Introduction
CHAPTER I
INTRODUCTION

The biggest challenge before the country, today, in the field of education is not only education expansion and universalisation of education but to improve the overall quality of education.

Earlier the teaching consisted mainly of giving lectures by the instructor and expecting students to be cognitively active but physically inactive. It was totally teacher centered but the advancement of technology has acted as a catalyst for considering full scale changes leading to quality education. Educational technology can provide the spark for promoting educators to envision new ways to teach and for creating the kind of schools needed now. If employed properly, it could make education more qualitative and help tremendously in continuation and expansion of teacher training, working on innovative teaching methodologies, introduction on assessment of learning achievement as well as monitoring of teaching learning processes for achievement.

No doubt, technology enhances the quality of teaching learning process but it cannot replace teachers. Technology alone does not improve student’s achievements; but trained teachers, school settings; smaller class size, proper content materials, cooperative learning and authentic instructions are an equally contributory factor in achievement (Johnson & Jennifer, 2005). The methodology of teaching is in a state of dynamic revolution today.

Thus, without declining either of human or technology part, an attempt has been made in present study to combine the advantages from both in the form of Hybrid Instruction.

To cope with global changes and to enhance quality of education we have to supplement our teaching learning process with innovations like Hybrid Instructions, which increases the effectiveness of learning environment not only in terms of academic achievement but also in terms of application of the learning to world outside i.e. the desired levels of life skills to make the maxim of Education –“All Round Development” a reality.
Overview of Traditional Method and Computer Mediated Instructions

Traditional Teaching

Traditional teaching is usually teacher centered in which teacher starts with an overview of the content to be covered, followed by some examples to clarify the mentioned content and finally gives the solution.

Dewey (1938) described it as being "imposed from above and from outside", the students are expected to docilely and obediently receive and believe the fixed answers. Teachers are the instruments by which this knowledge is communicated and these standards of behavior are enforced.

The main features of traditional teaching have been discussed below:

**Role of Teacher:** Teacher centered instruction. Teacher is active and structures the content and classroom environment.

**Classroom/Students:** Students matched by age, and possibly also by ability. A single, unified curriculum for all students, regardless of ability or interest. They are the passive learners who are spoon fed to get marks in the exams.

**Teaching Methods:** Traditional education emphasizes on Direct instructions, lectures, listening and observation.

**Materials:** Instruction based on textbooks, lectures and individual written assignments

**Subjects:** Subjects are taught in water tight compartments as individual, independent subjects. Little connection is made between the topics of same subject, with real world and with other subjects.

**Teaching of Science:** Fact-based science where teacher transmit concrete knowledge and specific vocabulary to the students. The science teaching is never related to the real world outside. Higher order cognitive skills are never emphasized. Students focus on memorizing what they are told. "Experiments" follow cookbook-style procedures to produce the expected results.

**Social aspects:** Little or no attention is given to social development. The main Focus is on independent learning. Socializing is largely discouraged except for extracurricular activities and teamwork-based projects.
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The teacher is considered as a respected role model in the community. Students obey and respect the teacher. There is close intimacy among students and between student and teacher.

- A few numbers, letters, or words are assigned to summarize overall achievement in each class based on individual performance. Students pass with different grades.
- A passing grade may or may not signify mastery.
- Some students fail due to poor performance based on a lack of understanding or incomplete assignments.
- Achievement based on performance compared to a reasonably stable, probably informal standard which is highly similar to what previous students experienced.

In short, such teaching focuses on teaching, not learning. It incorrectly assumes that for every ounce of teaching there is an ounce of learning by those who are taught.

This does not mean that traditional teaching is not in a position to fulfill its expected role. Despite of few limitations traditional teaching is still most effective. The main advantage of traditional teaching is the presence of teacher in classroom which adds human touch to the teaching learning process. Teachers understand when the teachable moment is at hand, guide and motivate student’s academic growth. The teacher facilitates learning and helps students transfer ideas to new learning situations. It is only teacher that identifies the individual demands of the learner and mould the content as per the need of hour.

What we need today is to define and prioritize the role of the teacher. Teacher has to keep in mind the child psychology and use different methods, strategies, styles, modes of delivery of instructions, to create an effective and interesting environment where the learner is the active participant. There is a need to transform traditional teaching and the integration of technology in the classroom is a major part of this transformation.

Computer Technology in Classrooms

Computer is being used in different formats in educational settings-drill and practice, tutorials, simulations, instructional management, supplementary exercises, programming, database development, writing using word processors and other
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applications. These terms may refer either to stand alone computer learning activities or to computer activities which reinforce material introduced and taught by teachers.

Cotton (2001), Park (2000) & Szabo (1992) listed few terms which are used to designate the role of computer in education. These represent commonly accepted (though certainly not the only) definitions of these terms:

- **Computer Mediated Instruction (CMI):** Computer-Mediated Instruction/Learning is the instruction (which is usually curriculum-based) that is presented to the student channeled or processed through the medium of computer software (Proctor, 2002).

- **Computer Based Instruction (Learning):** The use of computer technology to provide direction, instruction or management of instruction to the student. Szabo (1992) has identified two major components of CBI: (1) Computer Assisted Instruction (CAI) and (2) Computer Managed Instruction (CMgl):
  - **Computer Assisted Instruction (CAI):** It is a narrower term and most often refers to the use of computers to present drills, practice exercises and tutorial sequences to the student and sometimes to engage the student in a dialog about the substance of the instruction. It is also known as computer-aided instruction; computer-assisted learning (CAL).
  - **Computer Managed Instruction (CMgl):** It refers either to the use of computers by school staff to organize student data and make instructional decisions or to activities in which the computer evaluate each individual test performance guide them to appropriate to instructional resources and keep records of their progress.

- **Computer Based Interactive Multimedia (CBIM):** CBI which is delivered in a combination of computer and media formats. In other words, this is CBI with the integration of audio and video media, such as text, still/animated computer graphics, still/moving video images and audio all in digitized format (Szabo, 1992).

- **Computer Enriched Instruction (CEI):** It is defined as learning activities in which computers (1) generate data at the students request to illustrate relationships in models of social or physical reality (2) execute programs developed by the students.
and (3) provide general enrichment in relatively unstructured exercises designed to stimulate and motivate students (Cotton, 2001).

Other terms which have been used to describe the use of computer in education such as: computer based instruction or computer assisted instruction have been rejected in the present study because current technological trends are such, that instruction can merely funnel through a computer (the way messages channels through a telephone) and therefore does not have to be based on or assisted (which connotes augmentation) by that particular piece of hardware (Proctor, 2002).

Computer Mediated Instructions

Computer Mediated Instruction/Learning is the instruction (which is usually curriculum based) that is presented to the student channeled or processed through the medium of computer software. The alternate terms computer-mediated learning (CML) and computer mediated instruction (CMI) are used interchangeably, depending on whether the perspective is that of the student or the curriculum creator.

Definitions of CMI vary in the literature, but center around two or three main concepts. Quick (1994) offered a simple definition, calling it "any method of learning in which the computer is the primary delivery system".

Szabo (1995) described CMI as an advanced form of human-computer communication. He cited Bloom’s earlier work which showed that the intelligent one-on-one human tutor is more effective than other forms of instruction and suggested that CMI attempts to use the computer to capture some of the essence of the effective tutorial environment.

Thus, Computer Mediated Instructions is an umbrella term that subsumes computer based instructions, computer enriched instructions, online instructions, and computer mediated communication.

Effectiveness of Computer Mediated Instructions

The use of technology in a classroom setting is beneficial for both teachers and students. It not only increases student performance but they also prepare teachers and allow teachers to engage students in educational experiences that prepare them for the future.
The meta-analytic studies conducted by Kulik, Kulik & Cohen (1980); Kulik, Kulik & Schwalb (1986); Niemiec et al. (1987); Lee (1997) & Cotton (2001) pulled together the results of hundreds of studies into the relative effectiveness of CMI. The benefits of using computer technology can be summed up under two heads: Students outcomes and Teacher outcomes.

The Students Outcomes related with the use of CMI are summarized below:

- CMI results in higher academic achievement.
- Learning efficiency or amount learned per unit time is strongly and significantly better under CMI (studies have reported reductions in learning time of 20% to 33%).
- Retention of content learned using CMI is superior to retention following traditional instruction alone.
- The use of CMI is associated with other beneficial outcomes, including greater internal locus of control, school attendance, motivation/time-on-task, and student-student cooperation and collaboration than the use of conventional instruction alone.
- CMI is more beneficial for younger students, lower-achieving students, economically disadvantaged students, handicapped students, learning disabled, mentally retarded, hearing impaired, emotionally disturbed and language disordered.
- CMI is more effective for teaching lower cognitive material than higher cognitive material.
- CMI provides immediate, objective and positive feedback.

Besides, the benefits of CMI on students’ outcomes as under:

- The use of CMI leads to more positive attitudes toward learning, course content computers, quality of instruction, school in general and self learner than the use of conventional instruction alone (Szabo, 1995 & Cotton 2001).
- CMI foster and enhance the concept of collaborative and Cooperative Learning (Murphy & Collins, 1997).
- CMI encourages higher-order thinking (Crowther et al., 2004).
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• Student learning rate is faster with CMI (40 percent faster) than with conventional instruction (Capper and Copple, 1985).

