery learning strategy and group using mastery learning
strategy only significantly surpassed the control group on both computation and comprehension subtest scores.

Rudy (1990) studied the effect of reciprocal teaching (metacognitive strategies comprised one treatment variable and the use of cooperative learning by students was the second treatment variable of social interaction) and reported that social interaction positively affected student performance on both the criterion referenced and norm-referenced geometry measures. Metacognitive strategies had a positive effect on both the measures of ability and affect.

Shankara Narayanan (1990) revealed that the 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 was significantly better on measures of delayed achievement, immediate achievement, retention and delayed transfer irrespective of methods of instruction employed.

Todd (1994) reported that group taught with computer management system (CMS) had overall higher achievement mean scores and achievement rates than the control group in both 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 femininity 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 did children with normal achievement (NA) and children with difficulties in reading but not in mathematics (RD-only) 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.

Retention

Retention is the capacity to remember modeled behaviour. Retention processes include symbolic coding, organization of what has received attention and rehearsal. For the observer to form and retain a cognitive representation of the modeled behaviour, it is necessary that he or she code and store observations (McCown, Driscoll and Roop, 1996).

Remembering plays an important role in our daily life. Our life becomes richer if we are able to remember post experiences. This ability to remember plays an important role in the process of learning and constructive thinking which is essential for our
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intellectual life. Learning implies a relatively permanent change in behaviour that results from a practice or an activity and thus involves a three-step sequence of initial acquisition, retention and use. But retention can occur only if something has been acquired initially, and transfer of acquired outcomes to a new situation can occur only if the outcomes has been retained (Klausmeier and Goodwin, 1966).

In general two factors are cited most frequently as affecting memory of new material:

- Whether the new information is consistent with or can be related to prior knowledge and
- How the new information is processed.

Information that is consistent with, or can be related to, prior knowledge is more easily remembered than information that is not consistent with or relatable to prior knowledge. With respect to information processing, both encoding process (i.e., activities during study) and retrieval processes (i.e., activities during testing) are known to be critical determinants of how information is organized in long-term memory and how much of it is remembered (Pressely and Meter, 1995).

People retain a large portion of what they learn in school or college several factors contribute to long-term retention. The degree to which the students had learned the material in the first place is one factor (Bahrick and Hall, 1991). Instructional strategies that actively involve students in lessons contribute to long term retention (Slavin, 1997).

Long term retention of information that is learned varies a great deal according to the type of information for example, concepts are retained much longer than names (Conway, Cohen and Stanhope, 1991). In general, retention drops rapidly in the first few weeks after instruction but then levels off (Bahrick and
Hall, 1991). Whatever students have retained about 12 to 24 weeks after instruction, they may retain forever (Slavin, 1997). It is interesting to note that the effects of ability on retention is unclear. Higher ability students score better at the end of course but often lose the same percentage of what they have learned as low-ability students do (Semb and Ellis, 1994).

Berlyne (1966) explained that retention depends upon two distinct facts, intelligence and motivational disposition. Rothkopf (1965) ascertained that presentation of questions at various points in learning process can increase retention of facts, answering questions and produced a generalized improvement in retention of other facts.

Gupta (1978) investigated the role of organizing strategies and methods of presentation on short-term retention. The study reveals that the visual mode of presentation is significantly better than auditory mode in affecting retention.

Chitriv (1983) found that Advance Organizer Model and Concept Attainment Model were superior to the traditional method in knowledge transfer, heuristic transfer, short term retention and long term retention of concepts.

Specht and Sandling (1991) contrasted undergraduates who learned accounting using traditional lectures or role playing. The traditionally taught students lost 54 percent of problem-solving performance after 6 weeks, while the role playing group lost only 13 percent.

Bal (1992) found that – (1) The variable of intelligence had a significant effect on acquisition and retention of higher level writing skills in English. (2) The variable of cognitive style had a non-significant effect on retention as measured by last totals and scores on supply type items but not when measured by scores on selection type items. (3) Intelligence and cognitive style had a non-
significant effect on acquisition and retention of higher level writing skills in English.

