1.0 Introduction:

The recent challenge of Indian education is quality education. Research quality in education can contribute significantly in the realization of quality education. An appropriate knowledge, understanding and application of data analysis technique is one of the most important factors in doing research work.

According to report to UNESCO of the International Commission on Education for the Twenty-first Century (1996), "education must be organized around four fundamental types of learning, which, throughout a person's life will be in a way the pillars of knowledge: learning to know, that is acquiring the instruments of understanding; learning to do, so as to be able to act creatively on one's environment; learning to live together, so as to participate and co-operate with other people in all human activities; and learning to be, an essential progression which proceeds from the previous three." This clearly states that education should be imparted in such a manner so that students can appreciate human diversity, uniqueness, similarities and interdependence of people working together. In order to think creatively it is necessary for the students to focus on innovations and discoveries of peoples in different disciplines in the early stage of education, so that they could be inspired and motivated for some creative work. Moreover, it is the responsibility of teachers to provide such learning environment where dialogue and discussion could be made possible properly. This could be achieved by making proper groups and assigning common projects. One such strategy following all these aspects is Cooperative learning. According to Kerlin (1992) "The concept of cognitive engagement styles has a number of important implications for learning and teaching and these ideas are considered within the context of cooperative learning. Theory of cognitive engagement styles is not only viable but is a desirable approach to use when examining the learning processes employed adults". Cooperative learning is grounded in the belief that learning is most effective when students are actively involved in sharing ideas and work cooperatively to complete their academic tasks.

1.1 Cooperative learning:

The most widely used definition of cooperative learning in higher education is probably that of Johnson & Johnson (1995). According to them, cooperative learning is an instruction that involves students working in teams to accomplish a common goal, under conditions that include the following six essential elements:

The first element is **Positive Interdependence**. Positive independence means that a gain for one student is associated with gains for the other students. The second element is **Equal participation**. Equal participation refers to the fact that no student should be allowed to dominate a group, either socially or academically. The third element is **Individual Accountability**. Individual accountability means that when a group members accept as a personal responsibility of their contributions for the attainment of their common goal. The fourth element is **Simultaneous Interaction**. In cooperative groups, group members meet face to face to work together to complete assignments and promote each other's success. The fifth element is **interpersonal and Small Group Skills**. Cooperative learning is inherently more complex than competitive or individualistic learning because students have to engage in task work and teamwork simultaneously to coordinate efforts that will achieve mutual goals. Here students are encouraged and helped to develop and practice trust-building, leadership, decision-making, communication, and conflict management skills. The sixth element is **structuring group processing**. Under Group processing basically two important actions are considered; first is to describe what member actions were desirable/helpful and undesirable/unhelpful in the process of completing the common task and second is to make decisions about what actions to be remain as continue or change.

Cooperative learning is not merely working in groups but it is more than that. Say learning exercise which qualifies the above mentioned six elements is considered as cooperative learning. Therefore following are the chief characteristics of cooperative learning:

- Learners participate actively;
- Teachers become learners at times, and learners sometimes teach;
- Mutual respect is developed towards every member;
- Projects and questions develop interest and challenge to students;
- Diversity is celebrated and all contributions are valued;
- Students learn skills for resolving conflicts when they arise;

- Members draw upon their past experience and knowledge;
- Goals are clearly identified and used as a guide;
- Students are invested in their own learning.

From the above mentioned characteristics of Cooperative Learning difference between traditional classroom and cooperative classroom can be described as follow:

Traditional classroom	Cooperative classroom
Interacting with neighbors is discouraged.	Interacting with neighbors is encouraged.
Completing task alone and let others also do on their own.	Completing task with the help of group members so that work you do together becomes better than the sum of its parts.
Looking into their own notebooks.	Looking into the peer's notebook in order to learn from them, help them and for sharing ideas and thoughts.
In trouble seeking help from teacher.	In trouble first seeking help from their own group mates and at last from the teacher.
Seeking attention of teachers and friends.	Every member gets chance to participate in the task accomplishment and in the presentation too.
Students compete for extrinsic rewards like praise by teachers and grades.	Students get extrinsic as well as intrinsic rewards.
Less scope for developing humane values.	More scope for developing humane values.
Student feels classmates as competitors.	Student feels classmates as sources & resources.

According to Yale and Gillies (2011) well structured Cooperative Learning procedure enables students of diverse backgrounds and cultural heritages to contribute to everyone's learning, based on their competencies, experiences, knowledge and understanding of the world. Sahlberg reminds us, "Cooperative learning…is the best way to educate young people for a diverse competitive world".

While discussing on cooperative learning sometimes we get confused with a term known as collaborative learning. Let us first clear the difference between them. According to Panitz (2011), "Collaboration is a philosophy of interaction and personal lifestyle where individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers; Cooperation is a structure of interaction designed to facilitate the accomplishment of a specific end product or goal through people working together in groups".

According to Gerlach (1994), "Collaborative learning is based on the idea that learning is a naturally social act in which the participants talk among themselves. It is through the talk that learning occurs." Many times teacher does not have a pre-set notion of the problem or solution that students will be researching. It is a method of teaching and learning in which students team together to explore a significant question or create a meaningful project. A group of students discussing a lecture or students from different schools working together over the Internet on a shared assignment are both examples of collaborative learning.

In cooperative learning, students work together in small groups on a structured activity. They are individually accountable for their work, and the work of the group as a whole is also assessed. Cooperative groups work face-to-face and learn to work as a team. In small groups, students can share strengths and also develop their weaker skills. They develop their interpersonal skills. They learn to deal with conflict. When cooperative groups are guided by clear objectives, students engage in numerous activities that improve their understanding of subjects explored.

In order to create an environment in which cooperative learning can take place, three things are necessary. First, students need to feel safe, but also challenged. Second, groups need to be small enough that everyone can contribute. Third, the task students' work together must be clearly defined.

1.2 Benefits of Cooperative learning:

According to Jacobs, Power and Inn (2006) students can benefit from cooperative learning in the following areas:

- improved academic achievements
- more active involvement in learning by students, regardless of past achievement level or individual learning needs
- increased motivation to learn
- increased student responsibility for their own learning

- improved interethnic relations and acceptance of academically challenged students
- improved time on task (sometimes dramatically improved, compared to whole- class, teacher- led instruction)
- improved collaborative skills
- increased liking for school
- improved students attitudes toward learning, school, peers, and self
- increased ability to appreciate and consider a variety of perspectives
- greater opportunities for the teacher to observe and assess student learning .