• CMI makes the content more meaningful and students liked the content (Brush, 1997).

Various benefits of integrating technology in teaching learning process resulted in following Teacher Related Outcomes:

• More time engaged by teachers advising students.
• Increased emphasis on individualized instruction.
• Increased interest in teaching.
• Interest in experimenting with emerging technology.
• Increased administrator and teacher productivity.
• Increased planning and collaboration with colleagues.
• Rethinking and revision of curriculum and instructional strategies.
• Increased teacher and administrator communication with parents.
• Increased communications among teachers.

From the above discussion it is clear that the recent growth and use of various technologies, such as CBI, CAI, CMI, Web based learning, internet, etc., allow the students to become active participants in the learning process and cooperative/collaborative learning to take place. Students are able to discover and to interact with an almost unlimited amount of information and resources. There by enabling them to discover principles and knowledge for themselves, interpret and construct meaning based on their own experiences and interactions by self directed inquiry, guided activity, and discovery.

Limitations of Computer Mediated Instruction

No doubt computers help in making teaching learning effective and interesting but on the other side computers cannot replace teachers. Ingram (1994) noted the impotence of CMI alone to be a panacea for the woes of education. The human ingredient is critical to the teaching/learning process. She noted that merely sitting a student in front of a computer and expecting true education is naïve at best. Computers cannot yield the products of higher order thinking, and experience, namely wisdom, truth, and goodness. It is the teacher who analyzes the uniqueness of the
individual learner, determines what is most useful and worthwhile to be taught, and then motivates and inspires students to work at the task of learning.

Research studies have shown that for effective learning among the learners, interpersonal relationship and cooperative learning are highly accountable (Cheng, 2006).

The evaluation team of Brigham Young University’s Center for Instructional Design (CID) while evaluating the effectiveness of CD based chemistry course: ‘Chemistry 105’ (Chem 105) found that though students were initially excited about the flexibility and options the CD-based chemistry course offered them, but they quickly became frustrated with the confusing demands of navigating through the course. Few students thought the modules could replace a lecture here or there, not even one of the test participants agreed that the computer-mediated approach could effectively replace the entire course experience. Instead, they saw the modules as a supplement to the textbook and in class sessions, not as a replacement for them (Crowther et al., 2004).

Foreman and Widmayer (2000), while reporting success in achieving advanced levels of cognitive learning through CMI, warned other educators to also utilize elements of traditional classroom experiences (e.g., face-to-face interactions and activities) as supplements.

**Computer Mediated Instructions for Classroom: Research Support**

From the above discussion it is clear that the use of technology alone does not help students to learn. There are lots of ways in which computer-based educational technology can be useful in education and integrated in teaching-learning process. This is supported by various advantages that results because of integration of technology/multimedia in education, as cited by different studies.

Neo & Meo (2004) reported that when technology/multimedia is combined with proper teaching materials, it can be an excellent substitute to the present traditional methods. Multimedia can be an effective instructional medium of delivering information because it enables the teacher to represent the information in various media via sound, text, animations, video and images.
McFarlin (2008) found that students in a "hybrid class" incorporating instructional technology with in-class lectures scored a letter-grade higher on average than their counterparts who took the same class in a more traditional format. Teachers who integrate technology in their classrooms, not only motivate their students to learn, but it helps their students to acquire significant skills in the process. Faryadi (2006) reported that if the teacher uses technology in the classroom properly, no doubt, it will reinforce higher cognitive skills among the learners.

Meo (2005) reported that web-based multimedia mediated instruction based with constructivist paradigm motivates learners to work in a pair and construct their own solutions to problems. Multimedia motivates learners to continue learning and obtain knowledge faster and above all sustain the knowledge gained.

Duhaney (2000) reported that the introduction of new information technology in teaching and learning has impacted the traditional classroom activities. The various technologies generate a greater level of interaction between and among teachers and students. However, use of technology in the classroom should only be considered appropriate if it is used for specific purposes in the teaching and learning process. Its incorporation in this process should not just be as an appendage, but as an integral part of the teaching and learning objectives. Employing technology of any kind in the instructional process becomes valuable only when they are seen merely as elements in a well constructed learning environment (D'Ignazio, 1989). The use of technology, therefore, should be driven by specific objectives related to instruction and learning with direct linkages to the curriculum.

Thus, using of technology uncritically in classrooms or as a replacement for teachers we may actually be fostering educational retrograde motion. We need to supplement our teaching learning process with technology in the form of Hybrid Instruction.

1.1 HYBRID INSTRUCTIONS

Hybrid Instruction also called blended learning/instructions, integrated teaching and web enhanced instruction, in some ways is the middle ground between our society's adolescent love affair with technology and ancestral need for human contact and a sense of belonging.
Hybrid has been taking place for centuries with books, videos and print material being an integral part of the instruction. But, in today’s world that media is generally understood to be technology (Computer/Internet/Web/Online courses).

Hybrid Instruction means any format of instruction combining dynamically both technology and human instruction components to maximize respective advantages, but excluding the passive co-presence of the both (Park, 2000).

Tuckman (2002) & Brunner (2007) found hybrid instruction combines the important features of traditional classroom instruction (classroom, instructor, and textbook) with those of computer-mediated instruction (learning by performing rather than listening, frequent assessment and feedback).

Heinze & Procter (2004) have developed the definition for blended learning: “Blended learning is learning that is facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning and is based on transparent communication amongst all parties involved with a course”.

Katela et al. (2005) has used the term hybrid instructions to join the best features of in-class teaching with the best features of online learning to promote active independent learning and to reduce class time.

Thus, Hybrid/blended instruction may be defined as the approach to teaching and learning that combines traditional face to face classroom methods with more modern computer mediated activities, may be in the form of online programs or bringing other technologies into a physical setting. This strategy creates a more integrated approach for teachers and learners resulting in a socially supported, constructive, learning experience.

In this study the term hybrid instruction has been used to denote fusion and integration of Computer Mediated Instructions (CMI) in traditional classroom environment, where the students will not be spoon fed rather they will explore the content themselves in cooperative settings with teacher intervention according to the need of the content and learner. In combination, the model is distinguished from either distance or traditional instruction, and can be employed in campus computer laboratories.
Hybrid instructions provide constructivist environment to the students by:

1. **Cognitively Engaging Learner**: Hybrid instructions cognitively engage learner to explore his or her environment for new information.

2. **Providing Authentic Problem Solving Context**: Hybrid instructions places learner in a context in which the environment itself provides a context in which the information to be learned or applied makes sense as a satisfaction of a reasonable learning goal.

3. **Human Interaction Social Component**: Hybrid instructions provide social environment, where actual interaction with other learners and with mentors in the actual context of learning is facilitated.

**Role of Teacher in Traditional Teaching and Newer Roles in Hybrid Instructions**

The use of Computer Mediated Instruction (CMI) in traditional face-to-face classroom has resulted in a shift from teacher centered to learner-centered classes. In this situation the responsibility for learning is shifted to the student and the teacher facilitates the learning by acting as a coach, resource guide and companion in learning.

*Cohen, Manion & Morrison (2004)* had discussed the changing roles of teacher from traditional teaching to newer roles with technology, as given below:

<table>
<thead>
<tr>
<th>Traditional roles</th>
<th>Newer roles in Hybrid Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher transmit knowledge to passive learners who obey and receive</td>
<td>Process based curricula with learners who question and analyse</td>
</tr>
<tr>
<td>Class room is teacher oriented</td>
<td>Class room is learner oriented</td>
</tr>
<tr>
<td>Teachers as task setters for individual learning</td>
<td>Teachers as managers of collaborative learning</td>
</tr>
<tr>
<td>Teachers as an organizer of learning activities</td>
<td>Teachers as an enabler of quality learning experiences</td>
</tr>
<tr>
<td>Teacher dictates the learning</td>
<td>Teacher creates structures for learning</td>
</tr>
<tr>
<td>Technology is used as a tutor</td>
<td>Technology is used to promote interaction</td>
</tr>
</tbody>
</table>
Traditional roles | Newer roles in Hybrid Instructions
---|---
Technology as a resource for enquiry | Technology to support creativity, active learning and high order thinking
Didactic teaching | Teachers as advisors, managers and facilitators of learning
Teachers as providers of knowledge and information and experts in all knowledge | Teachers as developers of skills
Teacher as a distant authority | Developed student-teacher relationships
Teacher controls the learning – its time, pace and contents | Teachers standing back to let learning happen and for children to solve problems
Prescriptions for what, when and how students will be taught | Responsiveness to students’ cognitive needs and development
Teacher in narrow and unchanging range of roles | Teacher in many roles as required: designer, director-actor, facilitator, manager

Thus, the infusion and integration of technology in the education process have presented new avenues by which teachers can enrich and enhance teaching and learning activities. Duhaney (2000) reported that this will not only result in the greater use of collaborative learning strategies but will also increase the use of strategies such as thematic teaching, guided inquiry apprenticeship, group problem solving, and critical thinking. These strategies will help to deepen and enhance interpersonal relations in the classroom. The level of interaction between and among teacher and students increases as they work collaboratively to accomplish various learning objectives. Classroom activities will then be less centered on the teacher and can be more focused on the learners.