Mehra (1992) reported that retention is dependent upon intelligence and that the low intelligence group exhibited more forgetting as compared to the high intelligence group. Retention is equally effective for learning at knowledge as well as at the comprehension level of objectives.

Thompson (1992) reported that the small cooperative learning groups completing Van Hiele Phase-based paper and pencil activities scored higher on mean retention than the traditional group with the difference being in the performance on test items which used higher order cognitive skills whereas on post-test achievement scores differences were found for low cognitive skills, not for higher cognitive skills.

Semb and Ellis (1994) in reviewing research on retention, noted that laboratory studies of retention, of nonsense words and other artificial material greatly underestimate the degree to which information and skills learned in school can be retained.

Mehra and Khare (2001) reported that retention was found to be dependent upon instructional treatment. Students taught through Inductive Thinking Model and Advance Organizer Model retained comparably. But students taught through Inductive Thinking Model or Advance Organizer Model retained more than those taught through the conventional method. High intelligence students retained more than their low intelligence counterparts. Students exhibited more retention at comprehensive category than at the knowledge category of objectives.

Neeru (2001) reported that class V field-independent students retained more than their field dependent counterparts in maths. Students at knowledge category retained better as compared to the comprehension category of objectives.
Mondal (2002) reported that class IX students taught by traditional instruction followed by peer tutoring exhibited better retention as compared to those taught by traditional instruction. High intelligence students retained more than low intelligence students. Students retained comparably at knowledge and comprehension category of objectives.

1.12 SOCIAL SKILLS

Social skills are those communication problem-solving, decision making, self-management and peer relations abilities that allow one to initiate and maintain positive social relationships with others (Mclyntre, 2005).

Rewarding and enjoyable communication between people is one of the most important components of life. Throughout each day most people are exposed to a wide variety of interpersonal situations. These skills enable us to know what to say, how to make good choices, and how to behave in diverse situations. The extent to which children and adolescents possess good social skills can influence their academic performance, behaviour, social and family relationships, and involvement in extracurricular activities. Social skills are also linked to the quality of the school environment and school safety. While most children pick up positive skills through their everyday interactions with adults and peers, it is important that educators and parents reinforce this casual learning with direct and indirect instruction (NASP, Center, 2002).

McFall (1982) proposed that social skills are the specific behaviours that enable a person to be judged as socially competent by others on a particular social task. Social skills include both the overt behaviour that a person needs to engage in to produce a positive outcome and also the many cognitive skills that determine how we respond.
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Coleman and Lindsay (1992) have defined social skills as the cognitive functions and specific verbal and non-verbal behaviours that an individual engages in when interacting with others.

Hicks (2001) viewed that social skills develop naturally as they mature and they learn from their daily interactions with others. A child’s own physical abilities, attitudes and communication skills as well as the behaviour of his/her family members and peers influences this interpersonal, social process.

Social skills are interpersonal behaviours that assist individuals to achieve various goals and sources of reinforcement in an interpersonal context and in minimizing social punishment and negative feedback (Deffenbacher, 2000).

Glenister (2003) viewed social skills as little more than good communication or “the art of conversation”. As with most skills, they have to be acquired through practice and perseverance.

Murphy (2003) viewed social skills as the ways you interact with other people. It includes the way you talk your body language and how you treat others in general. We start building social skills at birth. We learn how to talk, how to react in certain situations and how to act towards others by what we learn from those around us.

D’souza (2005) described social skills as the ability to interpret situations correctly and behave accordingly. They are the base on which manners are formed. Without social skills, it is virtually impossible to have any kind of etiquette or manners.

McLyntre (2005) defined social skills as the ability to respond to a given environment in a manner that produces, maintains and enhances positive interpersonal (between people) effects.

