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Chapter – 2
Theoretical Consideration

2.1 Introduction

Cooperation is one of the basic processes of social life. One cannot expect a society to exist without cooperation. It is said in Gujarati ‘Veenna Sahkar Nahi Uddhar’. It is one of the continuous processes that take place in a society. Cooperation means 'joint work' or 'working together for a common goal'. Merrill and Fldredge were of the view that “co-operation is a form of social interaction wherein two or more persons work together to gain a common end.” Fairchild said, “Co-operation is the process by which the individuals or groups combine their efforts, in a more or less organized way for the attainment of a common 'objective'.” The chapter focuses on the theory of Group Learning Approaches viz. PBLA and CLA, wherein cooperation plays a vital role.

2.2 Group Learning Approach

Group learning enables the achievement of wide range of educational objectives. The approach helps in achieving higher-cognitive objectives, especially objectives related to important skills such as social skills, problem-solving, decision-making, etc. Working in a groups leads to divergent and creative thinking. Group learning facilitates achievement of cognitive, affective and interpersonal objectives. GLA assists in the development of desirable attitudinal traits such as open-mindedness, willingness to listen to others point of view, and also transferable process skills such as communication skills and general interpersonal skills, social skills, etc.

Recent studies have suggested that there are several compelling reasons that can make learning in a small group more effective (Blumenfeld, Marx, Soloway, & Krajcik, 1996; Brewer & Klein, 2006; Johnson & Johnson, 1999). Different approaches in group work and a particular approach of small group works effectively to achieve a particular type of learning outcome. The effectiveness of group work can be influenced by how the group is organised, what the tasks are, who the participants are and how the group is held accountable (Blumenfeld, et al., 1996). Group members often play certain roles and develop or practice some social skills in working within a small group to make learning more effective. Different types of discourse and
cognitive processes occur in small group work that make group learning more productive (Hackling, 2003).

Group learning engages students in discussing a task with each other. Different small groups like to work using different approaches. Linn and Burbules (1993) have identified two approaches in small group work: cooperative approach and collaborative approach. They indicate, “Cooperative learning involves dividing a task into parts and having each group member complete one of the parts. In collaborative learning two or more students jointly work out a single solution to a problem”. Johnson and Johnson (1999) argued that when students work cooperatively to achieve a common goal, they produce higher achievement and demonstrate greater output than they do working single-handedly. This practice produces greater psychological health, higher self-esteem, and greater social competencies. Johnson and Johnson (1999) also argued that cooperative group work makes students learn “how to communicate effectively, provide leadership, help the group make good decisions, build trust, repair hurt feelings, and understand other’s perspectives”. Thus, cooperative group learning might benefit students diversely.

Dickinson, 2000; Millis & Cottell, 1998; Thomas & Busby, 2003) are of the opinion that “learning through collaborative approach helps learners improve their communication skills, problem-solving abilities and capability to work as effective team members”.

**Success of Group Learning**

The learners achieve success only when they encourage each other and are responsible to other members of the group. An individual, working in a group, provides positive, constructive feedback on other members’ ideas and this promotes compromise and consensus among the group members. They ensure that everyone has an opportunity to contribute to the discussions and the task assigned to the group. Group learning helps in setting standards for the group and its work. It monitors the effectiveness of a group as a team. Group learning demands every member of the team to be a good listener, attending and responding to others’ contributions. During group learning, members of a group assume a fair share of the group’s work.
Research results have shown that students who have opportunities to work collaboratively learn faster and more efficiently, have greater retention, and feel more positive about the learning experience (Johnson, Johnson & Smith, 1991).

In the present study, the investigator has selected PBLA and CLA as the GLA to see its effectiveness in teaching and learning Science and Technology.

2.3 Cooperative Learning Approach

Cooperative learning offers a view of learning, socially based. In the very broadest sense, cooperative learning involves working together on the same task or issue in a way that promotes individual learning through the process of collaborating in the groups. It provides an opportunity to learn through the expression and exploration of diverse ideas and experience in groups. Cowie and Rudduck (1988) stated, “Cooperative learning is not about competing with the fellow members and winning, but about using the diverse resources available in the group to deepen understanding, sharpen judgement and extend knowledge.”

It can be said that cooperative learning is process driven, i.e. those involved in cooperative learning engage in a social process and only true involvement would lead to the achievement of the desired outcome. It usually involves people working in a group (at least two people are involved, usually more). Those goals which are not achieved by individual learning are met by cooperative learning. Cooperative learning contributes to positive, holistic development of the students involved in it.

Nelson–Le Gall (1992) mentioned, “Learning and understanding are not merely individual processes supported by the social context, rather they are the result of continuous, dynamic negotiation between the individual and the social setting in which the individual’s activity takes place. Both individual and social context are active and constructive in producing learning and understanding”.

Cooperative learning can be defined as a structured, systematic, instructional strategy in which small groups work together towards a common goal. Cooperative learning is an approach where students work together to achieve a group learning goal. Cooperative learning is a successful teaching approach in which small 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. Students work through the assignment until all the group members successfully understand and complete it. Depending on the objectives, groups may be academically, linguistically, socially, and culturally heterogeneous.

2.3.1 Recent Definitions of Cooperative Learning

Cooperative learning is a relatively new concept and is considered as having the potential of improving education, regardless of the discipline or level of instruction.

CLA is defined as a “small group of learners’ working as a team to solve a problem and complete a task, or accomplish a common goal” (Artzt and Newman, 1990).

Spencer Kagan (1990) provided an excellent definition of cooperative learning by looking at the general structures which can be applied to any situation. He defined cooperative learning as the structural approach which is based on the creation, analysis and systematic application of structures or content free ways of organizing social interaction in the classroom. Structures usually involve a series of steps, with prescribed behavior at each step. Structures may be used repeatedly with almost any subject matter, at a wide range of grade levels and at various points in a lesson plan.

Cooperative efforts result in participants striving for mutual benefit so that all group members:

- Benefit from each other’s efforts.
- Realize that the group has a common fate.
- Know that one cannot reach the goal alone unless they receive the support of the team members.
- Celebrate together when a group member is recognized for achievement.

Researches shows that cooperative learning promotes students’ learning and academic achievement, increases retention, enhances satisfaction with their learning experience, helps students develop skills in oral communication, develops students' social skills, promotes student self-esteem and helps to promote positive race relations. There are certain conditions under which cooperative learning may be expected to be more productive than competitive and individualistic efforts.
2.3.2 Characteristics of Cooperative Learning

Based on the above definitions, cooperative learning have the following characteristics.

- There are small heterogeneous groups that comprise of 4 to 6 members each working towards a common goal.
- The group members work together systematically.
- The success of the entire group working on a single task is promoted.
- Students with special learning needs are mainstreamed.
- It enhances racial relations within schools.
- Student discipline is improved in a proactive and positive manner.

2.3.3 Cooperative Learning Strategies / Methods

The Cooperative Learning Strategies/ methods evolved through research studies are listed below:

1. Learning together
2. Think pair share
3. Picture Perfect
4. Team Game Tournament
5. Round Robin Style
6. Three Step Interview
7. Jigsaw
8. Send a Problem
9. Student Team Achievement Division
10. Group Investigation
11. Cooperative Integrated Reading and Composition
12. Cooperative Learning Structures
13. Team Assisted Individualization

For the present study, the investigator had selected the following strategies / methods. The description for the same is mentioned below:

1. Picture Perfect

This strategy was evolved to enhance student’s social, ethical and intellectual development. Nagar, N. (2009) evolved this strategy. The strategy is an active way of
teaching students working in cooperation, while at the same time allows them to acquire content knowledge.

In this strategy, a team is formed through puzzle pieces. In this strategy, the size of group may vary. The size of group depends on the number of students and also on the topics or sub-topics to be covered, or on number of roles to be played by students. A set of cards is distributed amongst the students in each group. The students in their groups learn with cards, relate with the topic. To check the students’ understanding questions are asked and discussion is carried out on the topic to ensure student learning. Then the teacher shuffles the cards, mixes them and distributes the pack of mixed cards amongst each group. The students are then asked to identify the cards belonging to a particular sub-topic, pick them up and arrange them in order. Along with it write the theme / caption / event / and its relevance depicted in the picture. The groups of students are then made to indulge in a creative activity. They are made to prepare collage, or write a poem or short story or some quotes or whatever interesting their creative minds may think of related and based on the topic. The teacher may prepare achievement test. The test scores thus obtained are individual scores. The individual score within a team are summed up and scores of creative activity are added to get the team score. If an individual of a team scores more than 80% each, five bonus points are given to each individual of the team as a reward.

In the present study, the investigator used the Picture Perfect strategy to teach concepts in Physics i.e. ‘Force and Laws of Motion’. This strategy develops the competencies identified as necessary for success. It includes the abilities

a) To think critically and analyze the content matter
b) To try and relate abstract examples with concrete examples so as to enhance understanding
c) To acquire knowledge through interaction with peers
d) To work cooperatively in teams and small groups, to demonstrate effective social skills
e) To promote interpersonal values of caring, respect, fairness and responsibility
f) To promote students intrinsic motivation
g) To make students active participation
h) To use content knowledge and intellectual skills to become continual learners
i) To make learning fun
2. Jigsaw

The jigsaw approach was developed as a way to help build a classroom as a community of learners where all students are valued. Aronson et.al. (1978) developed this approach. In Jigsaw, each group member specializes in the subject matter and thereby possesses critical information to contribute to the classmates. Cooperation and mutual trust become valuable and necessary to academic achievement. There are four stages in the process namely,

Stage 1: Introduction
Stage 2: Focused Exploration
Stage 3: Reporting and Reshaping
Stage 4: Integration and Evaluation

In stage 1, the teacher organizes the class into heterogeneous “home” groups. The teacher then introduces a topic, text, information, or material to the class and helps the students to understand why they are studying this topic, how it fits with what they have done before, and what they will study in the future. The teacher explains how student learning will be assessed throughout the learning experience. Each member in home group is given, or selects, a part of the subject matter to be explored.