**How to Integrate Technology with Traditional Teaching**

The educators need to apply technology carefully in ways that support, rather than undermine, the learning goals, theories, and philosophies that they cherish. Therefore, it is important for instructors to design strategies that guide learners in the discovery process. From a constructivist view, this can be done by placing learning theory in the forefront of educational practices. The design factors that
need to be considered when applying technology from a constructivist perspective are (Cain, 2005):

1. **Real-world problems must be a part of the instruction:** Learners must be presented with interesting, relevant, and meaningful problems to solve. This should be done by partially constructing the learning activity without overly defining it, to allow students to seek out a solution to the problem.

2. **Task must be presented in a meaningful way:** Presenting the task or activity to the student in a meaningful context is an important design consideration. The initial presentation of the problem must be appealing, interesting, and engaging (Ewing et al., 1999). While presenting complex problems, several tools like interactive multimedia, simulations, demonstrations, and hypermedia programs can be used to assist and help the learner better understand the problem in its complexity. This allows the learner to recognize the complex relationships that exist with a problem.

3. **Productive learning environments:** Productive learning environments require manipulation of space that allows learners to conduct research, experimentation, and pose hypotheses (Jonassen, 1999). Active engagement gives ownership of the problem to the learner. More complex problem solving techniques may require the learner to have access to resources so that he or she can make an informed decision. This permits the learner to be acquainted with multiple perspectives in the problem solving process, particularly if the learner has inadequate prior knowledge.

4. **Providing adequate resources:** When designing learning environments, educators must have an understanding for the resources and information learners need. Such knowledge will aid and direct learners to the appropriate resources to become sufficient problem solvers.

5. **Use of Collaborative/Cooperative Strategies:** The use of these strategies helps facilitate discussion and sharing of ideas among learners as they attempt to achieve a common goal. Students can learn through sharing and exchanging their thoughts and ideas. Successful student-to-student communication in the constructivist sense results in peers being identified as resources for one another rather than competitors (Ewing et al., 1999).
Advantages of Hybrid Instructions

Taking the advantages of the human and technology components, hybrid instruction have advantages to:

- Maximize the efficiency of the technology used, by providing guides and necessary feedback concerning the technology.
- Reduce the anxiety of students and teachers, on the use of technology by providing friendly learning environment for students.
- Help them building relationship and membership of learning community which full technology model students usually lacks most.
- Bring flexibility for students of different learning styles and time management.
- Provide wider range of resources as main or supporting material in various delivery modes.
- Faculty can teach using a variety of online and in-class teaching strategies, which make it possible to achieve course goals and objectives more effectively.
- Integration of out-of-class activities with in-class activities allows more effective use of traditional class time.
- Students are better able to master concepts and apply what they have learned compared to students in sections of their traditionally taught courses.
- Students may develop higher order skills of critical thinking, problem solving, and the ability to apply theoretical models to real world data.
- Online materials are available 24 hours a day, seven days a week, insuring that students always have access to assignments and other handouts.
- On-line testing can be used for student pre-tests and practice. On-line discussion between class sessions can identify areas of student difficulty that need to be addressed in class.

To sum up, the use of technology in classroom does not only encourage teachers and students to work collaboratively but also results in more cooperative learning activities among the students. By working cooperatively, students help each other to understand more about the technology and how to use it to accomplish set learning objectives, thereby, increasing the level of interaction between and among them. Under such conditions students experience a change from an individual task
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structure with frequent whole class instruction to a task structure in which they interact in small groups. This facilitates an atmosphere of cooperation rather than competition in the classroom.

1.2 COOPERATIVE LEARNING

Cooperative learning (CL) is one of the most recognized and distinguished types of instructional practice and intervention and has a rich history spanning many centuries. One of the earliest appearances of this intervention in American education was during the Common School management of early eighteenth century.

Cooperative learning is a generic term for various small group interactive instructional procedures where small groups of students work on a specified mission to trounce their collective weaknesses, build on their strengths and share their experiences with one another to gain knowledge. Students work in groups of four to six to earn group recognition, rewards and grades based on group performance.

Cooperative learning involves students working in groups on problems or projects so that it fosters positive interdependence, individual accountability, leadership, decision making, communication and conflict management skills (Johnson, Johnson & Smith, 1991).

According to Nakagawa (n.d.), Cooperative learning is a type of structured peer interaction emphasizing positive human relationships, collaboration between peers, active learning, academic achievement, equal participation and equal status of students in the classroom.

Lin (2006) defined Cooperative learning as an instructional method in which students work in small groups to accomplish a common learning goal under the guidance of a teacher. They begin to reflect on their own thinking and are more aware of their own decision making and problem-solving skills. In the end, students not only develop deeper thinking and listening skills but also become cohesive units working together to meet challenges.

Sharma & Sharma (2008) defined Cooperative Learning as an act of believing in and practicing face-to-face interactive learning so as to encourage creativity and foster critical thinking through processes.
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Thus, cooperative learning is a successful teaching strategy in which students of different levels of ability interacts in purposely structured groups to support the learning of one self and others by taking advantages of each other’s expertise to achieve a common goal. Each member of a team is responsible not only for learning what is taught but also for helping team mates learn, thus creating an atmosphere of achievement. Besides, this strategy also develops various life skills among the students through group processes.

Cooperative Learning v/s Traditional Learning

Cooperative learning is different from traditional learning groups in following ways:

<table>
<thead>
<tr>
<th>Traditional Learning Groups</th>
<th>Cooperative Learning Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher is primary resource</td>
<td>Students are the major resource</td>
</tr>
<tr>
<td>Teacher intervenes</td>
<td>Teacher interacts</td>
</tr>
<tr>
<td>Responsibility only for oneself</td>
<td>Responsibility for each other</td>
</tr>
<tr>
<td>No individual accountability</td>
<td>Individual accountability</td>
</tr>
<tr>
<td>One appointed leader</td>
<td>Shared leadership</td>
</tr>
<tr>
<td>No interdependence</td>
<td>Positive interdependence</td>
</tr>
<tr>
<td>Social skills assumed</td>
<td>Social skills taught &amp; reinforced</td>
</tr>
<tr>
<td>No group processing</td>
<td>Effective group processing</td>
</tr>
<tr>
<td>Top priority: get the job done</td>
<td>Top priority: get the job done, have fun, enjoy each other</td>
</tr>
</tbody>
</table>

Cooperative and Collaborative Learning

Cooperative and collaborative learning are so closely related that the two terms are often used interchangeably. Collaborative learning has British roots. It is a teaching methodology in which student’s team together to explore a significant question or a meaningful project. On the other hand Cooperative learning was first used in America and can be traced back to John Dewey’s philosophy of the social nature of learning. It is a specific kind of collaborative learning in which not only the group is assessed as a whole, but students are also individually accountable for their work. Despite of the differences, both use discovery approach in which students share and compare their findings within their group.
Types of Cooperative Learning

Cooperative Learning groups are of three types on the basis of time duration:

- **Formal Cooperative Learning**
  
  Formal Cooperative Learning consists of students working together, for one class period to several weeks, to achieve shared learning goals and complete jointly specific tasks and assignments.

- **Informal Cooperative Learning**
  
  Informal Cooperative Learning consists of students working together to achieve a joint learning goal in temporary, adhoc groups that last from a few minutes to one period.

- **Cooperative Base Groups**
  
  Cooperative base groups are long-term, heterogeneous cooperative learning groups with stable members for the duration of the class (a semester or year) or preferably for several years.

  These three types of Cooperative Learning may be used together. A typical class session may begin with a base group meeting, which is followed by a short lecture in which informal cooperative learning is used. The lecture is followed by a formal cooperative learning lesson. Near the end of the class session another short lecture may be delivered with the use of informal cooperative learning. The class ends with a base group meeting.

  On the basis of composition of groups, cooperative groups may be classified as:

- **Heterogeneous Groups:** These are formed by grouping students on variables like sex, ethnicity, social class, religion, personality, age, academic achievement, language proficiency and diligence.

- **Homogenous Groups:** These are formed by grouping the students of same level on various variables mentioned in heterogeneous grouping.
Phases of Cooperative Learning

In a cooperative atmosphere the role of the teacher is different. He/she does not act as a sole deliverer of knowledge, but a friend and a helper in time of needs. Cooperative learning is implemented in three phases:

- Pre Implementation Phase
- Implementation Phase
- Post Implementation Phase

1. Pre Implementation Phase

There are several tasks that teacher must accomplish before implementing cooperative learning in the classroom (Johnson et al., 1991). These are:

- Specify Instructional Objectives (academic and social) of CL: Teacher should specify the various instructional objectives that she wants to achieve by using cooperative learning.

- Determine Group Size and Assign Students to Groups: Group size can range from two to four students, depending on the CL task. These groups can be homogeneous or heterogeneous.

- Arrange room: Teacher should optimize the space in their classroom so that students/groups can interact and move about in the room easily. It is essential that a group's seats face one another.

- Plan instructional materials to promote interdependence: The instructional methods and materials that teacher chooses must allow each individual to contribute to the group's success in a unique and meaningful way.

- Assign group roles: The teacher should choose or assist the students in choosing roles that use their strengths and improve their areas of weakness. Teacher has to make sure that there is a distinct role for each student.