On the similar lines, Slavin (1995) has also drawn suggestion to incorporate Cooperative learning in the educational practices. Following are the reasons:

- Ample number of researches shows that the use of cooperative learning improves student's achievements. Moreover there are some more supplement outcomes like inter-group relations, acceptance of handicapped classmates and increased self- esteem.
- There is a growing realization that pupils must learn to think, solve problems, integrate their knowledge and apply their skills. Cooperative learning is an excellent means for doing this.
- Cooperative learning takes opportunity to consider diverse or heterogeneous class as a resource rather than a problem. When schools are constructing heterogeneous ability grouping instead of homogeneous ability grouping it shows that cooperative learning is growing.
- Cooperative learning has been found to positively influence the social relations of students of different ethnic backgrounds and mainstreamed special education students and their classmates.

1.3 Cooperative learning types:

According to Johnson & Johnson (1998), there are three ways that cooperative learning may be used.

Formal cooperative learning group may last for one class period to several weeks to complete any course requirement such as solving problems, reading complex text material, writing an essay or report, conducting a survey or experiment, learning vocabulary, or answering questions at the end of a chapter.

Informal cooperative learning groups are temporary, ad hoc groups that last from a few minutes to one class period that are used during a lecture, demonstration, or film to focus students' attention on the material to be learned, set a mood conducive to learning, help set expectations as to what will be covered in a class session, ensure that students cognitively process the material being taught, and provide the closure to an instructional session.

Cooperative base groups are long term cooperative learning groups (lasting for one semester or year) with stable membership that gives each member the support, help, encouragement, and assistance he or she needs to make academic progress (attend class, complete all assignments) and develop cognitively and socially in healthy ways.

1.4 Cooperative Learning Techniques:

There are many techniques by which cooperative learning strategies can be employed in classrooms. These help the teacher to bring harmonious interaction in the classroom during the learning time and it also helps the students to learn content effectively and joyfully. Following are some of the common techniques which are used in different classrooms as cooperative learning techniques:

i. **Student Teams-Achievement Divisions (STAD) -** This technique was developed by Slavin (1994), in which students are assigned to four-member learning teams that are mixed in performance level, gender, and ethnicity. The teacher presents a lesson, and then students work within their teams to make sure that all team members have mastered the lesson. Finally, all students take individual quizzes on the material, at which time they may not help one another. Students' quiz scores are compared to their own past averages, and points are awarded on the basis of the degree to which students meet or exceed their own earlier performance. These points are then summed to form team scores, and teams that meet certain criteria may earn certificates or other rewards. In a related method called Teams-Games-Tournaments (TGT), students play games with members of other teams to add points to their team scores.

ii. **Cooperative Integrated Reading and Composition (CIRC) -** This technique was developed by Stevens & Slavin (1995). CIRC is a comprehensive program for teaching reading and writing in the upper elementary grades. Students work in four-member cooperative learning teams. They engage in a series of activities with one another,

including reading to one another, making predictions about how narrative stories will come out, summarizing stories to one another, writing responses to stories, and practicing spelling, decoding, and vocabulary. They also work together to master main ideas and other comprehension skills. During language arts periods, students engage in writing drafts, revising and editing one another's work, and preparing for publication of team books.

iii. **Jigsaw -** This technique was developed by Aronson, Blaney, Stephen, Sikes, & Snapp (1978), where students are assigned to six member teams to work on academic material that has been broken down into sections. Each team member reads his or her section. Next members of different teams who have studied the same sections meet in expert groups to discuss their sections. Then the students return to their teams and take turns teaching their teammates about their sections. Since the only way students can learn sections other than their own is to listen carefully to their teammates, they are motivated to support and show interest in one another's work. In a modification of this approach called Jigsaw II developed by Slavin (1994), students work in four- or five-member teams, as in STAD. Instead of each student being assigned a unique section, all students read a common text, such as, a book chapter, a short story, or a biography. However, each student receives a topic on which to become an expert. Students with the same topics meet in expert groups to discuss them, after which they return to their teams to teach what they have learned to their teammates. The students take individual quizzes, which result in team scores, as in STAD.

iv. **Learning Together -** Learning Together, a model of cooperative learning developed by David Johnson and Roger Johnson (1999), involves students working in four- or five-member heterogeneous groups on assignments. The groups hand in a single completed assignment and receive praise and rewards based on the group product. This method emphasizes team-building activities before students begin working together and regular discussions within groups about how well they are working together.

v. **Group Investigation -** This technique was developed by Sharan & Sharan (1992). Group investigation is a general classroom organization plan in which students work in small groups using cooperative inquiry, group discussion, and cooperative planning and projects. In this method, students form their own two- to six-member groups. After

choosing subtopics from a unit that the entire class is studying, the groups break their subtopics into individual tasks and carry out the activities that are necessary to prepare group reports. Each group then makes a presentation or display to communicate its findings to the entire class.

vi. **Cooperative Scripting:** Many students find it helpful to get together with classmates to discuss material they have read or heard in class. A formalization of this age-old practice has been researched by Dansereau (1985) and his colleagues. In it, students work in pairs and take turns summarizing sections of the material for one another. While one student summarizes, the other listens and corrects any errors or omissions. Then the two students switch roles, continuing in this manner until they have covered all the material to be learned. A series of studies of this cooperative scripting method has consistently found that students who study this way learn and retain far more than students who summarize on their own or who simply read the material (Newbern, Dansereau, Patterson, & Wallace, 1994). It is interesting that while both participants in the cooperative pairs gain from the activity, the larger gains are seen in the sections that students teach to their partners rather than in those for which they serve as listeners (Spurlin, Dansereau, Larson, & Brooks, 1984).

1.5 Historical Background of Cooperative Learning:

Educational practices are greatly influenced by learning theories and learning theories are again influenced by researches' in psychology. During late 19th century to mid 20th century Behaviorist learning theories aroused by Pavlov (1897), Watson (1913), Thorndike (1905), B.F. Skinner (1936), Hull (1943) and Chomsky (1959). According to them all behaviors are acquired through conditioning and conditioning occurs through interaction with the environment and behaviorists also believe that our responses to environmental stimuli shape our actions. Soon behaviorist learning theories were eclipsed by social learning theories of Albert Bandura in the year of 1963. According to Bandura people learn from one another through observation, imitation and modeling. Soon after social learning theories, cognitive learning theories emerged. This Bandura's theory is often considered as a bridge between behaviorist and cognitive learning theories because it encompasses attention, memory and motivation. Johnson & Johnson (1998) states that Cooperative learning is evolved basically on three major theoretical perspectives

namely behavioral perspective, social interdependence perspective and cognitive-developmental perspective.