Social skills are skills, a social animal uses to interact and communicate with others to assist status in the social structure.
and other motivations. Social structure and other motivations. Social rules and social relations are created, communicated and changed in verbal and non-verbal ways creating social complexity useful in identifying outsiders and intelligent breeding partners. The process of learning these skills is called socialization. (Wikipedia, encyclopedia 2005).

1.12.1 Consequences of Good Social Skills (NASP, 2002)

With a full repertoire of social skills, students will have the ability to make social choices that will strengthen their interpersonal relationships and facilitate success in school. Some consequences of good social skills are:

- Positive and safe school environment.
- Child resiliency in the face of future crises or other stressful life events.
- Students who seek appropriate and safe avenues for aggression and frustration.
- Children who take personal responsibility for promoting school safety.

1.12.2 Consequences of Poor Social Skills (NASP, 2002)

Students with poor social skills have been shown to:

- Experience difficulties in interpersonal relationships with parents, teachers and peers.
- Evoke highly negative responses from others that lead to high levels of peer rejection. Peer rejection has been linked on several occasions with school violence.
- Show signs of depression, aggression and anxiety.
- Demonstrate poor academic performance as an indirect consequence.
1.12.3 Factors Affecting Social Skills

1. **Personality**: Personal characteristics such as the physical attractiveness, mode of dress, personal grooming and sporting powers of children, influence how they are judged by others and the response of other people towards them (Rathjen, 1980).

2. **Culture**: All cultures have norms and rules concerning appropriate social behaviour and expected behaviours may conflict from culture to culture. (Deffenbacher, 2000).

3. **Age**: Different behaviour are judged to be appropriate for children of different ages. As we grow older, we keep on learning skills. By age six, a typically developing child has the ability to identify facial expressions (emotions), and by twelve, he/she can match his/her social skills with the demands of the situation. (Gut and Safron, 2002).

4. **Neurological Conditions**: Neurological deficits in some forms of mental retardation and schizophrenia may make it difficult for the individual to attend to and learn social effective behaviour and/or to attend to social, interpersonal cues and initiate appropriate behaviour (Deffenbacher, 2000).

1.12.4 Types of Social Skills

Social skills can be categorized in number of ways. Spence (1995) summarizes some of the most important micro-level social skills:

- Posture and body orientation
- Amount spoken
- Eye contact
- Facial Expression
- Voice volume
- Tone of voice
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- Head movements (for example, nods during listening)
- Latency of response (time taken to respond to questions)
- Body movements (for example, fidgeting and fiddling)
- Gestures
- Social distance (distance placed between self and the other person during interaction)

**Macro-level Social Skills are:**

- Giving a greeting
- Receiving a greeting
- Giving criticism
- Accepting criticism
- Asking for help
- Offering help
- Joining in
- Inviting others
- Saying ‘no’
- Refusing unreasonable demands
- Interrupting
- Dealing with teasing
- Dealing with bullying
- Taking turns
- Apologizing for mistakes
- Owning up
- Expressing positive feelings
- Giving complements
- Receiving complements
- Expressing anger and negative feelings
- Gaining attention
- Listening to others
- Starting conversations
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• Ending conversations
• Maintaining Conversations
• Dealing with arguments
• Negotiating compromises

According to Hicks (2001), “Social Skills” is an all-encompassing one. It includes:

• Friendship-Making Skills
  - Joining in a game
  - Giving a compliment
  - Sharing
• Skills for dealing with Feelings
  - Expressing your feelings
  - Dealing with anger
• Skill Alternatives to Aggression
  - Using Self-Control
  - Responding to Teasing
• Skills for Dealing with Stress
  - Dealing with being left-out
  - Reacting to failure
• Classroom Survival Skills
  - Following instructions
  - Asking for help

According to Gut and Safran (2002) the following are common difficulties:

• Conflict resolution
• Sharing
• Turn-taking
• Problem avoidance
• Adaptation to routines
• Initiation of Activities
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- Making Choices
- Interpreting facial expressions and gestures
- Emotional recognition and labeling.