- Assign task: The cooperative learning group's task should be interesting, challenging, and motivating. It should also be a performance driven and authentic task. The teacher should clearly explain procedures for the task and set a specific time frame. Finally, the instructor should question the students to check for understanding of the task and its procedures.
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- **Explain Criteria for Success:** The teacher should communicate the group-work skills and assessment task that will be evaluated and how it will be evaluated.

- **Structure positive interdependence and accountability:** Teacher should also "test" groups and individuals by asking questions from both. A group should be asked to collectively explain its results and individuals should be able to defend their own position as well as in the groups as a whole.

- **Specify desired behaviors:** An essential part of cooperative learning's success is teaching students how to work in a group. To accomplish this, the teacher can conduct mini-lessons on ways to respect others (i.e. praise, taking turns, and shared decision making). Students also need to be trained in conflict-resolution.

2. Implementation Phase

During the implementation phase of Cooperative Learning, the students play the most important role. Some of their tasks at this stage include: Working together, listening to one another, questioning one another, keeping records of their work and progress, producing the assessment task (product), and assuming personal responsibility/ being involved in the group. *Johnson et al. (1991)* list several roles that teacher has during the implementation of cooperative learning.

- **Monitor behavior:** During the implementation of cooperative learning, teacher should move throughout the classroom, visiting each group.

- **Intervene if needed:** While circulating, if the teacher notices any group in conflict or off-task behavior, she should intervene. Small-group conflict should be resolved as soon as possible and students should be shown how to prevent problems in the future.

- **Assist with needs:** While monitoring the group work, the teacher should assist groups with their needs. This might involve pointing out additional resources and/or points-of-view, and it also includes helping the students reflect on the work they have completed and their progress.

- **Praise:** The teacher should praise individual students and groups when they do something right or well so as to boost their morale.
3. Post Implementation Phase

Johnson et al. (1991) give three jobs for the teacher to complete after the students have worked together to complete and submit the task.

- **Provide closure through summarization:** At this point, the teacher should ask questions from the group to check their level of understanding. Finally, teacher should summarize the important points of the lesson/unit.

- **Evaluate students' learning:** The teacher must evaluate the individual and group performance and then provide feedback to the students about their product and their group performance to help students to improve their cooperative learning skills.

- **Reflect on what happened:** Teacher should keep a record of what worked and why it worked in cooperative learning and adjust their lessons based on the reflection and feedback of the students.

After completing the group work and assessment task, the students’ job is to reflect on the work that was accomplished in their group. The students should give feedback to their teacher about what worked and what did not work well or what was good about this unit. In order to incorporate cooperative learning in teaching-learning process teacher has to act smartly while making groups and using variety of strategies and techniques.

**Cooperative Learning Strategies**

Various strategies exist for cooperative learning and can be used at whenever the instructor see fit for their use. Listed below with a brief description are the strategies that have been used in present study:

- **Think Pair Share**

  It is a method that allows students to engage in individual and small-group thinking before they are asked to answer questions in front of the whole class. There are four steps to this method:

  Step 1: Groups of four students listen to a question posed by the teacher.

  Step 2: Individual students are given time to think and then write their responses.

  Step 3: Pairs of students read and discuss their responses.
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Step 4: A few students are called on by the teacher to share their thoughts and ideas with the whole class.

This method can be very useful and work well in the science classroom due to the continual request of science teachers having students formulating hypotheses about the outcome of an experiment before it is done.

- **Round Table or Rally Table**

  This is simple cooperative learning structures that cover much content, builds team spirit and incorporates writing. This type of cooperative learning can easily be used in the science classroom. The round table strategy has three steps to it:

  Step 1: The teacher poses a question that has multiple answers.
  
  Step 2: The first student in each group writes one response on a paper and passes the paper counterclockwise to the next student.
  
  Step 3: Teams with the maximum number of correct responses gain recognition.

- **Numbered Head Together**

  This strategy promotes discussion and both individual and group accountability. This strategy is beneficial for reviewing and integrating subject matter. It involves:

  Step 1: Divide the students into groups and give each member of a group a numbers i.e. 1, 2, 3, 4……...
  
  Step 2: Teacher poses a question or a problem to the class.
  
  Step 3: Students "put their heads together" to figure out the answer so that everyone in their group understands and can give an answer.
  
  Step 4: Teacher ask the question and calls out any number randomly (e.g. three) and each three of different group is asked to give the answer.
  
  Step 5: The students with that number raise their hands, and when called on, the student answers for his or her team.

  By having students work together in a group, this strategy ensures that each member knows the answer to problems or questions asked by the teacher. Because, no one knows which number will be called, all team members must be prepared.
• **STAD (Student Teams Achievement Divisions)**

  It is used in grades 2-12. Students with varying academic abilities are assigned to 4 or 5 member teams.

  Step 1: Students in their respective groups will revise what they have studied initially and to help each student, reach his or her highest level of achievement.

  Step 2: Students will be then tested individually.

  Step 3: Teacher will ask the students to cross check their team members’ responses. Teams with highest scores (by adding the marks of individual students) will earn recognition.

• **Three Minute Review**

  It is used when the teachers stop any time during a lecture or discussion to review what has been said with their group. This involves following steps:

  Step 1: Teacher allows the teams to review for three minutes what they have studied within their group.

  Step 2: Students in their groups can ask a clarifying question to the other members or answer questions of others.

  Step 3: Finally, they will clarify their doubts with discussion with the teacher.

• **Cooperative Quiz**

  It involves a combination of individual and group questions. It involves following steps and rules:

  Step 1: Individual questions are administered first and require one student to answer one question without the help of the other group members.

  Step 2: Group questions require the entire group to agree on one answer for a specific question.

**Rules for the quiz:**

- 1 mark for each correct answer and 0.5 marks are bonus for each passed question.
- There are five possible points:
  
  - 8 to 10 out of 10 correct = 5 points
  - 6 to 7 out of 10 correct = 4 points
4 to 5 out of 10 correct = 3 points
2 to 3 out of 10 correct = 2 points

Step 3: Every member of the group receives the same score.

Teacher can use a wide variety of cooperative learning strategies according to the requirement of the content so as to make his cooperative learning class more interesting and effective.

**Computer Supportive Cooperative Learning (CSCL)**

Technology can be integrated in the cooperative learning environment and can be helpful in achieving a common goal of group learners (Steelman, 2005). Cooperative learning with computer mediated learning tools makes the group learning more efficient and enjoyable. Computers can transmit large amounts of information to students in a variety of interesting, multi-media ways. Thus, the burden on teachers to lecture is reduced. Instead, more time can be devoted to teachers facilitating CL activities in which students use and explore information. All the principles, strategies apply equally well with computer supported cooperative learning.

According to Higgins (1991), CSCL (computer supportive cooperative learning) involves cooperative learning that includes both: groupings of learners around computers, as in conventional classroom arrangements and groupings of learners via computer networks.

Collaboration can take place at four points in computer use (a) before working at the computer (b) while using the computer (c) during a pause in computer use and (d) after using the computer.

When students pair up or work in small groups with the computer, they learn much more than the subject matter. They learn to work collaboratively, a skill that today's employers are looking for (Mandell, Sorge & Russe 2002).

**The Cooperative Learning Wheel**

The Cooperative Learning Wheel, formulated by Miller (2008), is a visual representation of the key concepts for designing and implementing Co-operative Learning successfully. The various rings and segments of the wheel show the interrelationships between the theory, principles and practices of CL (Figure 1.1).
Co-operative Learning Wheel

Figure 1.1: The Cooperative Wheel

**The First Ring of the CL Wheel: Pre-requisites for high performance CL groups**

The CL teacher creates the conditions in the classroom that will positively influence student motivation to work together in a learning community. The pre-requisites for high performance groups are indicated in the first ring of the CL Wheel:

- Process Management
- Will to Co-operate
- Will to Learn
- Skill to Co-operate and
- Skill to Learn
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❖ The Second Ring of the CL Wheel: Elements of Co-operative Learning

Co-operative Learning is different from traditional group work because it clearly structures for five principles or elements. These principles ensure equal and active participation and continuous improvement in learning and communication processes.

- **Group Processing:** Group processing occurs when we ask a group of students to reflect together to determine what is helping them learn together as well as what is hindering them from achieving the assessment criteria. To empower students to take responsibility, opportunities must be provided that allows students to observe the learning and communication process and to give each other constructive feedback so that students can take the responsibility of their own and team mates learning.

- **Individual and Group Accountability:** The group work task must be designed so that the whole group can take responsibility for all its members achieving their goals. If students feel individually accountable, they are more likely to learn, rather than letting others do the work and the learning for them. The accountability principle requires each member to publicly demonstrate that she/he has contributed to the learning goals by:
  - **Listening** the group discussion
  - **Participating** and contributing to group product
  - **Achieving the** specified learning outcomes.

- **Positive Interdependence:** Students perceive that they need each other in order to complete the group's task ("sink or swim together"). Teachers may structure positive interdependence by establishing mutual goals (learn and make sure all other group members learn), joint rewards (if all group members achieve above the criteria, each will receive bonus points), shared resources (one paper for each group or each member receives part of the required information), and assigned roles.