Cognitive Developmental Theory: At cognitive development theory the major contributions were of Jean Piaget and the Lev Vygotsky. According to Jean Piaget when individuals cooperate on an environment, socio-cognitive conflict occurs thus creating cognitive disequilibrium which in turn stimulates perspective-taking ability and reasoning and hence cognitive development occurs. In the similar lines Lev Vygotsky describes that cognitive development is a result of social interaction. That is knowledge as a societal product where cognitive abilities are socially transmitted, socially constrained, socially nurtured and socially encouraged. Therefore cognitive development theories suggest that social interaction is a major factor which leads to cognitive development of an individual and also make links between communication and internal thought process of an individual.

Behavioral Learning Theory: At Behavioral learning theory the major contributions were of Skinner (group contingencies), Bandura (imitation), Homans, Thibaut & Kelley (balance of rewards and costs), Mesch-Lew-Nevin (specific application to cooperative learning). The behavioral-social perspective presupposes that cooperative efforts are fueled by extrinsic motivation to achieve group rewards (academic and/or nonacademic).

Social Interdependence Theory: At social interdependence theory the major contributors were Kurt Koffka (1910) described that the whole is greater than the sum of its parts and where groups are dynamic wholes member interdependence; Kurt Lewin (1935) extended the Koffka notions and found that behavior is the result of the individual and the environment, Morton Deutsch (1949, 1962) continued on the work of Lewin and states that the absence of social interdependence and dependence results in individualistic efforts. Cooperation exists when individuals work together to accomplish shared goals. The three types of Interdependence could be positive interdependence, negative interdependence and no interdependence. Here in education perspective social interdependence is an essential component in teaching learning process which means that student's collective efforts to achieve a goal, develop positive outlook for their group members, develop good relationship and trusting group members, adjusting psychologically and practice social competences. Therefore it can be understood that the way

social interdependence is structured determines the way persons interact with each other and the outcomes are the consequences of students' interactions. Hence, one of the cooperative elements that have to be structured in the classroom is positive interdependence i.e. cooperation which enhances the promotive interaction within the group and encourages the students to work collectively to accomplish the goal.

Johnson & Johnson (2009) described that the researches on Cooperative Learning majorly focused on three areas of students i.e. (i) efforts to achieve (ii) pro-social behavior and social support and (iii) psychological health and self esteem According to fell into three major areas related to students. Whereas Brody (2011) stated that before cooperative learning needs to apply in the classroom teachers are expected to increase their knowledge of their subject matter; increase their ability to observe students; make stronger connections between daily practice and term goals; improve their sense of efficacy and personal motivation; and improve their collegial networks. It is the responsibility of each educational institution to build and use their own its social capital for educational growth. Mcwhaw, Schnackenberg, Sclater & Abrami (2003) found that students at the college level had much to gain from this approach to learning provided they had been trained to work constructively together, understand the purpose of the activity, believed the group product was attainable and their own contributions were important and the physical and psychological demands placed on the group were not excessive. In a comparative study, experiences of college students during cooperative learning and large group instruction, Peterson and Miller (2004) reported that cooperative learning can lead to greater cognitive involvement; higher levels of motivation, including higher engagements; greater perceived importance of the tasks; and more optimal levels of cognitive challenge in relation to skill. Johnson, Johnson, & Stanne (2000) reported that cooperative learning experiences are crucial to preventing and alleviating many of the social problems related to children, adolescents and young adults.

1.6 Role and Responsibilities of a Teacher in a Cooperative Classroom:

For an effective cooperative classroom certain pedagogical practices should be carried out by a teacher. According to Gillies (2007) following practices should be included in a cooperative classroom:

- Recognizing that students need to work on complex and interesting tasks.
- Using a verity of sources to stimulate students' interests.

- Modeling the types of talk they want students to use.

- Encouraging students to dialogue together.

- Creating opportunities for students to collaborate and problem –solve around tasks.

- Promoting higher order thinking.

- Ensuring learning is student-centered.

- Encouraging students to accept responsibility for their own learning.

- Providing students with explicit feedback on their progress.

It is the responsibility of a teacher that not even a single student can leave behind in the class. Therefore teaching must be carried in such a way that all students must get an opportunity to come out of their own barriers and learn in an academic learning environment. It is the pivot responsibility of the teacher to make best use of the social capital in its class for achieving their academic goals. From review of studies Taylor, Pressely and Pearson (2000) studied that effective teachers in contrast with less effective teachers had higher student engagements, provided smaller group instructions, had a preferred teaching style of coaching or facilitating as opposed to telling students what to do and asked higher level comprehension questions or questions designed to encourage students to think. Moreover, teacher should emphasis more on higher order meaning making and opposed to lower order thinking skills, then the instructions will be more effective. According to Gillies (2007) following are the key responsibilities of a teacher in a cooperative learning classroom:

i.   To ensure that groups are structured so that key components (positive interdependence, simultaneous and promotive interaction, equal participation, individual accountability, interpersonal and small group skills and group processing) are evident.

ii. To determine the size, the ability and gender composition of the group.

iii. To set a task that will encourage the students to interact together.

iv. To ensure that tasks that are set are inclusive of all students.

v.   To inform the class of the group experience and discuss with them clear expectations of acceptable behavior, including task-focused behaviors and interpersonal behaviors.

vi. Students need to understand that they have responsibilities both to themselves and to their group members when they work together.

vii.   Students need to be taught to monitor the group's process, including their own contributions, as well as how well the group is maintaining effective working relationships.

1.7 Cooperative Learning Environment:

i.   Physical Setup of the Classroom:

The group size and seating arrangement of the students in Cooperative learning is very important because the feasibility of interaction dependents on these two aspects mainly. If the group is too small learning opportunities will be less and if the group is too large the chances of loosing information and convenience in sharing the information will be very less by the students in their group. Most of the cooperative learning practitioners at school level suggest that four or five is the best group size for the students to make them in group. But students at college level or at higher education level are better mature as compared to school students and hence they can make group of size five or six also. Here in this study researcher has used five or sometimes six as a group size for cooperative learning based classes.