According to NASP, Center at Bethesda (2002) social skills related to school safety include:

- Anger Management
- Recognizing/understanding others point of view
- Social Problem solving
- Peer negotiation
- Conflict management
- Peer resistance skills
- Active Listening
- Effective Communication
- Increased acceptance and tolerance of diverse groups.

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- Social problem solving
- Peer negotiation
- Conflict management
- Peer resistance skills
- Active listening
- Effective communication
- Increased acceptance and tolerance of diverse groups.

There are specific skills deemed “essential” by teachers to succeed in generation education settings. These skills include:

- coping skills (i.e., expressing anger appropriately)
- work habits (i.e., using class time efficiently)
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- peer relationships (i.e., interacting with a variety of children on a regular basis).

According to National Association of School Psychologists (NASP, 2002) while there are hundreds of important social skills for students to learn, social skills can be organized into four areas:

1. Survival skills
   - listening
   - following directions
   - ignoring distractions
   - using nice or brave talk
   - rewarding yourself

2. Interpersonal skills
   - sharing
   - asking for permission
   - joining an activity
   - waiting your turn

3. Problem solving skills
   - asking for help
   - apologizing
   - accepting consequences
   - deciding what to do

4. Conflict resolution skills
   - dealing with teasing
   - losing accusations
   - being left out
   - peer pressure

Basic social skills that students need include (Gregory and Chapman, 2003).

- using appropriate language
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- speaking politely and quietly
- Encouraging others
- listening to others
- Asking for help.

Some social skills that students need to function well in a group include:
- Disagreeing in an agreeable way
- Accepting different opinions
- Following procedures
- Checking for accuracy and understanding
- Dealing with conflict.

Elliot (2005) discovered about the six key social skills as follows:

1. The ability to remain relaxed, or at a tolerable level of anxiety while in social situations. If body and face give the unconscious message that one is nervous, it will be more difficult to build rapport with others.

2. Listening skills, including letting others know you are listening. Good listening skills include:
   - Feeding back what you have heard
   - Physical stillness, eye contact and attentiveness while the other person is talking

3. Empathy with and interest in others’ situations. A major part of social anxiety is self-consciousness which is greatly alleviated by focusing strongly on someone else.

4. The ability to build rapport, whether natural or learned. Rapport is a state of understanding or connection that occurs in a good social interaction. Rapport is an unconscious process, but it can be encouraged by:
   - Body posture ‘mirroring’ or movement ‘matching’
• Reflecting back language and speech, include rate, volume, tone and words.
• Feeding back what you have heard.

5. Knowing how, when and how much to talk about yourself-disclosure. Good initial talk is often characterized by discussion of subjects not personal to either party, or by an exchanging of personal views in a balanced way. However, as conversations and relationships progress, disclosing personal facts leads to a feeling of getting to know each other.

6. Appropriate eye contact
   This doesn’t mean you have to stare at them.

Some of social skills that promote acceptance by teachers (and other adults) and peers are as follows: (Mclyntre, 2005)

1. Manners and positive interaction with others
   - approaching others in social acceptable ways
   - how to asking for permission rather than acting impulsively.
   - how to make and keep friends
   - sharing toys/materials.
   - consider the feelings of others.

2. Appropriate classroom behaviour
   - work habits/academic survival skills
   - listening
   - attending to task
   - following directions
   - seeking attention properly
   - accepting the consequences of one’s behaviour

3. Better ways to handle frustration/anger
   - distracting oneself to a pleasurable task
   - learning an internal dialog to cool oneself down.
4. Acceptable ways to resolve conflict with others.
   - using words instead of physical contact
   - seeking the assistance of the teacher

   Managing student behaviour in the classroom can be difficult and complex for any teacher, but when successful, teachers may find behaviour management professionally rewarding. Behavioural excesses and deficits detract from learning opportunities and preclude positive peer relationship.