In stage 2, the students reorganize to form focus groups. Members of each focus group work together to learn about a specific concept. During this stage, students think out loud in order to clarify their ideas and build understanding together. Sometimes the teacher also encourages exploratory writing where students jot down the main ideas they are working on to help them clarify and focus their thinking. The teacher may provide guided set of questions to help students explore the ideas in their assigned material.

In stage 3, students return to their home groups to take turns describing the ideas generated in their focus groups. During the reporting stage, group members are encouraged to pose questions and discuss ideas in depth. Often as students work together understanding each other’s part, they begin to reshape their understanding of the whole.

While integrating and evaluating in stage 4, the teacher may design an individual, small-group, or whole-class activity where students can actively integrate their
learning. For example, students may carry out a demonstration task in their home groups. The teacher may ask questions to help students reflect on how they worked together and what they might do the same or differently the next time they work together.

The strategy that is recommended most for social and science studies is the Jigsaw series (Slavin, 1990). STAD and TGT usually look for only one correct answer and are therefore best suited to the Math and Sciences. In the jigsaw technique, each student prepares a part of the assignment out of class. Returning to the group, each student peer teaches the information to the rest of the members. All groups in a class may cover the same topic, or different groups may have different parts of the topic. Groups are subsequently reorganized to peer teach the material (Grasha and Yangarber-Hicks, 2000). The jigsaw technique can enhance cooperative learning by making each student responsible for teaching some of the material to the group. In this technique, students are members of two different groups, the “home group” and the “jigsaw group”. Initially, students meet in their home groups, and each member of the home group is assigned a portion of the material to learn as an “expert” (Doymus, et al. 2004; Slavin, 1991). The home groups then break apart, like pieces of a jigsaw puzzle, and the students move into jigsaw groups consisting of members from the other home groups who have been assigned the same portion of the material. While in the jigsaw groups, the students discuss their particular material to ensure that they understand it. Students then return to their home groups, where they teach their material to the rest of their group (Colosi and Zales, 1998).

In the present study, the investigator has used Jigsaw approach given by Aroson and his team to demonstrate experiments on the concepts of Physics, i.e. Force and Laws of Motion’. There are several advantages:

1. It is a remarkably efficient way to learn the material.
2. It encourages listening, engagement, and empathy by giving each member of the group an essential part to play in the academic activity.
3. Group members must work together as a team to accomplish a common goal; each person depends on all the others. No student can succeed completely unless everyone works well together as a team. This "cooperation by design" facilitates interaction among all students in the class, leading them to value each other as contributors to their common task.
3. Student Teams- Achievement Divisions (STAD)

In Student Teams-Achievement Divisions (STAD) (Slavin, 1994a), students are assigned to four-member learning teams that are mixed in performance level, gender, 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 on the basis of the degree to which the students meet or exceed their own earlier performance. These points are then summed to form team scores, and teams that meet certain criteria may earn certificates or other rewards.

STAD Cooperative Learning is a strategy of instruction whereby students work together in groups of varying composition to achieve common objectives. To be successful in this strategy, students share ideas rather than working alone and assist one another in order to maximize mutual benefits (Slavin, 1997; Johnson & Johnson, 1989). In the present study, the investigator has used STAD method to teach concepts of Chemistry i.e. properties of matter. Chemistry occupies the central position among the Science subjects. It is the central subject in medicines, textiles, agriculture, chemical engineering etc. Students ignore the subject in spite of its scope in various fields of life. One of the greatest causes of students’ anxiety towards chemistry is poor teaching methods. (Jegede, 2007).

STAD, according to Rai (2007), is one of the many strategies in cooperative learning, which helps promote collaboration and self-regulating learning skills. The reason for the selection of STAD is good interaction among students, improve positive attitude towards subject, better self-esteem, increased interpersonal skills. STAD also add an extra source of learning within the groups because some high achievers act as a role of tutor, which results in high achievements. Finally, it enables the students, according to the requirements of the modern society, to work with their colleagues competently and successfully as explained by Balfakih (2003).

It is most appropriate for teaching well-defined objectives with single right answers, such as Science facts and concepts. However, it can easily be adapted for use with less well-defined objectives by incorporating more open-ended assessments.
4. Round Robin Style Brainstorming

The basic structure of the session where this technique is employed begins with a central theme, question, or issue which the facilitator identifies for discussion. Arranged in a circle, participants begin by considering the question. One participant is selected to lead off the process by offering a single thought or reaction, either out-loud or on a piece of paper/index card. In a verbal format, the rest of the participants remain quiet during his or her answer. Once this first participant is finished contributing, the participant sitting directly to his or her right contributes an additional point, idea, or thought. Working clockwise around the circle, each participant either speaks or writes a single idea - ideally one which has not yet been mentioned - until a full circle has been completed or the time reserved for the exercise has passed. During this period, the facilitator records insights and central point raised. The session then concludes with a group discussion.

In the present study, the investigator has used this strategy to teach one of the concepts of Biology i.e. ‘Why Do We Fall Ill’, as this activity helps team generate as many answers to the question as possible. Thus, this strategy involves taking turns and having teammates contribute one answer at a time.

2.3.4 Difference between Cooperative Learning Groups and Traditional Learning Groups

At this juncture, it is important to consider what cooperative learning is not. According to Johnson et. al. (1991), having students sit side by side at the same table and talk with each other as they do their individual assignments, having students do a task individually with instructions that those who finish first are to help the slower students, or assigning a report to a group where one student does all the work and the others put their names on it is not cooperative learning. Putting students into groups does not necessarily gain a cooperative relationship, it has to be structured and managed by the teacher. The classrooms which encourage cooperative learning can prove to be far more beneficial to the students than the classrooms which follow the conventional methods of teaching. Johnson & Johnson (1989) indicates that cooperation, compared with competitive and individualistic efforts, typically results in (a) higher achievement and greater productivity, (b) more caring, supportive, and
committed relationships, and (c) greater psychological, health, social competence, and self-esteem. The difference between the two can be stated as below.

**Table 2.1**  
**Difference between Traditional Classrooms and Cooperative learning Classrooms**

<table>
<thead>
<tr>
<th>Traditional Classrooms</th>
<th>Cooperative Learning Classrooms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration should be on the book or the teacher.</td>
<td>Concentration on peers in order to learn from them, help them and share ideas and materials.</td>
</tr>
<tr>
<td>Talking to neighbours is restricted.</td>
<td>Talking to neighbours is encouraged in order to exchange ideas, debate, explain, suggest and question.</td>
</tr>
<tr>
<td>Do one’s own work and let others do theirs.</td>
<td>Sharing of work with others is encouraged consequently the work done together becomes better than the one done individually.</td>
</tr>
<tr>
<td>If help is needed, teacher to be consulted.</td>
<td>If help is needed, consult group mates or members of other groups before asking the teacher.</td>
</tr>
<tr>
<td>Compete for the teacher’s attention.</td>
<td>Allow each student an opportunity to be spokesperson for the group.</td>
</tr>
<tr>
<td>Individual excellence</td>
<td>Group learning and excellence.</td>
</tr>
<tr>
<td>Learning is an outcome of teaching</td>
<td>Learning is not essentially an outcome of teaching.</td>
</tr>
<tr>
<td>No interdependence among group members. Students are concerned about self-performance.</td>
<td>Interdependence among group members is encouraged.</td>
</tr>
<tr>
<td>While working in groups, the lazy ones do away with working, ‘hitchhiking’ on other group member’s work.</td>
<td>While working in cooperative groups, each member is assigned with a different task to work on.</td>
</tr>
<tr>
<td>Group dynamics is not given importance.</td>
<td>Group dynamics is important.</td>
</tr>
<tr>
<td>A leader is often appointed.</td>
<td>Each individual in the group is a leader</td>
</tr>
<tr>
<td>A student is responsible only for his own learning.</td>
<td>A student is responsible for the learning of other group members also.</td>
</tr>
<tr>
<td>Group learning is never emphasized on and so never evaluated.</td>
<td>The teacher on a regular basis encourages students to process the learning of the group.</td>
</tr>
<tr>
<td>Teacher observation and feedback seldom takes place.</td>
<td>Teacher observes and encourages revisions and modification in learning strategies and its outcome.</td>
</tr>
</tbody>
</table>
2.3.5 Historical Background of Cooperative Learning

Cooperative learning has been used since very long time. Slavin (1995) pointed out that the history of cooperative learning can be traced back as far as in the 17th century. Comenius in the 17th century believed that students would benefit both by teaching and being taught by other students. Rousseau in the 18th century recognized a collective ‘general will’ which represents the common good among people and promotes liberty, equality and fraternity among people. He also believed that individuals must be encouraged to reason their way through to their own conclusions, they should not rely on the authority of the teacher. Thus, instead of being taught other people’s ideas, encouraged students to draw his own conclusions from his own experiences. Pestalozzi in the 19th century was against rote memory and cramming of subject matter. He wished that a child should himself search out knowledge and develop self-reliance. He emphasized on the observation and study according to psychology and advocated that a child should experience things and explain them in his own words. In this way, he followed Rousseau in emphasizing oral education and gaining real knowledge of things and material objects by his own efforts, observation and experiences. He advocated self-discipline through love, sympathy and human feeling and also a new pupil teacher relationship. John Dewey in the 20th century held some form of cooperation among students as essentials to learning. Group learning was a prominent component of John Dewey’s experiential classroom.