The seating arrangement of the students should be such that there should be comfortably face to face interaction. Therefore following seating arrangement structure was used by the researcher while conducting cooperative learning classes.
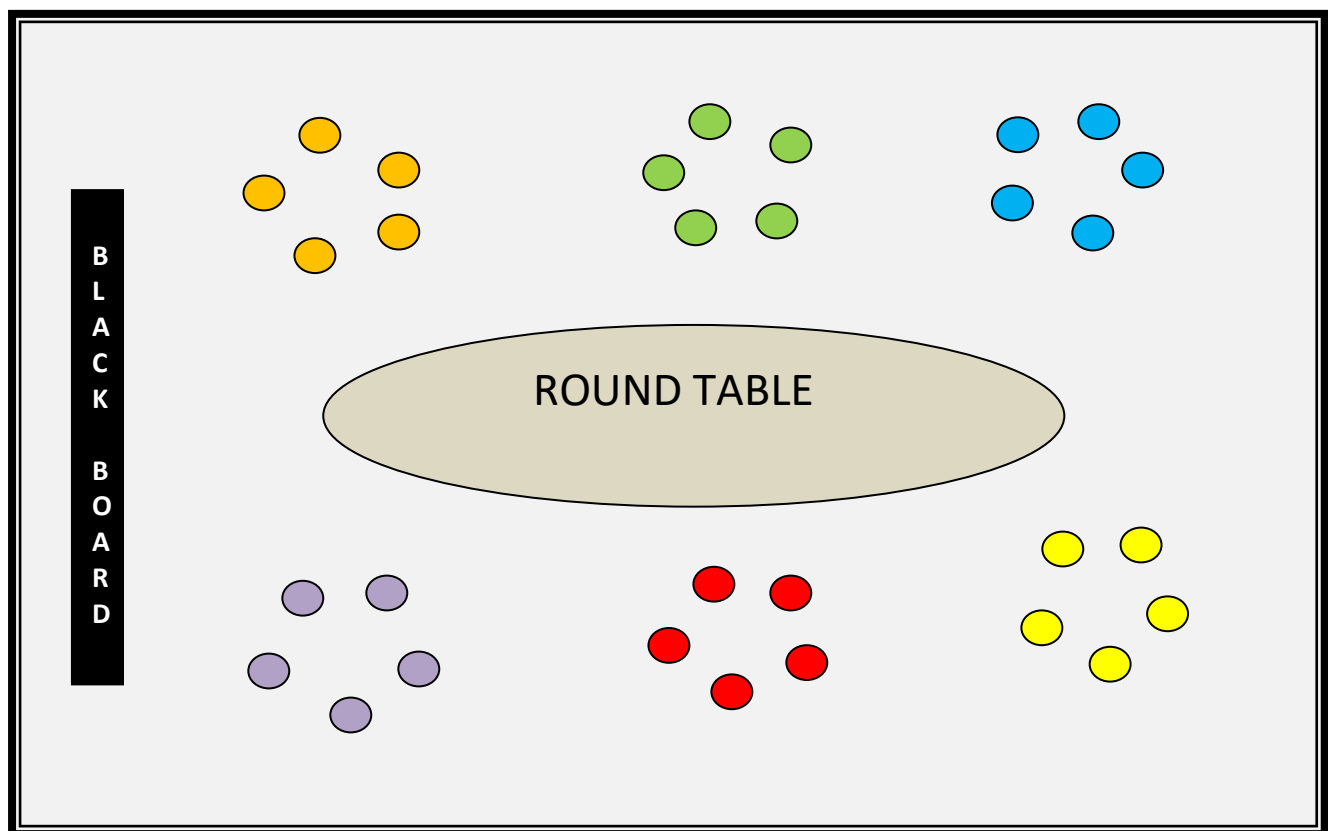
ii. Basis of Group Formation:

Group formation is a foundation on which the cooperative learning strategy is built up. Group of weaker students will not produce better results as the difficulties of students cannot be solved properly. Also, group of strong students should also be avoided as they avoid wider interactions and complete their task either alone or with limited interactions. Both of these kinds of situations are not good for the class and hence a heterogeneous kind of groups should be made for conducting cooperative learning based classrooms. Here heterogeneous means students with mixed ability of learning. One should also take care that each student in the group must contribute in some manner like students may play different roles in their group like group coordinator, information recorder, checker, group process monitor. Their roles may be altered in each class or periodically. The role of the coordinator is to manage the group members, identify meeting places, scheduling the meeting time and communicating every information with each member of the group; the recorder maintains the information, record the entire topic related information and get ready with the final solution for the submission; the checker make a thorough check before solution is handed in and make sure about the submission should get prior to the deadline of the time; monitor ensures that all members are understanding every step of the solution and with clear understanding about the strategy employed for getting the solution. Finally task of each student should be allotted prior and clearly.

According to Gillies (2007) following suggests the advantages of applying mix ability groups in cooperative learning classroom:

iii. Mix ability groups promote achievement gain for low and medium ability students.

iv. A high ability student does not suffer while working with low ability students.

v. Second language learners acquire language skills more readily when they play or work with peers in mixed ability groups.

vi. Cross ethnic relations and learning are promoted in mixed ability groups.

vii. Students with learning disabilities are likely to be accepted by their peers.

viii. Status and learning for low-status children can be enhanced in mixed ability groups.

Mix ability groups can be made in many ways. The ways which were used by the researcher for making mixed groups are defined below:

➢ **Calling Numbers**: As students seated in U–shape around the Round table initially. They call numbers loudly say first student call 1, second student call 2,

third student call 3, fourth student call 4, fifth student call 5, sixth student call 6, seventh student call again 1, eighth student call 2, ninth student call 3 and so on. Now first group was made of all the students called number 1, second group was made of all the students called number 2, third group was made of all the students called number 3, fourth group was made of all the students called number 4, fifth group was made of all the students called number 5 and sixth group was made of all the students called number 6. So in this way thirty students had constituted six groups. In each group five members were found and in case 31 or 32 or 33 students were present few groups with six members were also made. Since the maximum strength of the class was 33, group size never exceeds 6. It remains either 5 or at most 6.

➢ **Selection cum Randomization:** In this way initially 6 six students of high ability were selected from the class and then for rest of the students calling number technique was used and six groups were. Now each group is attached with one student of high ability. Sometimes in this way also researcher made groups for cooperative learning classroom.

iii. Team Building

In cooperative learning there must be cohesiveness and belongingness among the students. Each group must work as a team. Every team is like a complete system in their own. As the smooth functioning of a system depends on each and every part to get involve at its fullest similarly the success of cooperative learning depends upon the cohesiveness of the entire team as a group. For team building researcher has used following techniques:

➢ **Addressing students with name:** During interaction students address each other using their names only. The interaction may be within or between the groups. Therefore students were instructed to remember the names of their classmates. This can be done by using various strategies like playing games of hide and seek, *PakadamPakdai , pithu (seven stones/ satodiyu)* etc where student address each other student with their names.