- **Promotive Interaction:** This principle aims to help students bring out the best in each other. Students must enable each other's success by sharing resources and helping, supporting, encouraging and acknowledging each other's efforts to learn.
• **Social and Leadership Skills:** According to this principle social skills can be taught to the students by assigning **Social Roles** that relate to achieving the task while working in groups. This includes (i) Leadership (ii) Decision Making (iii) Trust-building (iv) Communication and (v) Conflict management skills.

❖ **The Third Ring of the CL Wheel: Elements of Task Design for the CL Principles**

The third ring on the CL Wheel identifies how teachers can design the group work task for each principle. It has been described in the second ring of the wheel.

❖ **The Fourth Ring of the CL Wheel: Elements of Lesson Design**

The Fourth ring focuses on the desired impact that educator would like the group work task to have on the students and classroom learning community. Knowing the purpose for assigning group work, teachers are able to make decisions about what to ask students to think about and do while in their Co-operative Learning Groups. These are:

- Class building
- Practice of social skills
- Share responsibility
- Mastery
- Team building
- Conceptual development
- Motivation of social skill acquisition
- Acknowledge and affirm their peers

❖ **The Fifth Ring of the CL Wheel Learning: Outcomes of Cooperative Learning:**

The outer (fifth) ring of the Co-operative Learning Wheel shows the kinds of learning outcomes that can be achieved by the Co-operative Learning approach. These are given below:

- **Academic Gain:** This is one of many critical learning outcomes of the Co-operative Learning approach. These goals are retention, mastery of the content, in-depth understanding, and active use of knowledge.

- **Effective Communicators:** The Co-operative Learning enables students to develop confidence and improve their communication skills, ranging from
active listening, encouraging equal participation, giving the group direction, summarising ideas and keeping members on task.

- **Skilful Leaders**: The CL approach promotes a style of shared leadership where people construct meaning and knowledge together and strive toward common goals and mutual success.
- **Group Synergy**: CL provides opportunities for class building and team building to help students build their relationships and thus, develop this positive energy flow of group synergy.
- **Pro-active Lifelong Learners**: The CL classroom seeks to equip students with knowledge and competencies they need in order to be self-directed, reflective and inquisitive learners for life. This occurs, when students practice pro-active roles during their classroom learning experiences.

The Co-operative Learning Wheel synthesises the theory, principles and practices for designing and implementing successful group work. Developing an optimal learning environment and using CL as an important teaching tool to achieve many critical outcomes at once.

**Importance of Cooperative Learning**

Cooperative learning is indicated whenever learning goals are highly important, mastery and retention are important, when task is complex or conceptual, problem solving is desired, divergent thinking or creativity is desired, quality of performance is expected, and higher-level reasoning strategies and critical thinking are needed *(Johnson & Johnson, 1994)*. Cooperative learning techniques have numerous benefits for both the teacher and the learner.

**Benefits to learner**

Various researches have shown that Cooperative Learning helps to produce:

- higher achievement
- increased retention
- greater social support
- better attitudes toward teachers
- greater intrinsic motivation
- higher self-esteem
- more on-task behavior
- better attitudes toward school
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• Improves interpersonal and communication skills
• Promotes critical thinking, reasoning and problem solving skills
• Understanding of course material
• Improves higher-level thinking skills
• Improves self-confidence
• Presents alternative perspective and viewpoints
• Enhances decision making and problem solving skills
• Reduces misbehavior in classrooms

Benefits to the Teacher

Besides the above mentioned benefits of cooperative learning to the learner, teachers are also benefited by this technique. Hamm and Adams (1992) noted that teachers using cooperative leaning are more beneficial than their counteractive parts as follow:

• Teachers became more cooperative in their professional interactions.
• Teachers feel that their time is spent more effectively.
• Enables the teacher to make good contact with five, six or seven groups instead of 25 to 35 individuals each day.
• Teacher interact in a more personal manner with students
• Teachers adopt a fresh, new attitude toward their jobs.
• Some teachers who experiment with cooperative learning techniques are surprised at how well their students perform in cooperative group settings.
• Teacher begins to feel that teaching and classroom management become easier.
• There is less paperwork for the teacher. Evaluating six or eight group papers is less work for the teacher than 24 or 32 individual ones.

As a result of employing cooperative learning techniques, the teacher might feel less stressed. Although the teacher is still responsible for the learning in the
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- **Case Study /Discussion Method:** In this method the teacher presents a case (or story) to the class without a conclusion. Using prepared questions, the teacher then leads students through a discussion, allowing students to construct a conclusion for the case.

- **Ambiguity:** In this technique teacher don't give clear cut material to the students rather give them conflicting information that they must think their way through.

Researches has found that the more often a student is exposed to critical thinking, the greater the probability that the student will transfer critical thinking to other areas of his or her life. Designing critical thinking into academic lessons not only helps students transfer critical thinking skills to other areas of their lives, it improves the effectiveness of the lessons. Critical thinking requires deeper analysis of the lesson. Deeper analysis produces deeper understanding of the subject matter or task at hand, resulting in better grades and higher test scores. Critical thinking empowers students to be independent, innovative and helps them succeed in school and in future life.

1.3.3 **SKILL OF CREATIVE THINKING**

Creativity is defined as “the ability to make or bring into existence something new. It may be a new solution to a problem, a new method or device or a new artistic object or form”.

Creative thinking is a process of generating ideas, processes, experiences or objects The word *creativity* comes from the Latin term ‘creō’, which means “to create” or “to make”. Dictionaries define “creativity” with words like “originality, expressiveness and imagination.”
It is a multi-dimensional attribute differentially distributed among the people. It is often equated with divergent thinking (Passi, Passi & Mishra, 2004).

Nickerson (1999) and Weisberg (2006) added a new viewpoint to the definition of creativity. Creativity can be understood to mean original or novel for the individual involved, such that an entity would be considered creative if it is novel for the one who produces it, irrespective of how many others may have come up with it earlier.

According to Northcott, Miliszewska & Dakich (2007), Creativity can be defined as a combination of thinking and innovation that is, a notion of different intelligences working together. This is accomplished by using a combination of ‘seeing, thinking and innovating’.

Thus, creativity can be defined as a “mental activity” which involves the process of developing or generating novel, unique and useful ideas by using thinking, characterized by a high degree of innovation and originality, divergent thinking and risk taking, in a situation where there is no prior correct solution or answer.

**Principles Underlying Creativity**

Lau and Chan (2004) advocated three basic principles of creativity. These are:

(a) **New ideas are composed of old elements**

Creativity is mainly about alternative possibilities - how to come up with new and useful ideas. New ideas are actually old ones rearranged in a new way. Ideas are usually composed of different elements and we look for new combination of ideas by joining different ideas together, deleting some elements, or replacing some elements by other ones. The first principle also has a practical implication - the ingredients for creativity depend on the store of ideas that are available for recombination. If you have a limited domain of knowledge, you will have fewer resources to draw from in forming new ideas.

(b) **Not all new ideas are on a par**

Creativity is not simply a matter of coming up with new ideas. The kind of creativity that is valued is the ability to come up with new and useful ideas, ideas that serve an important need or creates a new trend that makes an impact.
(c) Creativity is enhanced by the ability to detect connections between ideas

Our store of ideas provides the ingredients to generate new ones, but one must be ready to explore connections between different areas. Useful ideas might come from unexpected sources. This involves seeing a connection between the subject matter one is interested in and other subjects which might seem somewhat remote.

Thus creativity is the juxtaposition of ideas which were previously thought to be unrelated. It is one’s ability to combine ideas in a unique way or to make useful associations among ideas.

Dimensions of Creativity

Guilford has given following dimensions of creativity:

- **Fluency**: It refers to number of ideas that a person is able to come up with in order to solve a given problem. The more ideas a person can generate, the more ideationally fluent he/she is.

- **Flexibility**: It takes into account the range of themes or categories encompassed by the ideas generated. The greater the range of themes or categories covered, the higher the flexibility demonstrated.

- **Originality**: it emphasizes the ability to come up with unusual, unique, novel and innovative ideas as potential solutions to a given problem.

- **Elaboration**: It comprises the ability to add detail and depth to complete an idea so that it can fit into reality and has also been recognized as a significant creative ability.

Types of Creativity

Creativity might be divided into **artistic** and **cognitive** creativity.

- **Artistic creativity** consists in the creation of artwork and expressing one's ideas and emotions through various forms of art.

- **Cognitive creativity** is a matter of coming up with solutions to practical or theoretical problems. This includes creating a new scientific theory or launching a new commercial product.
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Stages of Creativity
The first well-known attempt to conceptualize the creative process was by Wallas in 1926 in his book the Art of Thought. His four stage model consists of:

(1) **Preparation:** In this stage, preparatory work on a problem that focuses the individual's mind on the problem and explores the problem's dimensions is carried out as long as possible.

(2) **Incubation:** In the second stage, the problem is internalized into the unconscious mind and nothing appears externally to be happening.

(3) **Illumination or Insight:** In this stage, the creative idea suddenly bursts forth from its preconscious processing into conscious awareness.

(4) **Verification:** This is the final stage where the idea is consciously verified, elaborated and then applied.