Thus, the concept of cooperative learning is not new to education. Although the term may not have been used earlier, cooperative learning in some form has been happening for decades.

In the late 1930’s however, interpersonal competition began to be emphasized in schools and in the late 1960’s, individualistic learning began to be used extensively. Following this, research on cooperative learning gained momentum in 1970’s.

2.3.6 Types of Cooperative Learning Groups

Johnson, Johnson, and Holubec’s (1998) theory has identified three types of cooperative learning groups: formal, informal, and base groups.

**Formal cooperative learning groups** range in length from one class period to several weeks. The teacher can structure any academic assignment or course
requirement for formal cooperative learning. "Formal cooperative learning groups ensure that students are actively involved in the intellectual work of organizing material, explaining it, summarizing it, and integrating it into existing conceptual structures. They are the heart of using cooperative learning".

**Informal cooperative learning groups** are ad-hoc groups that may last from a few minutes to a whole class period. The teacher uses them during direct teaching (lectures, demonstrations) to focus student attention on the material to be learned, set a mood conducive to learning, help set expectations about material, what the lesson will cover, ensure that students are cognitively processing the material being taught, and provide closure to an instructional session.

**Cooperative base groups** are "long-term (lasting for at least a year), heterogeneous groups with stable membership whose primary purpose is for members to give each other the support, help, encouragement, and assistance each needs to progress academically. Base groups provide students with long-term, committed relationships".

### 2.3.7 Role of the Teacher in Cooperative Learning

A teacher in a cooperative learning classroom needs to be tactful, multifaceted and a keen observer. Hosseini (2008) believed, “In a cooperative learning classroom, the teacher plays the role of an ‘integrative’ rather than a ‘dominating’ leader”. Dasan (2007) described the teacher who propounds cooperative learning as “a guide on the side, not a sage on the stage.”

Jollife (2007) and Gillies (2007) described the role of a teacher in a cooperative learning classroom which can be paraphrased as the following:

1. To plan lessons that decide on
   a) Objectives
   b) Size of groups
   c) Group formation
   d) Group roles
   e) Organization of the classroom
   f) Materials needed
2. To ensure that the group task is relevant and open and discovery based, requiring students to dialogue together.

3. To challenge students’ thinking and scaffold their learning, necessary skills to help students construct new ways of thinking and learning.

4. To explain the task and the cooperative skill with criteria for the success of both.

5. To promote student-to-students interaction and model how to interact with each other in socially appropriate ways.

6. To monitor and intervene with groups where necessary.

7. To evaluate the achievement and ensure that groups reflect on their achievement and effectiveness as a group and set goals for improvement.

8. To provide students with explicit feedback on their progress.

9. To celebrate achievement.

A teacher, in a cooperative learning classroom, should be a friend, philosopher and guide who focus on learning rather than teaching. The teacher should let the students know the rules of the group work and should encourage student discourse. Each group member’s role should be assigned and responsibility be discussed. In case of group failure, the teacher prompts without telling group members exactly what to do. The teacher should be tactful in resolving group conflicts to achieve the desired goals.

2.3.8 Limitations of Cooperative Learning

1. Though effective, cooperative learning is time consuming.

2. There are chances that a brilliant student, when grouped with classmates less efficient than him / her, may not find learning in groups beneficial.

3. The student – teacher ratio if high, would pose difficulty for the teacher to observe all the groups and students in the learning process.

2.3.9 Theoretical Basis of Cooperative Learning

Basically three theoretical perspectives have guided research on cooperative learning.

1. Social interdependence theory

2. Cognitive-developmental theory

3. Behavioral approaches
2.3.9.1 Social Interdependence Theory and its Impact on Cooperative Learning

Social Interdependence theory is based on the principle the way social interdependence is structured and determines how individuals interact and determine result. Koffka, Kurt Lewin and Morton Deutsch are the main promoters of this theory. The theory presupposes that group members’ cooperative efforts are based on inherent motivation generated by interpersonal factors in working together and joint desire to achieve a significant goal.

Kurt Lewin gave his theory of learning which is commonly known as Kurt Lewin’s Field Theory. It is defined as ‘the totality of coexisting facts which are conceived of as mutually interdependent. Individuals are seem to behave differently according to the way in which tensions between perceptions of the self and environment are worked through.

Kurt Lewin’s theory had a profound impact on a generation of researchers and thinkers concerned with group dynamics. Two key ideas, emerged out of the field theory that are crucial to an appreciation of group process are Interdependence of fate and Task interdependence.

**Interdependence of fate:** Kurt Lewin was of the view that groups come into being in a psychological sense 'not because their members necessarily are similar to one another (although they may be); rather, a group exists when people in it realize their fate depends on the fate of the group as a whole' (Brown 1988). Kurt Lewin was of the view that the formation of a group does not constitute similarity or dissimilarity of individuals, but rather interdependence of fate. Any normal group, and certainly any developed and organized one contains and should contain individuals of varied nature. This helps individuals to tolerate difference of opinion and helps to realize that the entire group’s fate depends upon the individual fate. In such circumstances the individual becomes ready and even eager to take over a fair share of responsibility for the group’s wellbeing.

**Task interdependence:** Another significant factor that Lewin advocated was interdependence in the goals of group members. If the group task is such that
members of the group are dependent on each other for achievement, then a powerful
dynamics is created. This interdependence can be positive or negative. In the positive
interdependence, a person’s success either directly facilitates other’s success or
indirectly is necessary for other’s to succeed. In negative interdependence, known
more usually as competition – one person’s success is another’s failure.

Kurt Lewin also put forth the argument that people join to work in a group with very
different outlooks, but if they share a common goal, they are likely to work together
to achieve it. This links back to what is usually described as Lewin’s field theory. He
also explained that an intrinsic state of tension within group members stimulates or
motivates movement towards the achievement of the desired common goals.
Interdependence of fate and task also results in the group being a dynamic whole.
This means that a change in one member or sub groups impacts the others.

Thus, we can summarize the important views or elements of Kurt Lewin’s theory
which formed the basis of cooperative learning as under-

a) The core of a group is the interdependence among members having common
goals which results in the group being a “dynamic whole” so that a change in
the state of any member or sub group changes the state of any other member
or sub group.

b) An intrinsic state of tension within group members motivates movement
toward the accomplishment of the desired common goals.

Besides these the other important element put forth by Kurt Lewin as a part of the
basic foundation stone of cooperative learning is

**Democracy:** Lewin admitted that democracy was far more difficult form of social
structure to attain and to maintain than autocracy. Lewin explored the different styles
or types of leadership on structured group and behavior of members and concluded
that originality, group mindedness and friendliness in democratic group was observed
to a greater extent than in autocratic group or laissez-faire.

Kurt Lewin was also involved in leadership and training of group dynamics. The
participative groups which he trained were known as ‘basic skill training groups’ or
T- groups. During the training sessions, he discovered that learning is best facilitated
in an environment where there is language tension and conflict between immediate,
concrete and logical disconnection. The following elements of the T-group are particularly noteworthy with respect to the theoretical basis of cooperative learning.

a) Feedback

Feedback was broadly used to have the information or real knowledge about the desired and actual result and to describe the process of adjustment.

b) Unfreezing

An environment was created in the group for challenging former values and beliefs so that individuals motivated to accept the change.

c) Participant Observation

Group members participate emotionally in the group, observe themselves and the group objectively.

The element of ‘group processing’ in cooperative learning can be said to have its roots somewhere in the above mentioned elements of Kurt Lewin’s research.

d) Cognitive Aids

Lewin involved the provision of models or organizing ideas through the brief lectures, handouts, film clips or video. He advocated that learning of group members can be facilitated by the use of such cognitive aids, lectures, reading assignments and theory sessions. The use of cognitive aids is considered as an integral preparatory part while organizing a cooperative learning lesson in a classroom.

Thus, we can see that Kurt Lewin’s theory, his views and suggestions have provided a wide base on which cooperative learning has been fruitfully structured.

2.3.9.2 Morton Deutsch’s Theory of Cooperation and Competition and Its Impact on Cooperative Learning

Deutsch propounded that social interdependence exists when individuals share common goals and the outcome of each individual’s action is affected by the actions of the others. It may be discriminated from social dependence (i.e. outcomes of one person are affected by the actions of a second person but not vice versa) and social interdependence (i.e., individual’s outcomes are unaffected by each other’s actions).
There are two types of social interdependence viz. cooperative interdependence and competitive interdependence. The absence of social interdependence and dependence results in individualistic efforts.

When individuals take actions there are three ways in which they relate / affect the actions of others. One’s actions may

a) promote the success of others
b) obstruct the success of others
c) have no effect on the success or failure of others.

In other words individuals may

1. work cooperatively to accomplish shared learning goals (social interdependence). Structuring cooperatively a situation correlates positively to individual goal achievements. Individuals perceive that they can reach their goals only if other members in the group also reach their goals. Thus, individuals seek outcomes that benefits to all those with whom they are cooperatively linked.

2. work against each other to achieve goal that only one or a few can attain. Structuring situations competitively correlates negatively to goal achievements of an individual. Each individual perceives that when one person achieves his or her goal, all others with whom he or she is competitively linked fail to achieve their goals. Thus, individuals seek an outcome that is personally beneficial but detrimental to all others in the group.

3. get involved in self-working to accomplish goals unrelated to the goals of others. Structuring individualistically a situation, there is no correlation among participant’s goal attainments. Each individual perceives that he or she can reach his or her goal regardless of whether other individuals attain or do not attain their goals. Thus, individuals seek an outcome that is personally beneficial without the concern for the outcomes of others.