➢ **Brief Interviews:** Here students take around two minute's time to introduce themselves to rest of the classmates. In their brief interview students are asked to

mention their full name, place from where they belong, qualifications, interest, hobbies, any two strengths and any two weaknesses. This technique helps the students to understand more about their classmates.

➢ **I know U:** In this technique roll no. 1 speaks about the two major strengths of the roll no. 2. Then roll no. 2 speaks about the two major strengths of the roll no.3. Then roll no. 3 speaks about the two major strengths of the roll no.4 and so on. Now in this technique students started internalizing their own strengths. After completion of each turn of the student researcher addressed the students to strengthen your strengths and try to minimize your weaknesses.

➢ **Fish pond**: Here students were asked to drop an envelope which should mention the weaknesses of your friends. In the envelope one who is writing the message should not write his / her name but for whom it is they should write it clearly. Confidentiality was maintained about this. Researcher read all envelops and a list was prepared where weaknesses were mentioned in front of the name of the students. Each student was informed about their weaknesses personally. And motivated too for minimizing their weaknesses. This technique helped the students to come out of their weaknesses and helps a lot in group processing and team building. This technique helps in identifying the desirable and undesirable behaviors of the students.

Psychologist Deci & Ryan (1985) suggest that human beings have three universal needs namely relatedness, competence and autonomy. Here cooperative learning helps to meet all the three needs of the students.

iv. Availability of Resources

Since students were informed prior about the next topic to be covered in the class. They were provided with the list of relevant books available in the library which are related to the said topics. Students were also allowed to bring books, use of internet inside the classroom and make them use when they were solving problems in their groups. So in this way more freedom in accessing the information was made to the students while learning.

v. Generating own list of behaviors

Students were asked to frame a list of expected behavior to be performed at the time of learning in groups. As these expected behaviors were framed by the students itself they are more likely to promote ownership of them and a sense of responsibility realized more and practiced by them.

vi. Caring and sharing nature of the teacher towards the students

Even outside the classroom researcher interacted and shared their thoughts with the students which help the students to understand a teacher better and also helped the researcher in making a better rapport with the students. This conversation may include some personal interactions like sharing the way of spending weekends, sharing the kinds of books, novels, journals, news papers, television programs and films you are following etc so that researcher and students both can understand the common interest areas and opinion on mutual topics of interest.

vii. Fostering the six essential elements of cooperative learning:

The six essential elements of cooperative learning are positive interdependence, equal participation, individual accountability, simultaneous interaction, interpersonal and small group skills, structuring group processing. Following are the ways through which each element of cooperative learning was fostered inside the classroom:

a) **Ways of structuring Positive interdependence:**

➤ **Resource interdependence:** Students were made to share their resources like issued library books, internet connect, hand notes etc.

➤ **Suggesting platforms for doing group discussions:** Researcher gave various ideas to carryout group discussions like at CASE library, at Smt. Hansa Mehta library, on Whats App group and at conference calling through mobiles.

➤ **Allowing students to use mixed language (English, Guajarati and Hindi) during interactions:** Students were made free to discuss among themselves in different languages while interacting either within group or between groups.

➤ **Division of task into sub tasks:** Within group students decided their own to choose the sub task of the allotted task. Since all students choose their sub task with the mutual concern, sense of responsibility felt by students was more. And

accountability of Learning by self was also realized by the students. Therefore they have high positive interdependency for learning.

b) Ways of structuring equal participation:

➢ **Using observation:** When students were performing interaction within the class researcher observed each group carefully and takes at most care that no student should left behind and no student should over rule the group. Every student must have some or the other participation in the group activity.

➢ **Briefing the class about expected behavior:** When students were aware of the expected behavior to be performed while learning through cooperative technique less clashes was found. Certain statements were shared by the researcher to the classmates so that they can understand the way the need to behave inside the group.

- I also want to add….
- I do feel like this…..
- It is my opinion that…..
- I might be wrong but…
- If it is so then….
- Can we look upon this in this manner….
- Is it ok…
- Are u convinced?..…
- I am agreeing with them….
- This it difficult to solve….
- May I try….
- You can also add…..
- My argument is this….
- You may be right but I think in this way…
- This is my submission…
- You may think differently but I perceived it in this way…..etc

Such statements realized the students to give scope for others also in the interaction and make healthy participation of all the group members.

c) **Ways of structuring individual accountability:**

Actually Individual accountability of a student leads to group accountability. As individual accountability directly affects the performance of group accountability. The researcher followed the ways of structuring the individual accountability of the students:

➢ **Assessing the task performed by the student with in a class:** when student perform in the group researcher observed them carefully and evaluate the performance of the presenters in the group.

➢ **Assigning individual home assignment:** depends upon the performance in the home assignment researcher came to know the individual accountability of the students.

➢ **Organizing & Assessing internal exam scores of the students:** internal exam was conducted by the researcher and scores attain by the students reflected the individual accountability of the learners.

d) **Ways of structuring simultaneous interaction:**

Face to face interaction is the preferred way of doing interaction by the students while learning through cooperative technique of learning. Following were the ways used by the researcher to structure the simultaneous interaction:

➢ **Appropriate seating arrangement: S**tudents seated with face to face when doing group interaction. Here the space of the classroom was enough large to accommodate to chairs in circular shape so that each member can see the other member of their group. Even substantial distance was maintained between the groups so that they may not get disturbance while interacting.

➢ **Enough time and space was given to the students for doing discussion:** Researcher arranged two successive classes for the organization of cooperative learning class. Where ample time was given to the students for their group discussion and presenting their ideas.

> **Out sourcing help or helping other groups if they are seeking help from your group:** In case some group is unable to perform some task or need some help to move ahead then members of other group may also helped them.

e) Ways of structuring interpersonal and small group skills:

Since students worked in small groups chances of arising conflicts and problems were more but proper orientation was given to them which reduces the chances of conflicts among them. Some interpersonal skills are like actively listening, stating ideas freely, accepting responsibility for one's behavior, providing constructive criticism and small group skills are taking turns, sharing tasks, making decisions democratically, trying to understand the other person's perspective, clarifying differences. Following were the ways of structuring interpersonal and small group skills.