The implied theory behind Wallas' model that creative thinking is a subconscious process that cannot be directed and that creative and analytical thinking are complementary is reflected to varying degrees in other models of creativity.

Abilities Involved in Creative Work
Creative work requires applying and balancing three abilities that can all be developed (Sternberg and Williams, 1996). These are discussed below:

- **Synthetic ability** is what we typically think of as creativity. It is the ability to generate novel and interesting ideas. Often the person we call creative is a particularly good synthetic thinker who makes connections between things that other people don't recognize spontaneously.

- **Analytic ability** is typically considered to be critical thinking ability. A person with this skill analyzes and evaluates ideas. Everyone, even the most creative person we know, has better and worse ideas. Without well-developed analytic ability, the creative thinker is as likely to pursue bad ideas as to pursue good ones. The creative individual uses analytic ability to work out the implications of a creative idea and to test it.
- **Practical ability** is the ability to translate theory into practice and abstract ideas into practical accomplishments. The creative person uses practical ability to convince other people that an idea is worthy.

**Creativity as a Cognitive Activity**

Creativity is a cognate activity that engages a range of mental abilities and processes, such as remembering, imagination, planning, anticipating, judging, organizing, storing, deciding, determining, perceiving, comprehending, learning, recognizing and interpreting (Martinse and Kaufmann, 1999; Weisberg, 2006).

(D’cruz, 2008) emphasized that creativity emerges from two mental processes:

- **Problem redefinition**
- **Ideation**

**Problem Redefinition** provides the opportunity to look at a situation from diverse perspectives that are not immediately available to us.

**Ideation** involves the generation of alternatives, triggered via the use of the imagination, associational thinking and other generative processes such as conceptual combination, analogical transfer and so on.

Both problem redefinition and ideation are aligned with divergent thinking and results in creative outcomes which could be manifested as products, processes or thoughts. The quality of output can be judged from the perspective of Guilford’s principles of fluency, flexibility originality and elaboration. These processes, correspond with the preparatory phase of Wallas’s stage model. They are followed by evaluation which ensures the usefulness of the ideas.

The initial ideas generated during this time could be wild/remote and impractical/unfeasible. They need to be followed up with the verification stage, characterized by convergent thinking in which alternatives are evaluated and appropriately developed to meet the demands of the problem situation.

D’cruz (2008) highlighted that both problem redefinition and ideation abilities can be developed, enhanced, and internalized through training and practice with creativity techniques such as brain storming, morphological analysis, lateral thinking and synectics, and their variants.
Development and Manifestation of Creativity

Guilford stated that while each of us has the ability to be creative, the manifestation of creative ability is contingent on many variables. D’cruz (2008) has classified them broadly into two perspectives:

❖ The Facilitator Approach
❖ The Inhibitory Approach

❖ The Facilitator Approach

According to this approach creativity arises as a consequence of facilitating factors. The facilitating factors can be divided into two tiers comprising:

➢ Primary level factors (Tier 1):
➢ Secondary level factors (Tier 2):

➢ Primary level factors (Tier 1): Primary level factors together are critical for creative thinking, in their absence, creative thinking is not possible. Primary factors subsume secondary level factors whose contribution is indirect. It includes motivation, efforts and self-efficacy.

• Motivation: Motivation is of primary significance in the development of creativity. The individual should desire to become creative. Intrinsic motivation is more effective determinant of creativity than is external or extrinsic motivation. External motivators can be used as a means of reinforcing internal motivation.

• Effort: Hard work and efforts are indispensable for creativity. Research has established that even sudden bursts of inspiration which seems to appear without effort emerge only after significant periods of hard work. Effort involves a command over the area/domain in which one is seeking to be creative.

• Self-efficacy: For creativity, motivation should be coupled with self-efficacy. That is, the belief that one can be creative. One’s belief in his/her ability to be creative forms the psychological foundations of a creative achievement (Plucker and Runco, 1999).

➢ Secondary level factors (Tier 2): Secondary level factors are necessary conditions for creative thinking, but their presence is insufficient and therefore
ineffective, without primary factors. It includes personality, environment and training (Figure 1.3).

![Two-tier model of factors facilitating Creative Thinking](image)

**Figure 1.3: Two-tier model of factors facilitating Creative Thinking**

- **Personality:** Personality of an individual plays a significant role in creativity. **Davis (1999)** has identified 15 categories of positive, desirable traits that promote creative thinking and distinguish more creative person from those who are less creative. These include:
  - Reflective and introspective orientation
  - Risk-taking ability and resourcefulness
  - Intrinsic motivation and energy
  - Attraction to complexity and ambiguity
  - Open-mindedness and flexibility
  - Artistic and sensitive nature
  - Intuition and perception
  - Awareness and appreciation of creativity
  - Originality
  - Independence and confidence
  - Capacity for fantasy
  - Curiosity
  - Sense of humor
  - Emotionality
  - Ethics

- **Environment:** For enhancing creativity, creativogenic and stimulating environment which promotes curiosity, exploration, challenges, new experiences, complexity, coupled with constructive and well-timed feedback and criticism,
appropriate reinforcement, tolerance for experimentation and risk taking, and learning from blocks and failures, is ideal (Plucker and Runco, 1999).

- **Training in Creative Thinking skills**: Researchers have supported the belief that training and practice rekindle, develop and maintain creative thinking (Cropley, 1999; Plucker and Runco, 1999). Both problem redefinition and ideation abilities can be developed, enhanced, and internalized through training and practice with creativity techniques such as brainstorming, morphological analysis, lateral thinking and synectics, and their variants (D'cruz, 2008).

- **The Inhibitory Approach**

  The inhibitory approach assumes that there are various blocks that inhibit the development and manifestation of creativity. These blocks include various cultural blocks, cognitive blocks, emotional blocks and resource blocks.

  - **Cultural Blocks**: These are blocks that we impose on ourselves due to the society, culture or group to which we belong. Cultural blocks can be summarized in two words: conformity pressures.

  - **Cognitive Blocks**: Mindsets/schema promote rigidity and distortions since information processing/thinking/problem solving are performed within their limits and boundaries. As a result they hinder the cognitive transformation that is needed for creativity (Baron and Byrne, 2004). Creativity training is directed to overcome these blocks that emerge from mindsets/schema (Davis, 1999).

  - **Emotional Blocks**: These include blocks like fear of taking a risk, fear of rejection, dislike for uncertainty, judgmental attitude, lack of challenge, inability to incubate, anxiety, insecurity, etc. They interfere with the ability to conceptualize fluently and flexibly. They prevent the individual from communicating their ideas to others.

  - **Resource Blocks**: The most common resource blocks to creativity include shortages of material and financial resources and time (Davis, 1999).
Ways to Develop Creative Thinking Skills

There are different techniques to nurture and promote creativity but it is not possible to mention all of them. Only few are discussed here:

- **Building Conducive Classroom Climate**
  
  For enhancing creativity positive classroom environment which promotes curiosity, exploration, challenges, new experiences, complexity, coupled with constructive and well-timed feedback and criticism, appropriate reinforcement, tolerance for experimentation and risk taking and learning from blocks and failures, is ideal (Plucker and Runco, 1999).

- **Suspended Judgment**
  
  Suspended judgment helps the students not to kill the ideas too soon. Many ideas do not make sense when listening first time. The students must be taught to restrain their negative remarks so that new ideas can breed. Edward de bono devised a technique known as PIN (Positive, Interesting and Negative). In this technique while making comments on any idea, one must first say positive about it, then something interesting and finally one can speak negatively. Such check on unwanted comments, in fact, can boost idea production (Joseph, 2006).

- **What If? Exercises**
  
  This exercise encourages the student to examine the alternative possibilities where the conventional vision tells they don’t work. This helps in developing the ability to imagine and to associate.

- **The game of Hypothesizing**
  
  This game helps in developing association skills and in bringing practical solution to problems. To play this game, teacher will ask a question beginning with “why”…? And students would come out with as many guesses or hypotheses as they can, to answer the question.

- **Brainstorming**
  
  Brainstorming is a useful tool to develop creative solutions to a problem. It is a lateral thinking process by which students are asked to develop ideas or thoughts that may seem crazy or shocking at first. Participants can then change and improve them into original and useful ideas.
• **Negative or Reverse Brainstorming**
  It uses both brainstorming and reversal techniques. It involves analyzing a short list of existing ideas, rather than the initial massing of ideas as in conventional brainstorming. In this after clearly defining a problem or challenge, questions are raised: "What could go wrong with this project?", "How could I possibly cause the problem?" or "How could I possibly achieve the opposite effect?" Then ideas are allowed to flow freely without rejecting any as one do in brainstorming. Evaluating these negative ideas can lead to possible positive solutions. It is valuable (CLET, 2011).

• **Concept Mapping**
  Concept maps represent knowledge in graphic form. Networks consist of nods (which represent concepts) and links (which represent relationships between concepts). Concept maps can aid in generating ideas, designing complex structures or communicating complex ideas (CLET, 2011).

• **Role Playing**
  In role playing exercises, each student takes the role of a person affected by an issue and studies an issue or events from the perspective of that person. Role play should give the students an opportunity to practice what they have learned and should interest the students. Provide concrete information and clear role descriptions so that students can play their roles with confidence. Once the role play is finished, some time is spent on debriefing (CLET, 2011).