   The cognitive-behavioural theory involves the use of inner speech (‘self-talk’) to modify underlying cognition’s that affect overt behaviour (Mahoney, 1974; Meichenbaum, 1977). Since theorists consider the internalization of self-statements fundamental to developing self-control, deficient or maladaptive self-statements are viewed as contributing to negative beliefs about oneself, which can contribute significantly to childhood behaviour problems, including aggression. Kendall (1993) noted that student’s cognition about social situation encountered throughout the school days can be examined and modified through verbal self-regulation (i.e., using self-talk to guide problem solving or some other behaviour).


1.12.5 Developing Social Skills

   We are born with some skills, we develop others depending on the circumstances and opportunities that life presents us with. The more complex ones can be learnt through training programmes.
Some of methods are

1. **Role playing**: It is a helpful technique for engaging student interest and providing opportunities for practice and feedback.
   
   - A role-play situation is described and students are assigned roles in which identified skills is lacking.
   
   - Observers watch performances of each student closely.
   
   - Performances in the role-play are discussed and evaluated and suggestions are provided for improved performances.
   
   - Students provide feedback to one another and practice new skills when they replay the scene.

2. **Modeling**: Teachers can teach social skills by the behaviour they model. We cannot ask children to treat each other decently and then treat children disrespectfully ourselves. Children learn by watching and practicing what adults do. Every time we talk kindly to the children, we are teaching them how to talk kindly to each other (Patten, 2002).

3. **Using Cooperative Learning Strategies**: Research has shown that cooperative learning techniques are effective for improving both academic and social skills of children and adolescents. In addition, cooperative learning improves the acceptance of children with disabilities into the traditional classroom by their typical developing peers (Kagan, 1992).

   Once students move into the work force, they need additional skills. Some skills can be learned on the job. They need to acquire the norms for interaction. The appropriate ways of addressing and referring to people, the accepting level of informality in meetings of different sizes, and involving people of different status (Holmes and Fillary, 2000).
1.13 COGNITIVE STYLE

How can several people look at one common object and describe it correctly, yet in so many different ways? Why is it that people exhibit the same variability when experiencing identical events? It is believed that individual biological and psychological differences affect the ways in which people perceive events, objects, sights, sounds and feelings. Thus, when several people encounter an identical object or event, each might experience a different perception of that object or event. The way we learn things in general and the particular approach we adopt when dealing with problems is said to depend on a somewhat link between personality and cognition, this link is referred to as cognitive style. When cognitive styles are related to an educational context, they are generally referred to as “learning styles”, cognitive, affective and physiological traits that are relatively stable indicators of how learners perceive, interact with and respond to the learning environment (Keefe, 1979).

The idea of style was formally introduced by Allport (1937), when he referred to style as a means of identifying distinctive personality types or types of behaviour. Since then, the term has been modified and imbued with different meanings, but the core definition of style—that is, its reference to habitual patterns or preferred ways of doing something (e.g., thinking, learning, teaching) that are consistent over long periods of time and across many areas of activity—remains virtually the same. (Grigorenko, 2000).

Psychologists’ interest in styles in cognition emerged when psychometric research on abilities and intelligence failed to reflect and interpret the processes generating individual differences. This led to a new school of thought in cognitive psychology that developed a number of stylistic constructs.
The term “cognitive” is a general term covering all the various models of knowing, perceiving, imagining, remembering, conceiving, judging, reasoning, understanding and problem solving. Cognitive area is primarily concerned with intellectual growth of the individual. It involves acquisition of basic intellectual skills such as reading ability, addition and subtraction, learning of facts. Studies of cognitive style originated in attempts to understand individual differences in these processes which might account for the wide variation in outcome among children and adults faced with the same tasks or demands.

Good (1959) defined the term cognitive style as concerned with the process of gaining information and understanding of the world through personal experience.