> Acknowledging someone's good experience or bad experience when worked in group activities.

> Reflecting upon some unacceptable behavior of a student / students in the classroom.

> Reflecting upon some highly desirable behavior of a student / students in the classroom.

> Taking reflections of students on some abnormal behavior of the student / students.

In the above mentioned reflections focus was made on the issue and not the person involved in that situation.

f) Ways of structuring group processing:

Group processing is required for maintaining effective working relationships among the group mates and the classmates too. For that students monitored themselves and the group as well. Following were the ways used by the researcher for structuring group processing:

> Certain question can be asked by the students for self evaluation, like:

  ▪ Am I Performing good?

  ▪ Is my contribution valuable?

  ▪ Are my group mates happy to work with me?

  ▪ Am I able to accomplish my task?

- How can I link my past experiences with this learning experience?
➢ Certain question can be asked by the students to evaluate the group performance, like:
- What did we do in smooth conduction of group work?
- What can be avoided to do in a group work?
- How can we improve our group working style?
- How can we make our better relationships with each other?
- Can we perform this task differently?

viii. Team development of students:

When students are working in cooperative groups they pass through five stages of team development. The process of learning to work together effectively is known as team development. Tuckman (1965) stated these five stages of team development i.e.- *forming, storming, norming, performing and adjourning.*

STAGES OF TEAM DEVELOPMENT
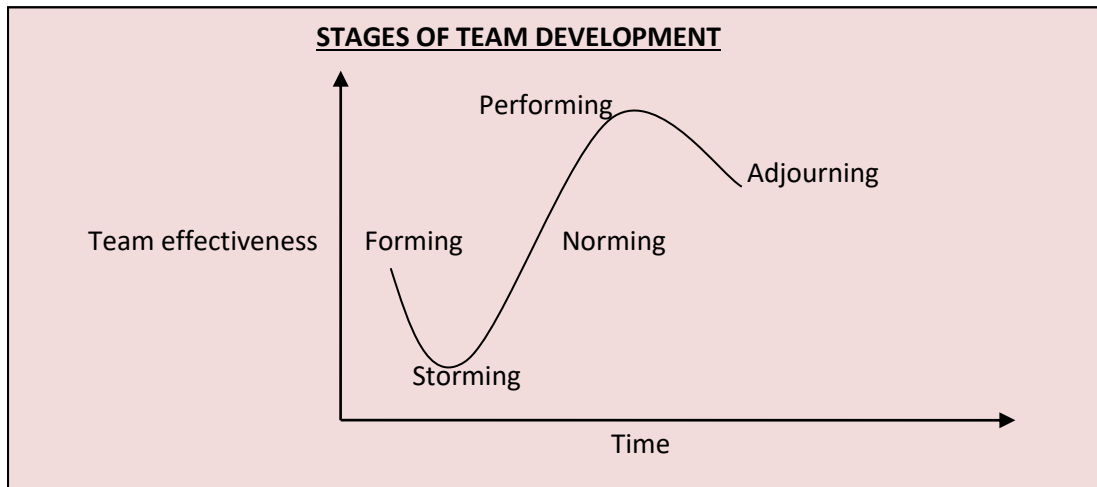
i. The forming stage involves experiencing some uncertainty as they begin to work out what they need to do to accomplish the common task.
ii. This stage is followed by the next storming stage where group members take some stress and tension as they work together with different ideas for accomplishing the common task.

iii. The next stage is norming which involve development of consensus about how will be the leader, who will be the coordinator, who will be the checker and so on. Allotment of responsibilities takes place i.e. norms of the team were formulated.

iv. The next stage is performing which involves working the actual set of required actions to attain the common goals of the group members. This is the most important stage of cooperative learning. Here team is focused on problem solving and meeting the common goals.

v. This is the last stage i.e. adjourning which some time called as mourning also. It involves wrapping up the final tasks and documenting the efforts and results. At this stage most of the team's goals have been achieved. As members knew that group had attained his common goal so soon group will be dissolve shortly and we all proceed for the next goals. Group member may sad about this part that group is dissolving. Hence this stage is known as adjourning stage.

1.8 Assessment of Cooperative Learning:

In Education the process of teaching-learning is incomplete without its assessment. Assessment ensures us about the level of achievement of the educational objectives by the learners. Here in cooperative learning researcher played as a pivot role "facilitator" rather than as an instructor. Hence the responsibility of "the learning" of students is equally shared by the learners and the researcher. The assessment of cooperative learning was carried by the researcher in the following manner. Researcher has used the following techniques in the process of assessment:

i. **Observation:** Here observation is considered as a tool for collecting information regarding the participation of students in their respective groups. Initially those who participated less were motivated to participate more by giving special opportunities to perform certain tasks.

ii. **Field notes:** After completion of each class immediately researcher wrote certain observations which she felt and found evident in the classroom. These observations helped the researcher to improve the lesson planning for teaching through cooperative learning. It also gives some information about the students to understand them better.

iii. **Assessment of home work:** For assessing the individual performance home assignment was given to students and weekly supervised by the researcher.

iv. **Work sheets / task sheets:** In groups work sheets/ task sheets were given where students need to solve the work sheets / task sheets in groups. Here there is lot of scope of interaction among the students. These work sheets were completed in classrooms only and students presented their accomplished tasks in groups.

v. **Rating scale:** Through rating scale students rated their self performance and effectiveness of cooperative learning can be studied from this.

vi. **Achievement Test:** Scores of this test signifies the level of achievement of the educational objectives of teaching data analysis techniques through cooperative learning of the students.

vii. **Internal Test / class test:** Scores of this test were used to give feedback to the students regarding their performances.

viii. **Group Presentations:** After the completion of task while working in cooperative groups students were asked to present their piece of work in a group presentation.

ix. **Individual Assignments:** After completion of each unit of the syllabus individual assignment was given for assessing the individual performance of the student.