Thus, we can say that the type of interdependence (i.e. positive or negative) structures in a situation determines how individuals interact with each other, which in turn determines outcomes. In cooperative settings, positive interdependence tends to results in promotive interaction that leads to wide variety of outcomes viz. high effort to achieve, positive relationships and psychological health. In competitive settings,
negative interdependence tends to result in oppositional interaction that leads to result in low effort to achieve by most students, negative relationships and low psychological health. In individualistic settings, no interdependence results in an absence of interaction that results in low effort to achieve and absence of relationships are observed.

2.3.9.3 Cognitive Developmental Theory and its Impact on Cooperative Learning

The Cognitive developmental theory is grounded in the work of Jean Piaget and Lev Vygotsky. Piagetian perspective suggests that when individual work together, it gives rise to socio- cognitive conflict and creates cognitive disequilibrium that stimulates ability to understand how a situation appears to other people and reasoning. Vygotsky’s theory presents knowledge as a societal product and emphasizes over the importance of discussion and problem solving among peers.

The Cognitive developmental theory states that children and adolescents construct intelligence continuously as they work and discover their world. It is also known as ‘constructivism’. In this learner constructs knowledge from prior experience, which is unique to each individual.

A) Cognitive Constructivism of Jean Piaget and Cooperative Learning

Cognitive constructivism is based on work of Jean Piaget. Piaget’s theory has two major parts: “ages and stages” which predicts what an individual can and cannot understand at different ages and theory of development describes how an individual develops cognitive abilities. The theory of development is the major foundation of cognitive constructivist approaches to teaching and learning. Piaget’s theory of cognitive development suggests that an individual cannot be ‘given’ information which they automatically understand and use; they must ‘construct’ their own knowledge. Prior experiences allow them to create mental processes that help to build their knowledge.

In Piaget’s theory, individuals are seen as modifying their ways of thinking to provide a better suit with reality when faced discrepancies between their own ways of viewing world and new information. The individual makes use of processes of assimilation,
accommodation and equilibration as prescribed by Piaget. According to Piaget, assimilation refers to the ability to explain events based on the available cognitive constructions or current schemas. Schemas are referred to the organization of knowledge attained through exploration and adaptation and with changes through the stages of development, becoming more complex as one progresses. Accommodation refers to the ability to change the cognitive construction of schemas to make meaning of the surroundings. Equilibration is the process of moving back and forth between disequilibrium and equilibrium where equilibrium refers to a sense of stability or comfort that is achieved through the process of adaptation (assimilation and accommodation) of new information experienced in daily life.

According to Piaget, when an individual comes under the effect of social interaction, it provokes a cognitive conflict within the individual which results in efforts to reestablish equilibrium. Individuals have their own unique schemas of knowledge or events they have interpreted based on their own ability of cognitive construction. For developing further, individuals require dissatisfaction with one’s current understanding of a problem or a change in perspective. This is possible through social interaction when during interaction cognitive conflict occurs between peers who have different answers to the same question. Social interaction then contributes to directing the individual to accept another view through presentation of the alternatives and consideration of the merits of each. Social influence fosters change through the induction of cognitive conflict and the logical operations carried out by individuals attempting to reconcile their differing views to achieve equilibrium of understanding.

Piaget thus, emphasized cooperation as the ideal form of social interaction promoting development because he believed that the social relations involved in cooperation are the same as the logical relations the children construct in regard to the physical world. Piaget laid out three conditions under which equilibrium can be achieved in intellectual exchange. The first is that the group should have a common scale of intellectual values, language and a system of ideas so that they can translate the differing notion / opinion / ideas of common terms. The second condition is that the group members recognize a conservation point where they can justify their difference in point of views and try to reach an agreement on propositions. The third condition is that there should be reciprocity or such mutual understanding between members that
they treat propositions of each, interchangeably. Piaget emphasized cognitive conflict as the working out of differences of opinion by coming to understand the other’s perspective and by logically comparing the value of the two perspectives.

The essential elements of cooperative learning viz. face-to-face promotive interaction and interpersonal and small group skills can be said to have been derived on the basis of Piaget’s views. Face-to-face promotive interaction and use of interpersonal and small group skills are not only important but essential for solving cognitive conflicts occurring within the cooperative learning groups so that individuals can maximize their own as well as each other’s learning.

B) Social Constructivism of Lev Vygotsky and Cooperative Learning

Vygotsky's theory is very similar to Piaget’s assumptions about how children learn. Vygotsky placed more emphasis on the social context of learning. It stressed the fundamental role of social interaction in the development of cognition as Vygotsky strongly believed that community plays a central role in the process of “making meaning”. Unlike Piaget’s notion, children development must necessarily precede their learning. Vygotsky argued that learning is the necessary and universal aspect of the process of developing culturally organized, specifically human psychological function. In other words, social learning tends to precede development. Vygotsky contended that learning and development are intertwined from the first day of life and learning cannot be matched to stages but must be determined by assessment of two developmental levels viz. Actual Developmental Level and the Zone of Proximal Development.

The MKO

The More Knowledgeable Other (MKO) is somewhat self-explanatory. It refers to someone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. Although the implication is that the MKO is a teacher or an older adult, this is not necessarily the case. Many times, a child’s peers or an adult’s children may be the individuals with more knowledge or experience. In fact, the MKO need not be a person at all. Some companies, to support employees in their learning process, are now using electronic performance support systems. Electronic tutors are also being used in educational settings to facilitate and guide students through the learning process. The key to MKOs is that they must have
(or be programmed with) more knowledge about the topic being learned than the learner does.

**The ZPD**

Vygotsky defined the Zone of Proximal Development as “the distance between the actual development of a child as determined by the independent problem solving, and the level of potential development as determined through problem solving under adult guidance or in collaboration with more peers”. He believed that when a student is at the ZPD for a particular task, providing the appropriate assistance gives the student enough of a boost to achieve the task. Once the student, with the benefit of assistance masters the task, the assistance can then be removed and the student would then be able to complete the task again on his own.

In cooperative learning, when heterogeneous groups are formed on the basis of ability, for example low achievers are placed along with high achievers in the same group, the notion of ZPD and MKO comes into being.

Although both the theories and the research deriving from them emphasize cooperation in cognitive activity, they differ in the extent to which the process of cognitive development is seen as occurring in the cooperative interaction.

**Table 2.2**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Piaget’s Theory</th>
<th>Vygotsky Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cooperation provides information for the individual to use in becoming aware of differing perspectives and in determining the differences between them.</td>
<td>The individual makes use of joint decision making processes itself to develop understanding and skills.</td>
</tr>
<tr>
<td>2.</td>
<td>Importance to individual</td>
<td>Importance to Social</td>
</tr>
<tr>
<td>3.</td>
<td>Individual work independently and equality on each other’s ideas to solve cognitive conflicts</td>
<td>Problem solving occurs between partners / group members working jointly under the guidance of a skilled person</td>
</tr>
<tr>
<td>4.</td>
<td>Collaborative problem solving is explained by deriving both cognitive and social processes</td>
<td>The correspondence between cognitive and social processes is due to the derivation of individual cognitive processes from joint</td>
</tr>
<tr>
<td>5. Development moves from the individuals to the social</td>
<td>Development moves from the social to the individual</td>
<td></td>
</tr>
</tbody>
</table>

Both the theories also differ in terms of social interaction to be effective in the right age. According to Piaget, a young child is largely unreceptive to social influence because egocentricity blocks the reciprocity and cooperation in considering different points of views. Thus, it is not until when logical argument between children with varying viewpoints becomes possible, children at middle age benefit intellectually from social interaction. It becomes difficult for young children to consider the logic of other’s without understanding the rationale. They would either continue to see things from their own perspectives or switch to the other person’s perspectives without actually advancing developmentally. The three conditions he set for the development of equilibrium for the child having egocentrism are not possible. Piaget specified that at the stage of concrete operations i.e. from about 7 to 11 or 12 years, children become able to cooperate and to coordinate points of view. Formal operations which begin after 11-12 years gives importance to social interaction and the role of society become still more obvious. Vygotsky’s approach contrasts Piaget’s in its assumptions that a child is a social being from his / her birth, involved in social exchanges that guide the development of higher cognitive processes. Vygotsky assumed that social guidance aids children in learning to communicate, to plan and remember deliberately from the first years of life. This guidance provides children with the opportunities to participate beyond their own abilities and to internalize activities practiced socially, thus develop their capabilities to manage problem solving independently. Vygotsky argued that rather than deriving explanations of psychological activity from the individual’s characteristics plus secondary social influences, the unit of analysis should be social activity, in which individual functioning develops. Piaget’s approach was reverse; he argued that to focus on the individual as the unit of analysis, with social influence overlaid on the individual’s activity, after the child becomes able to take another person’s perspectives. Thus, Vygotsky focus on development of understanding and skills in using cultural tools and Piaget’s focus on qualitative shifts in perspective.
The two theorists also attributed varying degrees of importance to the roles of adults and peers. Piaget emphasized peer interaction between companions of equal status. Piaget felt that children’s discussions with adults are unlikely to promote cognitive development because of the unequal power relations between adults and children, provided the possibility that adults may be able to interact with children in a cooperative fashion that permits the sort of reciprocity required for children to advance to a new level of equilibrium. For Vygotsky, ideal partners are not equals, but the inequality is in skill and understanding rather than its power. For this reason, interaction with either adults or peers can bring about cognitive growth. But for cognitive development to occur in the course of interacting with a peer, the partner should be more capable.