Broverman (1960) conceptualized cognitive style as an expression of different responses, probably of response strengths in certain types of classes of behaviour.

Coop and Sigel (1971) used the term cognitive style to denote consistencies in individual modes of functioning in a variety of behavioural situations. Common to all theory and research on cognitive style is an emphasis on the structure rather than the content of thought. Structure refers to how cognition is organized, content refers to what knowledge is available.

Witkin and Goodenough (1981) described cognitive styles as modes by which learners approach, acquire and process information as well as including the consistent ways in which an individual memorises and retrieves information.

Entwistel (1985) explained cognitive style as the term used to describe different ways in which people process information, including perception, storage, transformation and utilization or information from the environment. It describes habitual
processes of perceiving and thinking which are qualitatively distinct.

Tennant (1988) defined cognitive style as “an individual’s characteristic and consistent approach to organizing and perceiving information.”

Riding, Glass and Douglas (1993) termed cognitive styles as “a fairly fixed characteristic of an individual” and “one static and are relatively in-built features of the individual.”

Messick (1995) described cognitive style as a characteristic modes of perceiving, remembering, thinking and problem-solving, reflective of information processing regularities that develop in congenial ways around underlying personality trends. They are inferred from consistent individual differences in ways of organizing and processing information and experience.

Riding and Rayner (1998) defined cognitive style as an individual’s preferred and habitual approach to organizing and representing information. They concluded that various style labels could be accommodated within two fundamental style dimensions-the wholist-analytic and the verbal-imagery.

1. The wholist-analytic dimension of whether an individual tends to organise information in wholes or parts.

2. The verbal-imagery dimension of whether an individual is inclined to represent information during thinking verbally or in mental pictures.

Liu and Ginther (1999) referred cognitive styles to the individual’s consistent and characteristic predispositions of perceiving, remembering, organizing, processing, thinking and problem solving.

Scholl (2001) referred cognitive style as a dispositional variable that involves the ways in which the individual processes information. It operates in an unconscious manner, that is, while
individual may be aware of the outcome of the information processing process he or she is often unaware of the mental processes used to acquire, analyze, categorize store and retrieve information in making decisions and solving problems.

Ausburn and Ausburn (1978) argued that cognitive styles were characterized by three important properties.

(i) The first important property is the generality and stability across tasks and over time. Therefore, they are resistant to training and change.

(ii) The second important property is the relative independence of cognitive styles from traditional measures of general ability.

(iii) The third important property is cognitive styles relationships with some specific abilities, characteristics and learning tasks.

1.13.1 Types of Cognitive Styles

The most extensively studied cognitive styles are as follow: (Satterly, 1990; Messick, 1995 & Liu and Ginther, 1999).

(a) Field-independence Vs. field-dependence

It refers to a tendency to approach the environment in an analytical as opposed to global, fashion. At a perceptual level, field independent personalities are able to distinguish figures as discrete from their backgrounds compared to field dependent individual who experience events in an undifferentiated way.

(b) Reflection Vs. impulsivity.

The tendency to evaluate alternative solution hypotheses versus the tendency to respond quickly with the first seemingly reasonable answer. Impulsive students tend to jump at the first response, perform tasks rapidly but usually with high error rate. Reflective individuals think about their answers and are more analytical. They are slower but more accurate.
(c) Convergence Vs. Divergence

An individual’s relative reliance on convergent thinking (pointed toward logical conclusions and uniquely correct or conventionally best outcomes) as contrasted with divergent thinking (pointed toward variety, quality and originality of relevant output).

(d) Leveling Vs. Sharpening

The tendency to minimize as opposed to exaggerate stimulus differences in memory and perception. Levelers tend to select many memories from the past in an attempt to clarify and categories newly acquired information but can miss distinguishing featured among similar, yet not identical objects. Sharpeners select fewer memories, tend to have more accurate identifications of new knowledge and can relate recently acquired material to old material with more specificity.