• **DO IT**
  DO IT stands for Define problems, be Open to many possible solutions, Identify the best solution and then Transform it into effective action. DO IT accelerates and strengthens one's natural creative problem solving ability and to stimulate a large number of good, diverse ideas. When time allows, students can take advantage of incubation (unconscious thinking) and research processes.
several possible alternatives. Learning of one thinking skill will automatically lead to enhancement of other.

**Cooperative Learning and Thinking Skills**

Cooperative Learning tasks provide an ideal social environment in which we can incorporate training of Thinking Skills. By using this technique teachers can help students analyze their thinking processes and encourage all students to interact with their teachers and peers. The use of Cooperative Learning provides all students with opportunities to recognize diversity in the views of their classmates while being held accountable, on an individual basis, for their own learning. The sharing of ideas allows students to explore, refine, and question new ideas. *Johnson et al. (1991)* noted that Cooperative Learning "resulted in more high-level reasoning, more frequent generation of new ideas and solutions (i.e., process gain), and greater transfer of what is learned within one situation to another (i.e., group to individual transfer) than did competitive or individualistic learning". Further, it promotes Creative Thinking by increasing the number of ideas, quality of ideas, feelings of stimulation and enjoyment, and originality of expression in Creative Problem Solving (*Johnson & Johnson, 1994*). According to *Lee (1997)* four key thinking strategies that can be enhanced through it are: Problem Solving, Decision Making, Critical Thinking, and Creative Thinking.

The ability to learn is the most important skill one can acquire. When confronted with new experience or learning situation in life, in careers or in job, one has to shift from listening to creating an idea to make decisions. Better learning performance and life situation can be achieved through improving the match between learning approach and life situation. Key elements of quality learning relate to the students’ perception of quality teaching that in turns influence their approach to study and ultimately learning outcomes.
1.4 LEARNING APPROACHES

The concept that students learn in different ways is not new. Academician know that certain students they teach will have a seemingly insatiable desire to learn and understand what they are learning, while others will do the bare minimum required to pass the course being taught (Biggs, 1999). Approaches to learning describe what students do when they go about learning and why they do it i.e. it describes as the relationship between the student and a learning task.

Morgan (1997) defines student approach to learning as what student do while studying course materials. The approach to learning the students undertake can have an influence on outcome of a course. This process is not static but is dynamic and changes as the situation changes.

The important researches on approaches to learning are of Marton & Sajlo (1976); Biggs (1987) and Entwistle (1991).

Historical Perspective

❖ Marton and Sajlo’s Mehtodology

The original work on approaches to learning was carried out by Marton and Saljo (1976). Their study explored student’s approaches to learning a particular task. In their studies students read a 1,500 word article and were asked about what they remembered, how they felt about the task and how they approached the task. Analysis of the interviews showed that students could be divided into two groups:

The first group adopted an approach where they tried to understand the whole picture and tried to comprehend and understand the academic work. They termed this as the ‘deep approach’.

The second group who tried to remember facts contained within the text, identifying and focusing on what they thought they would be asked later were termed as those adopting ‘surface approach’. This is related with rote learning or superficial learning.
Students who approached the task using a deep approach understood more of the article, were better able to answer a range of questions about it, and were also able to remember its message more effectively.

Pask (1976) referred to the two different learning strategies that he had found as "serialists" and "holists". *Serialists* look at the detail and steps in the argument and appear to be a sophisticated surface approach. *Holists* have a broad focus and see the task in context, using analogies and illustrations.

In separate studies of deep and surface approaches, leading researchers Biggs (1987) and Entwistle (1992) independently identified an evidently strategic approach and noted that it is used in conjunction with a deep or surface approach to learning.

❖ Biggs’s Methodology

Biggs undertook work on approaches to learning from different perspective, by designing a questionnaire to measure approaches to learning. Biggs (1987) defines approaches to learning as “a composite of a motive and an appropriate strategy”. The motive and corresponding strategies combine to create one of three approaches to learning.

➢ Motives are the reasons or motivations a student had for undertaking a study.

Biggs proposes three motives that a student may choose: deep, surface, and achieving. Each learning motive can be expressed through a corresponding learning strategy.

➢ Strategies are the methods employed by the students to obtain their goals or fulfill their motivation for studying.

The three approaches, their motives and strategies employed are discussed below:

• Surface Motive

A student who has surface motive wants to meet the minimum requirements of the course, and has no interest in the subject matter would employ surface strategies: read minimally and limit to the information required to simply pass the subject. A surface approach is mainly associated with extrinsic motivation and is related with fear of failure or test anxiety.
Table 1.3: Biggs’ Approaches to learning

<table>
<thead>
<tr>
<th>Approach</th>
<th>Motive</th>
<th>Strategy</th>
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<tr>
<td>SA: Surface</td>
<td>Surface motive (SM) is instrumental: main purpose is to gain a qualification with pass only aspirations, and a corresponding fear of failure.</td>
<td>Surface strategy (SS) is reproductive: limit target to bare essentials and reproduce through rote learning.</td>
</tr>
<tr>
<td>DA: Deep</td>
<td>Deep motive (DM) is intrinsic: study to actualize interest and competence in particular academic subjects.</td>
<td>Deep strategy (DS) is meaningful: read widely, inter-relate with previous relevant knowledge.</td>
</tr>
<tr>
<td>AA: Achieving</td>
<td>Achieving motive (AM) is based on competition and ego enhancement: obtain highest grades, whether or not material is interesting.</td>
<td>Achieving strategy (AS) is based on organising: follow up all suggested readings, schedule time, behave as 'model student'.</td>
</tr>
</tbody>
</table>

- **Deep motive**
  
  A student who is deeply motivated studies because of intrinsic motivation as they are interested in the subject area. They would read widely and integrate new information with previous knowledge.

- **Achieving Motive**
  
  Students with an achieving motive are stimulated by grades rather than interest. They would be strategic about what they read, and organize their time to maximize their grades.
Entwistle: Four Constructs of Learning

Entwistle (1991) using similar approach to Biggs found four constructs related to approaches to learning, namely meaning (deep), reproducing (surface), achieving, and non-academic. The definitions of these are same as given by Biggs.

Classification of Learning Approaches

There are three common approaches to learning, which students follow while studying course materials:

Deep Approach

Deep learning involves the critical analysis of new ideas, linking them to already known concepts and principles, and leads to understanding and long-term retention of concepts so that they can be used for problem solving in unfamiliar contexts. Deep learning promotes understanding and application for life.

Surface Approach

Surface learning is the tacit acceptance of information and memorization as isolated and unlinked facts. It leads to superficial retention of material for examinations and does not promote understanding or long-term retention of knowledge and information.

Achieving/Strategic Approach

Strategy Approach is the strategy in which learners adapt their learning style in order to fit with the needs of the task. The strategic approach derives from an intention to obtain the highest possible grades and involves adopting well-organized and efficient study methods.

The main features of the deep, surface and achieving approaches are summarized in Table 1.4.
Table 1.4: Features of Different Approaches to Learning

<table>
<thead>
<tr>
<th>Deep Approach</th>
<th>Knowledge Transforming &amp; Seeking Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>An intention to understand material for oneself by:</td>
<td></td>
</tr>
<tr>
<td>• Relating ideas to previous knowledge and experience</td>
<td></td>
</tr>
<tr>
<td>• Looking for patterns and underlying principles</td>
<td></td>
</tr>
<tr>
<td>• Vigorous and critical interaction with knowledge content</td>
<td></td>
</tr>
<tr>
<td>• Discovering and using organizing principles to integrate ideas</td>
<td></td>
</tr>
<tr>
<td>• Relating evidence to conclusions</td>
<td></td>
</tr>
<tr>
<td>• Examining logic and argument cautiously and critically.</td>
<td></td>
</tr>
<tr>
<td>An intention simply to reproduce parts of the content by:</td>
<td></td>
</tr>
<tr>
<td>• Accepting ideas and information passively</td>
<td></td>
</tr>
<tr>
<td>• Treating the unit as unrelated bits of knowledge</td>
<td></td>
</tr>
<tr>
<td>• Concentrating only on what is required for assessment</td>
<td></td>
</tr>
<tr>
<td>• Studying without reflecting on purpose or strategies</td>
<td></td>
</tr>
<tr>
<td>• Memorising facts and procedures routinely</td>
<td></td>
</tr>
<tr>
<td>• Failing to distinguish guiding principles or patterns</td>
<td></td>
</tr>
<tr>
<td>• Feeling undue pressure and worry about work</td>
<td></td>
</tr>
<tr>
<td>Intention to achieve highest possible grades by:</td>
<td></td>
</tr>
<tr>
<td>• Managing time and effort effectively</td>
<td></td>
</tr>
<tr>
<td>• Finding conditions and materials for studying appropriately</td>
<td></td>
</tr>
<tr>
<td>• Putting consistent effort effectively</td>
<td></td>
</tr>
<tr>
<td>• Being alert to assessment requirements and criteria</td>
<td></td>
</tr>
<tr>
<td>• Using previous exam papers to predict questions</td>
<td></td>
</tr>
<tr>
<td>• Be alert to cues about making schemes</td>
<td></td>
</tr>
<tr>
<td>• Gearing work to the perceived preferences of lectures</td>
<td></td>
</tr>
</tbody>
</table>

The 3p Model of Learning

The 3P model (Biggs, 1989) provides a useful context for understanding the importance of approaches to learning. This model describes three points in time at which learning related factors are placed:

- Presage, before learning takes place
- Process, during learning
- Product, the outcome of learning
❖ **Presage**: Presage factors are of two kinds:

- **Student Based**: Students bring into the learning system some predispositions that are learning-related, such as prior knowledge, abilities, values and expectations, ways of learning. These learning-related characteristics are referred to as the student presage factors that have a direct impact on the ways students choose to process academic tasks.