Thus, up to whatever extent the theories of Piaget and Vygotsky differ in the process of cognitive development occurring in the cooperative interaction, both of them equally emphasize cooperation in cognitive activity. Cooperative learning equally owes its growth on the seeds of both the theories and equally reaps the benefits involved by them.

2.3.9.4 Behavioral Learning Theory and its Impact on Cooperative Learning

The behavioral social perspective presupposes that cooperative efforts are fueled by extrinsic motivation to achieve group rewards (academic and/or non-academic)

Social Learning Theory of Bandura and Cooperative Learning

The Social Learning theory of Bandura focuses on learning that occurs within the social context. Bandura is of the view that people learn from one another including concepts like observational learning, imitation and modeling the behaviors, attitudes and emotional reactions of others. Bandura demonstrated that children learn and imitate others behavior. Children’s learning has to be represented by permanent change in the behavior. In contrast social learning theorists say that people learn through only observation their learning may not be seen in their performance. Awareness and expectations of future reinforcement and punishments can have a major effect on people’s behavior which they exhibit. Bandura emphasize on components that plays a major role in the process of learning. Bandura indicate that in order to learn, an individual has to pay attention that helps an individual to store
information and perform the behavior based on observation. For successful learning motivate children to imitate observed behavior.

Social learning theory is based on observational or learning through indirect experiences rather than the learning based on direct experiences. The theory emphasizes that we acquire many things through simply watching and listening to other people. Observational learning can provide extra dimensions and opportunities for the learners in addition to their learning through self-experience and direct involvement with environment consequences. It has successfully floated the idea that learner should learn from the examples of others. They keenly observe each other’s habits, values, attitudes, personality, behavior, mental thinking and processes, etc. and are influenced by these and readily adapt them. The behavior imitated by the learner is reinforced for proper adoption and further continuance. Weaker students observe the thinking process and problem solving techniques of brighter students in cooperative groups, remember them and then later on try to put it into actions as and when needed. In this way, through social learning, an individual learns many things concerning one’s behavior as well as academics.

2.3.10 Implementation of Cooperative Learning in the Classroom

The teaching learning process is effective only when the right approaches, methods and techniques are used at the right time. The approach used for the teaching learning process has various phases. There are three phases of implementation of cooperative learning viz. Pre-implementation phase, Implementation phase and Post-implementation phase.

Pre-implementation Phase

In this phase, a teacher has to specify instructional objectives, determines group size and assigning students to groups, assigning group roles, arranging room, assigning tasks, explaining criteria for success, structuring positive interdependence, structuring individual accountability, structuring inter group cooperation and interaction and specifying desired behaviors.
Implementation Phase

In this phase, a teacher has to monitor behavior of group members, provide task assistance, intervening if needed while working with the task and praise them for the success.

Post-Implementation Phase

In this phase, a teacher provides closure through summarization, evaluate student’s learning and reflecting on what happened.

Successful implementation of cooperative learning requires that the essential elements of cooperative learning are systematically and effectively structured. Thus, structuring cooperative learning systematically in the classroom is an essential part of the whole process so as to ensure the success of cooperative learning efforts.

2.3.11 Structuring Cooperative Learning in the Classroom

According to Johnson, Johnson and Holubas (1989), Positive interdependence, individual and group accountability, face to face promotive interaction, interpersonal and small group skills and group processing are the essential elements of cooperative learning. Structuring systematically these elements into group learning situation helps to ensure cooperative efforts and enables the implementation of cooperative learning for long term success.

The following steps elaborate in detail the procedure for structuring cooperative learning.

1. Specifying Instructional Objectives

The teacher has to plan two types of objectives before the beginning of cooperative learning lessons viz. academic objectives and social skills objectives. The academic objectives need to be specified at the correct level of instruction according to a conceptual or task analysis. The social skills objectives emphasize on interpersonal and small group skills during the lesson.

2. Deciding the Size of the Group

The optimal size of the groups learning cooperatively should be in the range from two to six members per group. Selecting the size of a cooperative learning group is based on a number of factors. The larger the group, the larger the range of
abilities, expertise and skills and at the same time larger is the time requirement so that everyone has a chance to speak and also larger is the requirement of the members to be highly skilled. Decision of the size of the group should be based on the materials available on the specific nature of the task. Small groups of two to six members are more effective because they take less time to get organized, they operate faster and there is more ‘air time’ per member.

3. Assigning Students to Groups

To make the groups heterogeneous random or stratified random procedure is used to assign the students to the groups. Selection of groups by students often tend to be homogeneous i.e. high achieving students working with high achieving students, males with males and females with females. Groups made by the teachers often have best mix of the students because the teachers can put together optimal combination of students. The varieties of ways are used by teacher to assign students to learning groups. For example, the students can be randomly assigned to groups by having them count off and place the “ones” together, the “twos” together and so forth, placing non –task oriented students with task oriented students, asking students to list two peers with whom they would like to work then, place them in a learning group with one person they chose and one or more students selected by the teacher. Assigning of students to groups can be considered as a creative and manipulative task where in the teacher uses his/her experience and creativity to keep the eagerness and curiosity of students aroused at all the times. The selection of the duration of the cooperative learning group also rests with the teacher who on the basis of instructional unit takes the decision about the cooperative learning group being formal, informal or base groups.

4. Assigning Group Roles

Teacher should ensure that students in each group possess four types of skills viz. forming skills, functioning skills, formulating skills and fermenting skills. Each group member fulfills the assigned role / responsibility that help in effective functioning of the group. The roles performed by the members of a group may include

a) Researcher – to get the needed materials for the groups
b) A recorder to write down the group’s proceedings
c) An encourager – to reinforce member’s contributions

d) An observer – to keep the track of how well the group is cooperating

The researcher firmly believes that when students are involved in cooperative learning, various aspects of their personality build. Cooperative learning can lead to holistic development in students. A student, at a time, can take up multiple roles. Group roles should be assigned keeping in view the demand of the instructional task and to maintain a novelty in classroom teaching learning process.

5. **Arranging the Room**

Students learning in a group require proper sitting arrangement in the room. This is very important for lesson development. The furniture should be so arranged that members of a group are able to sit close enough for better communication and without disrupting the other learning groups. Teacher should have a lane to access every group. Students need to be able to see all relevant task materials and each other so that they can exchange their ideas and materials in a comfortable atmosphere. When students are seated on a rectangle table, they will not have eye contact with all the other members and this does not serve the purpose of achieving goal. Also, the groups need to be seated far enough from each other so that they do not interfere with the other group’s learning.

6. **Explaining the Academic Task**

Before the beginning of the task, the teacher should orient the students to the task i.e. what to do to complete the task and how to do it. A few steps that should be followed in explaining the tasks are as below.

a) Clear, measurable explanation about the task.

b) Ensure the transfer and retention of task.

c) Explanation of lesson objectives which should be stated as outcomes.

d) Explanation of concepts, principles and strategies to be used by the students to complete the assigned task.

e) Relate explanation to students’ past experience or prior knowledge.
f) Explain the procedure to be followed to complete the task. This will keep the students on task and ensure responsibility of each individual to achieve the goal.

g) Asking questions to check students’ understanding of the given task. This will ensure that the assigned task is effective and students are ready to complete it.

7. Explaining Criteria for Success
Criterion based evaluation is used when students work cooperatively. This means adopting fixed set of standards and judging the achievement of each student against these standards. In the beginning of the lesson, the teacher has to explain the criteria by which students’ work would be evaluated. The criteria for success should be structured. Students may achieve success without penalizing other students and groups may achieve success without penalizing other groups. The criteria should be challenging and realistic for each individual group member. The teacher may say, “Every member must demonstrate mastery till each member of the group completes the assigned task”. To promote inter-group cooperation, the teacher may say, “If the whole class can score above 80 percent correctly on the assigned task, each student would receive three bonus points”.

8. Structuring the Components of Cooperative Learning Approach
Students working in a group are from diverse backgrounds. They have different ideas, thoughts, views and opinions to share with the other members of the group. Working in a group needs skills, qualities and abilities to achieve the desired goals. The following were the components of CLA given by Johnson, Johnson and Holubes (1989) help in achieving the desired goal.
1. **Positive Interdependence**

The following saying by Alexander Dumas, “We instead of me, all for one and one for all clearly explains the meaning of positive interdependence”.

The technical term for dual responsibility is positive interdependence. Positive interdependence exists when students perceive that they are linked with group mates in such a way that they cannot succeed unless their group mates do (and vice versa) and / or that they must coordinate their efforts with the efforts of their group mates to complete a task. The success of one depends on the success of the other. Group member's efforts are essential and vital for group success. Each group member has to uniquely contribute his or her resource and / or role and task responsibilities to make to the joint efforts that will either make group members sink or swim together. Within cooperative learning students, have two responsibilities:

1) Learn the assigned material.
2) Ensure that all members of the group learn the assigned material.

Positive interdependence promotes a situation in which students:

a) See that their work benefits group mates and their group mate’s work benefits them.
b) 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.

Thus, positive interdependence establishes that:

a) Each group member’s efforts are required and indispensable for group success.

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

2. Face-to-Face 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. Each individual of a group interact by explaining orally how to solve problems, teach their knowledge to others’, check their own understanding by discussing concepts being learned and connect present learning with the past learning and gets success by promoting face to face interaction.