1.9 Quantitative Data Analysis Techniques and Cooperative Learning

Here in this study, quantitative data analysis techniques were comprised of both descriptive statistics and inferential statistics. In 2013 researcher has browsed the online syllabus of M. Ed. programme of various universities like Devi Ahilya University, Indore; Mumbai University; Delhi University; The Maharaja Sayjirao University of Baroda, Vadodara and Regional Institute of Education Bhopal. After reviewing the M.Ed. syllabus of all these, the researcher prepared a list of data analysis techniques which were commonly found among them. This list of data analysis techniques was finalized after discussing with of my Ph.D. supervisor and the list comprised of the following data analysis techniques:

➢ **Descriptive Statistics:**
- Graphs & charts
- Measures of Central Tendency
- Measures of Dispersion
- Kurtosis and Skewness
- Correlation (simple, partial, multiple, bi-serial, point bi-serial)
- Simple Regression and Concept of Multiple Regression

- Z-Score
- Sampling Methods (probability sampling- simple random sampling, cluster sampling, systematic sampling, stratified sampling, multi phase sampling, multi stage sampling; non-probability sampling- purposive sampling, judgmental sampling, convenient sampling, quota sampling, snow ball sampling)

> **Inferential statistics:**

- Steps of doing hypothesis testing
- Parametric tests: t-test (testing for mean, testing for correlation, testing for proportion), f-test (ANOVA, ANCOVA), chi-square test (testing for variance), Confidence Interval.
- Nonparametric tests: Median test, Sign test, Mann Whitney U-test, Chi-square test (Testing for Independence of Two Attributes, Testing Whether Observations Are Normally distributed or not, Testing whether observations are equally distribution or not).

Hence for this study the researcher considered all the above mentioned data analysis techniques in her study. A large number of workshops, seminars, conferences and symposiums are being organized at national as well as on international levels. Now a day's every university is organizing at least one workshop on Research Methodology either on quantitative data analysis techniques or on qualitative data analysis techniques. UGC has also realized its importance for researchers and so suggested to do compulsory Course Work by the research scholars at primary stage of their research work. Since there is a mutual relationship between quality of Education and the data analysis techniques as Innovations and refinements in educational practices (in education) are brought through educational researches where as better education (i.e. better knowledge, understanding and application of Statistical data analysis techniques in research) brings quality in educational researches. To make teaching–learning process more effective and innovative one should use some new techniques of teaching pedagogy. Now a day there is a great focus on group work as group has a social capital that can be used in teaching learning process in a right manner. The reviews of the related literatures shows that many researches has been made at abroad but very few has been found in India on Cooperative learning. More over most of the studies were conducted on school education and with learning of either second language or in the discipline of Science and Mathematics.

Researcher has conducted a pilot study on "Competency in using data analysis techniques in research work". It was administered on 36 Ph.D. research scholars who has either submitted their thesis or has completed their data analysis of their doctoral study. It was found that 66.66% of Ph.D. students took help from professional data analysts and paid a good amount to them; 22.22% of Ph.D. students said they have performed data analysis of their doctoral study by their own and 11.11% of Ph.D. students said that their data analysis was done with the help of their guide only. All these results persuaded the researcher to take this piece of work as a doctoral study.

2.0 Review of Related Literature

Review of the related literature is an eternal part of any research process. Without reviewing each research is incomplete and chances of duplication of work enhances. Through a proper review of research researcher can trace substantive research gaps in the researches and worked upon them. Following are the relevant studies reviewed by the investigator:

Reviews related to Higher Education in India:

Chaudhary (2019) studied on "Outcome Based Education in Higher Education Institutions in India Assessment of Understanding and Application and Measuring Training Impact"; Trakru (2017) studied on "Effectiveness of e Learning in Higher Education An Empirical Study"; Khan (2015) studied on "Higher Education In Punjab An Evaluative Study"; kholi (2011) studied on "A study of environmental education attitude and awareness among the students in higher education in Nagaland"; Singai (2018) studied on "Higher Education And University Governance In India"; Sarmah (2015) studied on "Inequality in access to higher education"; Bhatnagar (2015) studied on "A study of higher technical educational institutes in western UP and NCR with special reference to qualification and performance of faculty in delivering quality education"; Hijam (2015) studied on "Management of the higher education in Manipur since 1972"; Singh (2015) studied on "The growth of higher education in Manipur 1980 - 2001"; Pradhan (2015) studied on "A Study of the Materials and Methodology Used to Teach English in Colleges of Engineering"; Tajeri (2017) studied on "An exploration of digital storytelling as a learning activity in teaching of English as a second language in higher education"; Ahjuja (2018) studied on "An in depth studies of teaching competencies of higher education teachers and its

relation to social capital"; Banumathi (2018) studied on "Faculty competencies for effective teaching learning process in higher education institutions"; Nagaraj (2005) studied on "Effectiveness of reciprocal teaching technique in enhancing the reading skills of engineering students in English"; Chandrasekarac (2012) studied on "Effective communicative English teaching techniques for non English speakers at the undergraduate programmee." From these recent studies on higher education researcher could found that the major area of investigation of researchers in higher education are on studying the training impact, studying the ICT or e learning impact, studying the awareness, attitude, performance and teaching competencies of the teachers and students in higher education. Investigators have also studied the status of higher education in different states.

Reviews related to Teacher Education in India:

Mishra (2018) studied on "A study of relationship of academic achievement to aptitude, attitude and anxiety of MEd students studying under Dr. Babasaheb Ambedkar Marathwada university jurisdiction"; Yazdani (2016) studied on "Professionalism among Teacher Educators of District Institute of Education and Training DIETs in Delhi"; Gunjal (2014) studied on "Evaluative study of the relation between socio economic background with perception and attitude of B Ed students towards teacher training and teaching profession"; Atula (2016) studied on "Teacher Education Programmes in Himachal Pradesh An evaluation Study"; Balasubramanya (2017) studied on "Teaching competence of teacher educators in relation to their personality type and attitude towards teaching profession"; Mathew (2003) studied on "Feasibility of implementing Modern Instructional strategies in the Institutions of Teacher Education in Kerala"; Nagarathna (2018) studied on "A study of the intended and implemented curriculum of internship at secondary teacher education in Karnataka"; Singh (1990) studied on "Effectiveness of VALUE Teaching Using Value Clarifying Strategies in Development Value Orienation of Student Teachers"; Moruskar (2004) studied on "A comparative study of the teachers trained through four year integrated course and one year course in secondary teacher education in respect of teacher competency and teaching effectiveness"; Gopinath (2014) studied on "Developing a package based on metacognitive strategies for promoting skills in teaching Mathematics among student teachers at secondary level"; Qureshi (2016) studied on "Teaching Aptitude Level of Intelligence Mental Health and Attitude towards Teaching of Student Teachers in Secondary Teacher

Education Institutions of Jammu and Kashmir Divisions A Comparative Study"; Santhakumari (2014) studied on "Study on the perception of teacher educators on the practical aspects of secondary teacher education"; Subbulakshmi (2016) studied on "An Analysis of The Techniques of Teaching Drama to ESL Learners"; Khan (2007) studied on "To investigate into the effectiveness of microteaching as a techniques on general teaching competence gtc on pupil teachers". Sansanwal (1976) studied the effect of Programmed learning material for teaching of research methodology at M.Ed. level. He has used a control group experimental for the study and found that the program is effective for learning research methodology.