- **The Teaching Context Based**: It is the environment set by the teacher and the institution, through the course structure, curriculum content, methods of teaching and assessment. Students perceive and interpret the teaching context and adopt a study approach that they think will help them to meet the demands of the teachers and the courses.

These factors interact at the process level to determine the student’s immediate learning related activities, as approaches to learning. Hence, an approach to learning is not simply a fixed attribute of the learner, but a function of both learner characteristics and the teaching factors.

**The 3-P Model of Learning** (Biggs, 1989)

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**Figure 1.6: 3P Model of Learning** (Biggs, 1989)
• **Process:** The approach, which students use to process academic tasks, is referred to as the Process phase. The student and teaching contexts when combined will produce a particular approach to learning which is broadly conceptualized as either ‘deep’ or ‘surface’.

• **Deep Approach** is indicated by an intention to understand the material to be learnt, using strategies such as reading widely, combining a variety of resources, discussion, reflection, relating parts to a whole, and applying knowledge in real world situations.

• **Surface Approach** is indicated by an intention to reproduce the material to be learnt and avoid failure through regurgitating information and using rote learning techniques.

❖ **Product:** The ‘Product’ phase of the 3-P model suggests that study approaches are related to qualitative differences in learning outcomes. The deep approach will produces high quality learning outcomes, while a surface approach will result in lower quality outcomes.

The 3P’s (Presage, Process and Product) when combined, explain what learning is about. The overall assumption that Biggs has about learning through this 3-P model is that learning outcomes are a result of the interactions of the teaching and learning contexts with the student approaches to learning. Both student and teaching presage factors interact to produce an approach to learning, which produces its characteristic outcome.

**Describing Student Learning in Two or Three Categories of Approach is Overly Simplistic**

It is very simple to describe student learning in terms of two or three categories of approach described above. People are far more complex than this. Learning is too complex to be described from one perspective. In the view of Marton and Saljo (1976), students' study activity is the outcome of interaction between the student and his or her environment. While using these categories to identify
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approaches adopted by students to learning the following three key points have to be taken into consideration.

1. **Students approaches are not fixed personality traits**

   Although learners may be classified as “deep” or “surface”, they are not attributes of individuals. Rather, they refer to the different approaches that student adopt. Student’s approaches can vary according to student’s perceptions of their learning environment. A student, who takes a deep approach to one subject, or even part of a subject, may take a surface approach in relation to something else. **Laurillard (1997) & Jones (2002)** found that students changed their approach according to the different demands that they perceived to be imposed by their varied tasks.

2. **Memorisation can be a feature of both the surface and the deep approaches, but it plays a different role in each.**

   All learning assumes some process of remembering. A key distinction between deep and surface approaches to learning is the prominence that ‘memory work’ is accorded in each. To the learner adopting a deep approach, different forms of memorisation are a means to an important end that of creating understanding. To the learner adopting a surface approach, memorisation is an end in itself (**Meyer, 2000**).

3. **The deep approach and surface approach are a manifestation of the intention that the student possesses.**

   Engaging in the task, the student intends either to adopt a “knowledge-making” approach, or a “data-reproducing” approach. These intentions may change as the student works (for example, if the material is too difficult or if time runs short, the student may flip from knowledge-making into data-reproducing). But for any one task the student cannot hold both intentions simultaneously and cannot therefore adopt both a surface and a deep approach at the same moment.

   From the above discussion, it is clear that one should not identify the student with a fixed approach to learning. Students’ approaches to learning can be influenced by the teacher. All that is needed is the understanding on the part of teacher how to
design learning opportunity that encourages students to adopt a particular approach. Good teaching should encourage a deep approach (together with an achieving approach) at the expense of a surface approach.

Factors Affecting Approaches to Learning

C-SAP (2011) in their website Research in Higher Education has shown that factors affecting student approaches to learning include:

- **Students' conceptions of learning**
  
  If students believe learning involves memorising to recall for assessment purposes, or alternatively, if they believe learning is about changing their understanding, they are likely to adopt learning approaches consistent with that belief.

- **Level of students' intellectual development**
  
  If students see knowledge as essentially facts rather than something to be negotiated and understood, they are more likely to adopt surface approaches to learning. If students see knowledge as a way of understanding the discipline and the world, they are more likely to adopt a deep approach.

- **Students' awareness of task demands**
  
  If students’ perceive that what is required of them is to reproduce facts for assessment purposes, or is about relating and connecting knowledge to experience, they will study accordingly.

- **Style of teaching**
  
  Surface approaches to learning are more likely to be associated with teaching which involves the selection, presentation and assessment of content by the teacher, whereas deep approaches to learning are more often associated with a supportive environment in which students make most of the decisions about their learning.
• **Newness and size of subject**

Students, who find subject matter new, complex and over-extensive, make it impossible for them to adopt a deep approach to learning, even if they want to. Clear subject outlines and expectations can help them adopt deep approaches.

• **Workload**

Students who think the workload is high are more likely to adopt a surface approach to learning.

• **Degree of threat and anxiety felt by students**

Students who feel under threat by, for example, examinations or over-demanding tasks, are more likely to adopt a surface approach to learning.

• **Nature of assessment**

If students believe the assessment is testing their understanding of the subject rather than their ability to recall information, they are more likely to adopt a deep approach to learning to develop understanding.

**Ways to Encourage Deep Approach**

Teacher should teach in a way that encourages students to adopt a deep approach; although achieving this is not so easy. Institute of Interactive Media & Learning (IML, 2007) reported that teacher can encourage students to take deep approach by:

- Designing assessment which rewards students for understanding, making connections, etc.
- Encouraging active engagement with learning tasks, e.g. students are engaged in inquiry or creative production; explore complex issues, problems or case studies of practice.
- Bringing out the structure of the subject explicitly and encouraging students to make connections with (or challenge) what they already know.
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- Giving students opportunities to discuss debate and compare their understanding with each other and with the teaching staff.
- Giving students opportunities to gain qualitative feedback.
- Giving students reasonable opportunities to make reasonable choices about what and how they will learn.
- Correlating learning objectives, teaching and learning approaches and assessment to assist students to achieve the learning goals.
- Helping students to perceive clear goals and standards for learning.
- Designing the subject in a way which matches student’s prior knowledge and learning skills and helps students to develop further.
- Using student focused teaching approaches which emphasize changes in student understanding, and help students to become aware of critical differences between their prior understandings about the subject matter and new understandings or ideas which the subject is seeking to develop.
- Teaching in different ways which encourage student’s intrinsic interest.

Thus, Teachers should discourage cynicism and encourage intrinsic interest by sharing their passion and enthusiasm for the subject, emphasizing its relevance, devising interesting assessments which help students to make connections between the subject and the 'real world'.

Significance of study

The present study brings forth fruition mix of the traditional class room environment along with a constructivist educational attitude, with a belief that the student will learn more than merely be left alone on the computer to learn. It will help the students to attain higher levels of achievement by enabling them to learn to the best of their abilities.
Hybrid Instruction supports constructivism, as according to constructivism, learning is fun and learners learn to learn together and support each other. In constructivism environment instructor utilizes variety of tools to enhance his teaching and creates such atmosphere in the classroom which is active and productive.

The use of Hybrid Instruction enhances the efficiency of the teaching-learning process as it enables students to acquire knowledge and explore possibilities to solve problems.

Further students with Deep Approach of learning who have normally a high potential for long lasting learning may satisfy their deep urge through these modules with equivalent impact on Surface Approach students. This has been hypothesized that Hybrid Instructions in Cooperative situation will prove to enhance all life skills of students whether they adopt Deep Approach or Surface Approach to learning.

It has been revealed from the literature review that small group learning with technology had significantly more positive effects than individual learning on student individual achievement, group task performance and several process and affective outcomes.

If students are provided with cooperative learning experiences through activities using varied media which requires students to be actively engaged in learning activities, reward deep learning and inform students in advance of meeting criterion and standard required they can perform at higher levels of achievement than what they in present do; irrespective of the approach they apply in learning situation.

Apart from academic excellence, many more life skills especially thinking skills are required by an individual to lead an effective life. The benefits of developing thinking skills are manifold. By developing one's thinking skills one can perform academically better; can become successful; can shine in social life; can attain emotional, social and economic maturity. Cooperative situation where students interact face-to-face provides an ideal environment to them to learn and enhance thinking skills- Decision Making, Problem Solving, Critical Thinking and Creative
Thinking. Training students in these areas of life skills will prepare them for meeting the challenges of life courageously and successfully.

With this understanding of research literature, the investigator chooses to work on a proposal involving these variables.