Promotive interaction in individuals can be enhanced by motivating them to –

a. Provide each other with efficient and effective help and assistance.

b. Exchange needed resources, such as information and materials and process information more efficiently and effectively.

c. Provide each other with feedback in order to improve their subsequent performance.

d. Challenge each other’s conclusions and reasoning in order to promote higher quality decision making and greater insight into the problems being considered.

e. Advocate the exertion of effort to achieve mutual goals.

f. Influence each other’s efforts to achieve the group’s goals.

g. Act in trusting and trustworthy ways.

h. Be motivated to strive for mutual benefit.

i. Maintain a moderate level of arousal characterized by low anxiety and stress.
3. Individual & Group Accountability

Individual accountability is the measurement of whether or not each group member has achieved the group’s goal. The basic function of individual accountability is to assess contribution of each member’s quality and quantity. It is important for the group to know that who needs more assistance, support and encouragement in completing the assignment.

Individual accountability is the component which shows that students learn better in cooperative situation. The purpose of cooperative groups is to make each member stronger individually in his or her own right. After participating in the cooperative lesson, group members should be better able to accomplish the same kind of tasks themselves. They learn to do something together so that they can do it easily when they are alone. **Lev Vygotsky (1986) also favored this view when he said, “What children can do together today, they can do alone tomorrow”**.

To ensure that each student is individually accountable to do his or her fair share of the group’s work, one needs to assess how much effort each member is contributing to the group’s work, provide feedback to groups and individual students, help groups avoid unnecessary efforts by members, and ensure that every member is responsible for the final outcome.

Common ways in which individual accountability can be structured include:

- a) Keeping the size of the group small. Smaller the group size more will be the group accountability.
- b) Each individual is given separately a test. Each student is examined randomly orally by calling and presents his or her group’s work in the presence of the group or to the entire class.
- c) Each member’s work is observed and frequencies are recorded that shows the individual’s contribution and group accountability for the group’s work.
- d) Group members remain accountable by assigning different roles to each members of the group. Assign one student in each group the role of checker. The checker asks other group members to explain the reasoning and rationale underlying group answers.
- e) Having students teach what they learned to someone else. When all students do this, it is called simultaneous explaining.
This is the pattern of classroom learning. First, students gain knowledge and learn skills, strategies, or procedures in a cooperative group. Second, students apply the knowledge or perform the skill, strategy, or procedure alone to demonstrate their personal mastery of the material. Students learn it together and then perform it alone.

4. Interpersonal & Small-Group Skills

Socially unskilled students when placed in a group and told to cooperate do not guarantee that they have the ability to do so effectively. We are not born instinctively knowing how to interact effectively with others. The group formed is heterogeneous in terms of cognitive, affective and psychomotor domain. Interpersonal and small – group skills do not magically appear when they are needed. The teacher should teach social skills like get to know each other, accept and support each other, leadership, decision – making, trust- building, communication and conflict management skills for high quality collaboration and be motivated to use them if cooperative groups are to be productive.

Skills Needed For Cooperative Learning

There are four levels of cooperative skills.

a) Forming Skills

Forming skills are basic to cooperative learning. Students need to ensure that each one of them moves into cooperative learning groups quietly. They need to ensure that they stay in the group and participate in the group’s work. The group members must use quiet voices and ensure that each student has a part in the group effort and assignment.

b) Functioning Skills

These skills help the groups manage their efforts and maintain relationships within the group. To achieve this goal, students need to share ideas and opinions ask for facts and rationalizing that will ease their interaction and thus their understanding of each other’s work; give direction to the group work to help the group move ahead; encourage everyone to participate; ask for help or clarification; accept support and recognition, offer to explain and clarify; paraphrase; energize the group; and describe feelings.
c) **Formulating skills**
Formulating skills build deeper level accepting of the material being studied, stimulate the use of higher quality reasoning strategies, and maximize mastery and retention of the assigned material. The students need to summarize out loud from memory; seek accuracy by correcting a member’s summary; seek elaboration by relating the material learned to earlier learned materials and to previous knowledge; help the group remember; and check for understanding by demanding verbalization and asking the others to plan out loud.

d) **Fermenting Skills**
Fermenting skills are needed for re-conceptualization of the material being studied, cognitive conflict, the search for more information and the communication of the rationale behind one’s conclusions. For this the students need to criticize ideas without criticizing people; differentiate between ideas and reasoning of group members; integrate ideas into single positions; ask for justifications; extend answer; probe by asking in-depth questions; generate further answers and test reality by checking the group’s work.

The above mentioned skills enhance communication, trust, leadership, decision making and conflict management of the individuals.

9. **Teaching Cooperative Skills**
In order for the development of cooperative skills, students working in teams should be provided with opportunities, motivation and means to work together cooperatively.

Johnson, Johnson and Holubec (1998) described four steps which can be used for teaching the different social skills to the students. They are –

**Step – 1** Ensure that students understand the need for the teamwork skill. To establish the need for the teamwork skill, one can –
- Ask students to make a list of social skills needed to improve group work. Emphasize on one or two from the skills listed.
- Present a situation to the students so that they realize that it is better to know the skill than remaining illiterate about it. Congratulate the students who use the skills in the classroom.
• Illustrate the need of the skill through a role play that provides a counter example in which the skill is obviously the mission in the group.

**Step – 2** Ensure that students understand what the cooperative learning skill is, how, and when to use the skill. To accomplish this one can do the following –

• Define the skills in terms of verbal and non-verbal behaviors and explain thoroughly what students have to do. This can be done using “T – chart”. After listing the skills (e.g. check students understanding) the class is asked: “What would this skill look like? (Non –verbal behavior) and what does this skill sound like?” (Verbal behavior).

• Demonstrate and model the skill in front of the students and explain it step by step so students have a concrete idea of what the skill entails in terms of verbal and non-verbal behavior.

• Have the students practice the skill twice in their groups before the lesson starts.

“T – Chart” that can be used to teach the social skill of checking for understanding in the cooperative classroom is stated below in the table 2.3

<table>
<thead>
<tr>
<th>T – Chart for Social Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Checking for Understanding</strong></td>
</tr>
<tr>
<td>Looks Like (Non-verbal)</td>
</tr>
<tr>
<td>Eye Contact</td>
</tr>
<tr>
<td>Leaning forward</td>
</tr>
<tr>
<td>Interested expression</td>
</tr>
<tr>
<td>Open gestures and postures</td>
</tr>
</tbody>
</table>

Similar “T-charts” can be prepared for teaching different social skills.

**Step – 3** Set up practice situations and encourage skill mastery. To master a skill, students need to practice it again and again. Help in the students accomplish this task one can –

• Assign a specific role / responsibility to all the students of the group. Gradually introduce the skills, and repeat the previously introduced skill at the same time until mastery occurs.
• Observe each group how frequently and effectively, who uses the skills and record it.
• Cue the use of skills periodically during a lesson by having a student demonstrate the skill in front of the others.
• Intervene in the cooperative groups to explain the skills and show how to use them.
• Coach the students on how to improve the use of the skill.

**Step – 4** Ensure the effective communication in the learning process. For this provide each student with –
• Feedback on his or her use of the skill.
• Reflection on how to engage in the skill more effectively next time.

**Step – 5** Ensure that students practice the skill until the skills seem to be natural action. Students are required to pass the four stages of skill development.
• Awkward – The beginning stage, where the students feel awkward in engaging in the skill.
• Phony – Students use the skill they feel inauthentic.
• Mechanical – Students keep on doing the same thing.
• Integrated – When the skills occur naturally.

**10. Monitoring Students’ Behavior**

Students working in a group need to be observed and assessed in terms of academic progress and appropriate use of interpersonal and small group skills, to see what problems are being faced by the members to complete the given task/assignment. A variety of observation tools and procedures can be used.

With the help of formal observation sheet, social skills like contributing ideas, asking questions, active listening, expressing support and acceptance, encouraging group members to participate, summarizing, checking for understanding, sharing materials, expressing warmth and liking towards group and its members, giving direction to group’s work, etc. may be observed. Besides social skills, academic learning and performance, cognitive reasoning, attitudes and work methods can also be observed. Observation checklist can be used to determine the quality of behavior. Informal
observation can be used to determine teacher’s impression of what is happening in the classroom.

11. Providing Task Assistance
Observation helps to clarify instructions; review important procedures and strategies for completing the assignment answer the questions and teach task skills as and when necessary. The use of more specific statements motivates the desired learning and promotes positive transfer by helping the students understand the concept to learn.

12. Intervening to Teach Interpersonal Skills
One may intervene to suggest more effective procedures for working together and more effective behaviors for students to engage in. At times, one may become a consultant to a group in order to help it function more effectively. Choosing when to intervene and when not to is part of the art of teaching and hence, one should judiciously use it. One should also praise and reinforce particularly the effective and skillful behaviors.

13. Providing Closure through Summarization
At the end of the cooperative assignment, students should be able to summarize what they have learned, recall ideas or give examples and answer questions that students have, and to understand where they would use it in future.