(e) Verbalizers Vs Visualizers

Preference for sensory modality. A sensory modality is a system that interacts with the environment through one of the basic senses, viz. visual, verbal or kinesthetic verbal or kinesthetic modes. “Verbalizers” prefer to store information in verbal codes, “Visualizers” in images. Visualizers are better in performance in the text-plus-picture condition, while verbalizers are better in text-plus-text conditions. Visualizers more often use diagrams to illustrate their answers than verbalizers.

(f) Serialist Vs. Holist

Contrasts a linear, sequential approach in problem solving with one which attempts to deal with the whole problem. “Holist” adopts a global task approach, relay on analogies and illustrations, and tend to construct an overall concept, “Serialist”
adopt a linear task approach and focus attention on operational details and sequential procedures.

(g) **Confidence Vs. Caution**

A risk-taking dimension in which a chance is taken to increase the likelihood of success versus an approach in which caution is exercised to reduce the risk of failure.

(h) **Conceptual style**

Individual consistencies in the utilization of particular kinds of stimulus properties and relationships as bases for forming concepts, such as the preferred use of thematic or functional relations among stimuli (thematic-relational conceptualizing) as opposed to the analysis of descriptive attributes (analytic-descriptive conceptualizing) or the inference of class membership (categorical-inferential conceptualizing).

(i) **Category width**

Consistent preferences for broad inclusiveness as opposed to narrow exclusiveness in establishing the acceptable range for specified categories.

(j) **Cognitive complexity**

The tendency to use multidimensional constructs when organizing environment stimuli versus a preference for the use of simpler constructs. This dimension seems to be more domain specific than other cognitive styles investigated.

Witkin et. al. (1954) stated that among the cognitive styles identified to date, the field independence-field dependence dimension is one which has the largest research base and appears to have obvious implications for educational issues. They hypothesized that field independent persons achieve a higher level
of differentiations than field dependent persons as identified by Rod and Frame Test (RFT) and Embedded Figures Test (EFT). The adequate performance on RFT and EFT requires differentiation of experiences. The individual must perceive his environment in a discrete fashion in order to separate one item from the entire figuration.

The field independent person is able to break-up the total field and attend to the relevant items while holding attention from the irrelevant items.

Field independent individuals are more capable of developing their own internal referents and are more capable of restructuring their knowledge, they do not require an imposed external structure to process their experiences. Field independent individuals tend to exhibit more individualistic behaviours since they are not in need of external referents to aide in the processing of information, are better at learning impersonal abstract material, are not easily influenced by others, and are not overly affected by the approval or disapproval of superiors (Rollock, 1992; Witkin et. al., 1977).

Field dependent individuals are considered to have a more social orientation than field independent persons since they are more likely to make use of externally developed social frameworks. They tend to seek out external referents for processing and structuring their information, are better at learning material with human content, are more readily influenced by the opinions of others, and are affected by the approval or disapproval of authority figures (Castaneda, Ramirez and Herold, 1972).

Garger and Guild (1987) have summarized the characteristics of field independent and field dependent and learners.
**Independence/Dependence Descriptions**

**Table 1.2**

**Learning Style**

<table>
<thead>
<tr>
<th>Field-dependent</th>
<th>Field-independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceives globally</td>
<td>Perceives analytically</td>
</tr>
<tr>
<td>Experiences in a global fashion, adheres to structures as given</td>
<td>Experiences in an articulate fashion, imposes structures of restrictions</td>
</tr>
<tr>
<td>Makes broad general distinctions among concepts, sees relationships</td>
<td>Make specific concept distinctions, little overlap</td>
</tr>
<tr>
<td>Social orientation</td>
<td>Impersonal orientation</td>
</tr>
<tr>
<td>Learns material with social content best.</td>
<td>Learns social material only as an intentional task</td>
</tr>
<tr>
<td>Attends best to material relevant to own experience</td>
<td>Interested in new concepts for their own sake</td>
</tr>
<tr>
<td>Requires externally defined goals and reinforcements</td>
<td>Has self-defined goals and reinforcements</td>
</tr>
<tr>
<td>Needs organization provided</td>
<td>Can self-structure situations</td>
</tr>
<tr>
<td>More affected by criticism</td>
<td>Less affected by criticism</td>
</tr>
<tr>
<td>Uses spectator approach for concept attainment</td>
<td>Uses hypothesis-testing approach to attain concepts.</td>
</tr>
</tbody>
</table>