14. Group Processing
Group processing is an essential component of cooperative learning. Group members discuss how well they have achieved their goals and will maintain effective working relationships. They portray what members’ actions were helpful and not helpful, decide what behaviors are to be endured or amended.
Group needs specific time to describe what member actions were helpful and unhelpful and make decisions about what behaviors to continue or change. The purpose of group processing is to:
   a) Improve continuously the quality of the group’s task work and teamwork.
   b) Increase individual accountability by focusing attention on each member’s responsibility and skillful actions to learn and to help group mates to learn.
   c) Reduce complexity and make learning process simpler.
   d) Eliminate unskilled and inappropriate actions.
Group processing occurs at the small – group and whole class levels. Each level comprises of four levels of processing.

a. **Feedback** – Ensure that learning group and individual students receive feedback. Students’ actual performance is compared with the ideal performance criteria. Feedback is based on the information collected by teacher and students while observing cooperative group learning. When feedback is given skillfully, it motivates, directs and generates energy towards constructive action and transforms the energy into action towards improving the performance. Self-efficacy improves and students feel compelled to be more effective in the next group work.

b. **Reflection** – Students reflect on and analyze the group work they have just completed to discover what helped and what hindered the quality of learning and whether specific behaviors had a positive or negative effect. This can be done by having each group focus on one member at a time, having members write a positive comment about each team mate on a card and having students comment on the proper use of social skills.

c. **Setting Improvement Goals** – Goal setting is the link between how students did today and how better they will do tomorrow. It can have powerful impact on students’ behavior as there is a sense of ownership of and commitment to actions that a student has decided to engage in as opposed to assigned behaviors. Encourage students to set improvement goals, specifying how they will act more skillfully in the next group session. Students announce publicly the behavior they plan to improve goals. Students should write the goal down and review it at the beginning of the next group session.

d. **Celebrating** – This is the final step wherein students celebrate their hard work and the success of their cooperative efforts. Persistent, hard and long term efforts to learn something come from the heart than from the head. Both small group and whole class celebrations should take place. Small group processing provides the means to celebrate the success of the group and reinforce the positive behaviors of group members. Individual efforts
contribution to the group success should be recognized and encouraged. Members’ actions / efforts helping group mates should be perceived, respected and recognized for learning. It is the feeling of success, appreciation and respect that makes individual to build commitment to learning, enthusiastic about working in cooperative groups and a sense of self efficacy about mastery over the subject content and working cooperatively with classmates.

15. Assessing, Evaluating and Reporting Student Learning

Assessment is the collection of data to make a judgement. Evaluation is the rendering of a judgement based on merit. Reporting is the communication of the results of assessment and evaluation to interested audiences. There are two levels of assessment and evaluation when students learn using cooperative learning instructions viz. individual and the group. Individual assessment is more frequent than group assessment. The purpose of cooperative learning groups is to make each member a stronger individual in his or her own right. Assessment in a cooperative classroom includes –

a. Diagnostic assessment – students’ actual level of knowledge and skills are assessed.

b. Formative assessment – students’ progress towards learning goals are assessed.

c. Summative assessment – students’ final level of students’ learning are assessed.

What is to be assessed and how is it to be assessed can be understood by the following table 2.4

<table>
<thead>
<tr>
<th>What is to be assessed</th>
<th>Assessment procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic learning</td>
<td>Goal setting conferences</td>
</tr>
<tr>
<td>Reasoning process/ strategies</td>
<td>Standardized tests</td>
</tr>
<tr>
<td>Skills and competencies</td>
<td>Teacher – made tests</td>
</tr>
<tr>
<td>Attitudes</td>
<td>Written compositions</td>
</tr>
<tr>
<td>Work habits</td>
<td>Oral presentations</td>
</tr>
<tr>
<td></td>
<td>Projects</td>
</tr>
</tbody>
</table>

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2.3.12 Benefits of Cooperative Learning

Research states that adopting CLA in the classroom will help students’ learn, encourage deeper understanding of the concept and feeling of comfort will be experienced, demonstrate the ways before students to solve the problems, create conducive environment and represent a democratic process in action resembling real world of experience. Learning becomes more efficient as it breaks up the daily practices. Students communicate their ideas, thoughts and opinions to achieve the desired goal.

The advantages of using Cooperative learning are numerous. Gillies (2007) asserted the same view, when he said, “The benefits attributed to cooperative learning are widespread and numerous.”

Jacobs et.al. (2002), Gillies (2007), Jollife(2007) and Samuel (2010) enlisted benefits of cooperative learning which can be paraphrased as:

1. Improved academic achievement
2. Higher level strategies used to conceptualize material and organize cognitively, resulting in storage of information and its mastery, as it takes more efforts to explain, summarize and teach others than to understand by one’s own self
3. Working in heterogeneous groups, exchanges of ideas result in creative thinking.
4. More active involvement in learning by students, regardless of past achievement level or individual learning needs.
5. Externalization of one’s ideas and reasoning for critical examination leads to considerable peer monitoring and regulation of one’s thinking and reasoning.
6. Immediate feedback given by peers improves one’s reasoning and performance.
7. Constructive management of conflicts among ideas, opinions, conclusions, etc. promotes correctness of one’s views and an active search for more information.
8. Increased motivation to learn.
9. Increased students’ responsibility for their own learning.
10. Improved time on task compared to teacher led instruction.
11. Improved liking for school.
12. Improved student attitude towards learning, school, peers and self.
13. Greater opportunities for the teacher to observe and assess student learning.
14. Infusion of democratic and scientific way of investigation.
15. Learning both academic and social skills.
16. Sense of being together and belonging where low achievers are not ostracized.

2.4 Project Based Learning Approach

Student-centered instruction through projects is the basis of this approach. It engages learning experiences that involve students in complex, real-world projects through which they develop and apply their skills and knowledge. Students require learning to draw from many information sources and disciplines in order to solve problems. Autonomous student learning leads to realistic and student-generated products.

Project-Based Learning Approach is a learner centered and affords learners the opportunity for in-depth investigations of worthy topics. The learners are more autonomous as they construct personally-meaningful artifacts that are representations of their learning (Grant, 2002).

Project-based learning is a structure that transforms teaching from "teachers telling" to "students doing". Students become active problem-solvers, decision and meaning-makers rather than passive listeners; they collaborate or cooperate forming groups, organize their activities, conduct research, solve problems, synthesize information, organize time and resources and reflect on their learning.

Katz & Chard (2000), are of the opinion that Project Approach refers to a way of teaching and learning, as well as to the content of what is taught and learnt. Projects
provide backbone to the children’s and teachers’ learning experiences. They are based on the strong conviction that learning by doing is of great importance and that to discuss in groups and to revisit ideas and experiences is the premier way of gaining better understanding and learning. Projects are based on the children’s interests and their familiar knowledge. The PBLA is a set of teaching strategies that enable teachers to guide students through in-depth studies of real-world topics. Projects has a complex but flexible framework within which teaching and learning are seen as interactive processes. Students feel highly motivated and actively involved in their own learning, leading them to produce high-quality work and to grow as individuals and collaborators implementing project based learning approach successfully.

Crawford, Bellnet & Blumenfeld et al (2005), is of the view that Project-based learning focuses mostly on a production model. Students start by defining the purpose of creating the end-product, identify their audience, they research the topic, design the product, do the project management, solve the problems that arise and finish the product followed by a self-evaluation and reflection So, the driving force is the end-product, but the key to success is the skills acquired during its production.

Stites (1998) is of the view that Project-based learning is effective in increasing student motivation by engaging them in their own learning, in improving student problem-solving and higher order thinking skills. Students generate their own strategies for problem definition, information gathering, data-analysis, and hypothesis-building and testing, comparing these strategies against and sharing them with other students and mentors' strategies by promoting meta-cognition and self-regulated learning. Project-based learning enables students to work cooperatively with peers and mentors in a student-centered environment where learners are encouraged to explore various topics of interest. Scott (1994) indicates, "The collaborative nature of the investigation enhances all of these valuable experiences ... as well as promotes a greater appreciation for social responsibility.” Engaging students in applying the content of different subject areas during the various phases of the project provides opportunities for interdisciplinary learning. Students develop real world skills like the ability to collaborate well with others, make decisions and take initiative, and face complex problems.
PBLA exposes students to complex tasks based on challenging questions or problems that involve the students' problem solving, decision making, investigative skills, and reflection that includes teacher facilitation. PBLA is focused on questions that drive students to encounter the central concepts and principles of a subject hands-on. Students form their own investigation of a guiding question, allowing students to develop valuable research skills as students engage in design, problem solving, decision making, and investigative activities. Through Project-based learning, students learn from these experiences and take them into account and apply them to the world outside their classroom.

2.4.1 Definitions of Project Based Learning

PBLA is defined as “a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks.” This process can last for varying time periods and can extend over multiple content areas (Buck Institute of Education).

Project-based learning requires “complex tasks, based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations (Thomas, 2000).

Project-based instruction often has a ‘driving question’ encompassing worthwhile content that is anchored in a real-world problem; investigations and artifacts that allow students to learn concepts, apply information, and represent knowledge in a variety of ways; collaboration among students, teachers, and others in the community so that participants can learn from one another; and use of cognitive tools that help learners represent ideas by using technology (Marx et. al., 1994)

2.4.2 History of Project Based Learning

Project-based learning has its roots in experiential education and the philosophy of John Dewey (According to the Buck Institute for Education (BIE),). The method of project-based learning emerged due to developments in learning theory in the past 25 years. The BIE suggests, “Research in neuroscience and psychology has extended
cognitive and behavioral models of learning — which support traditional direct instruction — to show that knowledge, thinking, doing, and the contexts for learning are inextricably tied. Learning is a social activity; teaching methods can scaffold on students’ prior experiences and include a focus on community and culture.” We live in an increasingly more technological and global society, teachers realize that they must prepare students not only to think about new information, but they also must engage them in tasks that prepare them for this global citizenship. Based on the developments in cognitive research and the changing modern educational environment in the latter part of the 20th Century, project-based learning has gained popularity.

2.4.3 Characteristics of Project Based Learning

Following are the characteristics of Project Based Learning.

- Students make decisions within a prescribed framework.
- There’s a problem or challenge without a predetermined solution.
- Students design the process for reaching a solution.
- Students are responsible for accessing and managing the information they gather.
- Evaluation takes place continuously.
- Students regularly reflect on what they’re doing.
- A final product (not necessarily material) is produced and is evaluated for quality.
- The classroom has an atmosphere that tolerates error and change.