*Source*: Garger and Guild (1987)
### Teaching Styles

<table>
<thead>
<tr>
<th>Field-Dependent</th>
<th>Field-Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefers teaching situations that allow interaction and discussion with students</td>
<td>Prefers impersonal teaching situations such as lectures emphasizes cognitive aspects of instructions</td>
</tr>
<tr>
<td>Uses questions to check on student learning following instruction</td>
<td>Uses questions to introduce topics and following student answers</td>
</tr>
<tr>
<td>Uses student-centered activities</td>
<td>Uses a teacher-organized learning situation</td>
</tr>
<tr>
<td>Viewed by students as teaching facts</td>
<td>Viewed by students as encouraging to apply principles</td>
</tr>
<tr>
<td>Provide less feedback, avoids negative evaluation</td>
<td>Gives corrective feedback, uses negative evaluation</td>
</tr>
<tr>
<td>Strong in establishing a warm and personal learning environment</td>
<td>Strong in organizing and guiding student learning</td>
</tr>
</tbody>
</table>

**Source:** Garger and Guild (1987)
### How to Motivate Students

<table>
<thead>
<tr>
<th>Field-dependent</th>
<th>Field-independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through verbal praise</td>
<td>Through grades</td>
</tr>
<tr>
<td>Though helping the teacher</td>
<td>Through competition</td>
</tr>
<tr>
<td>Through external rewards (stars, stickers, prizes)</td>
<td>Through choice of activities, personal goal chart</td>
</tr>
<tr>
<td>Through showing the task's value to other people</td>
<td>Through showing how the task is valuable to them</td>
</tr>
<tr>
<td>Though providing outlines and structure</td>
<td>Through freedom to design their own structure</td>
</tr>
</tbody>
</table>

**Source:** Garger and Guild (1987)

#### 1.14 IMPORTANCE OF MATHEMATICS

Mathematics is a science of space and quantity that helps us in solving the problems of life needing numeration and calculations. Courant and Robbins (1941) defined mathematics
as an expression of the human mind rejects the active will, the contemplative reason, and the desire for aesthetic perfection, its basic elements are logic and intuition, analysis and construction, generality and individuality. Mathematics facilitates both the learners of science based courses such as physics, engineering and statistics and commerce based courses.

Mathematics, is the prime vehicle for developing students' logical thinking and higher order cognitive skills (Muijs and Reynolds, 2002) and gives mental exercises best fitted for strengthening the faculties of the mind. It helps the child develop speed, precision, brevity, accuracy and neatness in computation and calculation work. The child develops ability to perform calculations mentally, to estimate and check results.

Mathematics helps the child in the development of correct attitudes by

- analyzing the problem.
- by discovering the facts and solving the problems with his own independent efforts.
- expressing his opinions precisely, systematically and logically without any biases and prejudices.

For applying all the skills mentioned above in the classroom, a conducive learning environment need to be created.

Though one of the most important subjects in the curriculum of most countries, is also commonly seen as one of the most difficult subjects by students. In school, a lot of students
seem to become disenchanted with mathematics, and often question the relevance of the large amount of time spent teaching mathematics.

In the view of both significance and the problem involved with learning Maths it is not surprising that there is a lot of research into student’s mathematical thinking and learning. (Muijs and Reynolds, 2002).