2.4.4 Difference between Project Based Learning Approach and Traditional Approach

PBLA is different than TA is given below in the table 2.5
Table 2.5
Difference between Project Based Learning Approach and Traditional Approach

<table>
<thead>
<tr>
<th>Project-based Learning Approach</th>
<th>Traditional Learning Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Teachers perform the roles of Resource Providers i.e. they provide inputs and language preparation as the students work on the assigned project.</td>
<td>• Teachers assign reading materials to the students. Students are required to do homework exercises. Lectures in the classroom are tied to textbook materials.</td>
</tr>
<tr>
<td>• Teachers perform the roles of Facilitators and Counselors i.e. they give support and guidance to the students as they work on the assigned project.</td>
<td>• The lectures are sometimes enriched with audiovisual presentations.</td>
</tr>
<tr>
<td>• Students become Co-learners as they get involved in learning together with the other students.</td>
<td>• Students are graded on the basis of their ability to remember factual information.</td>
</tr>
</tbody>
</table>

2.4.5 Role of a Teacher in Project Based Learning Approach

A teacher has to perform the following roles while using PBLA.

1. Be a facilitator.
2. Develop an atmosphere of shared responsibility rather than not to relinquish control of the classroom.
3. Structure the proposed question/issue so as to direct the student's learning toward content-based materials.
4. Regulate student success with intermittent, transitional goals to ensure student projects remain focused and students have a deep understanding of the concepts being investigated.
5. Not to provide the students any answers because it defeats the learning and investigating process.
6. Provide the students with feedback that will help them strengthen their skills for their next project after completion of the project.

2.4.6 Essentials for Project Based Learning Approach

According to John, L and John R. (2012) following essentials will lead to effective project-based learning.

Figure – 2.2
Essentials for Project Based Learning

1. A Need to Know

Students' need to know the content by launching a project with an "entry event" that engage interest and initiates questioning. An entry event can be almost anything: a video, a lively discussion, a guest speaker, a field trip, or a piece of mock correspondence that sets up a scenario.

2. A Driving Question

Students get a sense of purpose and challenge for doing project by driving a question that captures the heart of the project in clear, compel language. The question should be provocative, open-ended, complex, and linked to the core of what students want to learn.
3. Students’ Voice and Choice

Students’ voice and choice is a key element of project-based learning. More the voice and choice better will be the project. Teacher should design the projects with the extent of student choice that fits their own style and students.

4. Enhancing 21st Century Skills

Project based learning gives student opportunities to build such 21st century skills as collaboration, communication, critical thinking, and the use of technology, which will serve them well in the workplace and life. Project-based learning environment explicitly teaches and assesses skills and provides frequent opportunities for students to assess themselves.

5. Inquiry and Innovation

Real inquiry makes project work more meaningful, which does not mean finding information in books or websites and pasting it onto a poster. In real inquiry, students begins with their own questions, leads to a search for resources and the discovery of answers, and often ultimately leads to generating new questions, testing ideas, and drawing their own conclusions. With real inquiry comes innovation—a new answer to a driving question, a new product, or an individually generated solution to a problem. Students will not simply reproduce teacher or textbook-provided information in a pretty format. Teacher guides students in doing inquiry to refer the list of questions they generated after the entry event. Instruct them to add to this list as they discover new insights. Questioning, hypothesizing and openness to new ideas and perspectives will culture the classroom environment.

6. Feedback and Revision

Creating high quality outcome and performances is an important purpose of the endeavor. Formalizing a process for feedback and revision during a project makes learning meaningful. Instead of providing direct feedback, the teacher should coach students in using rubrics or other sets of criteria to critique one another's work. Arrangements of experts or adult mentors can be made to provide feedback, which is especially meaningful to students.
2.4.7 Teacher’s Role in Project Based Learning Approach

Project-based learning is only possible in classrooms where
1. teachers support students by giving sufficient assistance and feedback.
2. teacher must systematically explain all tasks that are to be completed, provide
detailed directions for how to develop the project, and socialize within the
classroom in order to answer questions and encourage student motivation.
3. teachers must plan well and be flexible.
4. teachers often find themselves in the role of learner and peer with the students.
5. teachers can evaluate project-based learning with a combination of objective
tests, checklists, and rubrics; to measure task completion and its success.

2.4.8 Significance of Project based Learning

Project-based learning is a dynamic approach to teaching. Working in small
collaborative groups, the students explore real-world problems and challenges.
Project-based learning is filled with active and engaged learning, it inspires students
to obtain a deeper knowledge of the subjects they're studying and also help them
develop cross-curriculum skills. Research also indicates that students are more likely
to retain the knowledge gain through this approach far more readily than through
traditional textbook-centered learning. In addition, students develop confidence and
self-direction as they move through both team-based and independent work.

Assessment and evaluation of students working with the project based learning
approach is more meaningful compared to narrow rubrics defined by exams, essays
and written reports. They quickly see how academic work can connect to real-life
issues -- and may even be inspired to pursue a career or engage in activism that relates
to the project. Project-based learning approach invigorate learning environment for
the students, energize the curriculum with a real-world relevance and spark students’
desire to explore, investigate and understand their world.

Project-based learning has several positive effects on students’ content knowledge.
Compared to traditional classes, students in PBL classes performed better on
assessments of content knowledge (Boaler, 1997; Penuel & Means, 2000; Stepien, et
al., 1993). Research also reported that Project-based learning had a positive effect on
specific groups of students. For example, students with average to low verbal ability
and students with little previous content knowledge learned more in PBL classes than in traditional classes (Mergendoller, et al., 2006; Mioduser & Betzer, 2003). In addition, students were able to demonstrate specific content area skills after taking part in PBL (Mioduser & Betzer, 2003; Peck, et al., 1998). Students taught in PBL classes emerged with useful, real-world content knowledge that they could apply to a variety of tasks (Boaler, 1997).

PBL also has resulted in high levels of student engagement (Belland, et al., 2006; Brush & Saye, 2008). Study reported that PBL had a positive effect on student motivation to learn (Bartscher, et al., 1995). Students who participated in PBL also benefitted from improved critical thinking and problem-solving skills (Mergendoller, et al., 2006; Shepherd, 1998; Tretten & Zachariou, 1995). In particular, one study of PBL showed a positive effect on low-ability students, who increased their use of critical-thinking skills including synthesizing, evaluating, predicting, and reflecting by 446% while high-ability students improved by 76% (Horan, et al., 1996). Furthermore, during PBL, students showed initiative by utilizing resources and revising work, behaviors that were uncharacteristic of them before they engaged in PBL (Barron, et al., 1998).

PBL has been shown to benefit a variety of students in developing collaborative skills. For example, through PBL, elementary students learned to understand multiple perspectives (ChanLin, 2008) and conflict resolution skills (ChanLin, 2008); special education students developed social skills such as patience and empathy (Belland, et al., 2006); and low-ability students demonstrated initiative, management, teamwork, and conscientiousness as they worked in groups (Horan, et al., 1996). Students also enjoyed PBL because it gave them opportunities to interact with their friends and make new friends through cooperative projects (Belland, et al., 2006; Lightner, et al., 2007). However, group- efficacy were found to depend largely on the quality of the group process (Weng-yi Cheng, et al., 2008).

2.4.9 Benefits of Project Based Learning Approach

Project-based learning offers a wide range of benefits to both students and teachers. A growing body of academic research supports the use of project-based learning in school to engage students, cut absenteeism, boost cooperative learning skills, and improve academic performance (George Lucas Educational Foundation, 2001).
For students, benefits of project-based learning include:

Increased attendance, growth in self-reliance, and improved attitudes towards learning (Thomas, 2000). Academic gains equal to or better than those generated by other models, with students involved in projects taking greater responsibility for their own learning than during more traditional classroom activities (Boaler, 1997; SRI, 2000). Opportunities to develop complex skills, such as higher-order thinking, problem-solving, collaborating, and communicating (SRI, 2000). Access to a broader range of learning opportunities in the classroom, providing a strategy for engaging culturally diverse learners (Railsback, 2002). The authenticity of the experience is what makes project-based learning more appealing. Students take on the role and behavior of those working in a particular discipline. Students are engaged in real-world activities that have significance beyond the classroom.

2.4.10 Theoretical Foundations of Project Based Learning Approach

PBLA has a long history. As far back as the early 1900s, John Dewey supported "learning by doing." This sentiment is also reflected in constructivism and constructionism. Constructivism (Perkins, 1991; Piaget, 1969; Vygotsky, 1978) explains that individuals construct knowledge through interactions with their environment, and each individual's knowledge construction is different. So, through conducting investigations, conversations or activities, an individual is learning by constructing new knowledge by building on their current knowledge.

Constructionism takes the notion of individuals constructing knowledge one step further. Constructionism (Harel & Papert, 1991; Kafai & Resnick, 1996) posits that individuals learn best when they are constructing an artifact that can be shared with others and reflected upon, such as plays, poems, pie charts or toothpick bridges. Another important element to constructionism is that the artifacts must be personally meaningful, where individuals are most likely to become engaged in learning. By focusing on the individual learner, project based learning strives for "considerable individualization of curriculum, instruction and assessment-in other words, the project is learner centered." (Moursund, 1998).
2.5 Summary

Cooperative learning is “carefully structured” group learning. Cooperative learning is not putting students at the same table and allowing them to chat occasionally while they perform their individual tasks. It is not assigning a project to a group in which one or few students do all the work while the others do nothing but earn the grade. Nor is it assigning a report to a group in which members divide the labour and then each works individually on his or her share only.

Project based learning is an unstructured group learning. It is assigning a project to a group in which only one or few students put efforts in completing assigned tasks. There is no division of a labour found. It is designed to answer a question or solve a problem and generally reflect the types of learning and work people do in the everyday world outside the classroom.