From the above mentioned recent studies in teacher education researcher found that most of the investigators studied on perception, attitude, aptitude and teaching competencies of teacher educators towards teaching profession, effectiveness of some programme like new internship programme, microteaching, developed package, value teaching etc. Here studies are comparative, evaluative, survey and experimental in nature. In the premises of Teacher Education most of the researches are either on B.Ed. students or on Teacher educators and very few studies were conducted on M.Ed. students. Only one study of Sansanwal (1976) was found on M.Ed. students for learning of Research Methodology with Programmed learning material strategy. Still no such study was found who took interest in teaching of Data analysis techniques to M.Ed. students with some effective strategy.

Reviews related to Cooperative Learning:

Old reviews related to Cooperative Learning:

Salvin (1953) studied Cooperative learning methods mostly aim at the development of cognition, which includes thinking, remembering, concept formation, problem solving and logical reasoning in social context.

Vygotsky (1978) defined and pointed out the existence of a zone of proximal development, which means a distance between what a student could do alone (the actual development level) and what a student could achieve in collaboration with others (the proximal level). They called good learning if there is advance development to the next zone. The main path of learning proceeds from the social to the individual. Therefore, the proximal level today in collaboration with other will be the actual development level tomorrow.

Krashen (1985) identified second or foreign language acquisition should be a highly collaborative and interactive process. He also claimed that a small group approach enabled learners to gain better language competencies than teaching methodologies that stressed the memorization of grammar, vocabulary and drill exercises in isolation.

Newmann & Thompson (1987) has provided descriptive inventory of research studies of cooperative learning at the secondary level. They have reviewed twenty-seven reports of high quality studies, involving 37 comparisons of cooperative versus control methods. The effectiveness of cooperative learning is discussed along with implications for practice. Cooperative learning is also advocated for improving social relations between races, ethnic groups, high and low achievers, or for increasing productivity in problem solving. A summary is presented on studies of five major techniques for implementing cooperative learning in grades 7-12.

Johnson et al. (1987) conducted a Meta analysis of 122 studies of cooperative learning done between the year 1924 to 1981. It was found that cooperative learning tends to promote higher achievement than does competition or individual work, with this finding holding for all age levels, all subject areas, and a variety of tasks.

Slavin (1991) identified 70 studies that evaluated various cooperative learning methods for periods of 4 week or longer. Here also it was reported that cooperative learning was found to be effective at all grade levels in the same degree, in all major subjects and in urban, rural and suburban schools. Effects were equally positive for high, average and low achievers.

Muthaiah (1994) studied on "A study of the effectiveness of cooperative learning strategy in enhancing achievement in mathematics and social interaction of high school students in Coimbatore".

Murray (1994) identified learning is social and further stresses that people learn best when they learn through social interaction.

Banerjee (1997) compared the effect of lecture and cooperative learning strategies on achievement in chemistry in undergraduate students. Peer assisted learning has significant positive effects on study achievements. The results are consistent with the arguments put forward by Gyanani & Pahuja (1995) (as sited in Prof. Dr. Mohamed Dahlan Bin Ibrahim and Dr. Naila Aaijaz, 2011).

Rahaya (1998) conducted a study using STAD/Jigsaw as a model which involved 1180 students from 18 schools. It was also found that cooperative learning can enhance scientific skills, promote enquiry learning and increase science achievement.

Armstrong (1999) conducted a study comparing the performance of homogenously grouped, gifted students to heterogeneous ability groups that included gifted, average and low performing learners. Both groups experienced a comparable increase in achievement after working together, with gifted group performing only slightly higher (as sited in Qaisara Parveen, Sheikh Tariq Mahmood, Dr. Azhar Mahmood, & Prof. Manzoor Arif, 2011).

Kosar (2003) investigated the effects of cooperative learning on the achievement of 7th class students in the subject of Social Studies. The sample comprised 40 students of 7th class equally placed in experimental group and control group on the basis of scores obtained in the social studies annual examination. In this experiment of two weeks, "cooperative learning resulted in higher achievement as compared to routine method of teaching social studies" (as sited in Qaisara Parveen, Sheikh Tariq Mahmood, Dr. Azhar Mahmood, & Prof. Manzoor Arif, 2011).

Siddiqui (2003) studied the available researches on second language acquisition which reveals that to develop and learn a language, learners must interact in that language. Increasing the frequency and variety of the verbal interaction in which learners participate is an important goal of any instruction based on the principles of second language acquisition. The teacher-fronted approach often ends up preventing students from having genuine interactions with the teacher and fellow students because the teacher initiates and controls the interaction. Collaborative learning encourages mutual interaction and, by increasing the number of opportunities available for verbal expression, provides opportunities for a wider range of communicative functions than those found in teacher fronted classrooms (as sited in Qaisara Parveen, Sheikh Tariq Mahmood, Dr. Azhar Mahmood, & Prof. Manzoor Arif, 2011).

Jhala (2003) studied on "A study of the effectiveness of cooperative learning and mastery learning approaches in teaching of algebra in STD IX".

Chien (2004) conducted study on incorporating cooperative learning to teach English as a foreign language in Taiwan. The purpose of the study was to provide a measure of the effectiveness of cooperative learning in teaching English as a foreign language in terms of students' achievement, oral production and improvement in students' attitude language learning.

Results shows that teaching through cooperative learning proved to be effective as all the classes improved over the scores gained in pre-test and post test.

Iqbal (2004) studied that cooperative learning is more effective as a teaching learning technique for mathematics as compared to traditional teaching method. Students in cooperative groups outscored the students working in traditional learning situation, but in cooperative groups, they have no obvious supremacy over students taught by traditional method in retaining the learnt mathematical material. Low achievers in cooperative groups have significant superiority over high achiever (as sited in Qaisara Parveen, Sheikh Tariq Mahmood, Dr. Azhar Mahmood, & Prof. Manzoor Arif, 2011).

Recent reviews related to Cooperative Learning:

Lin & Li Li (2010) studied to examine the perspectives of both teachers and students toward the Cooperative Learning Jigsaw technique as an instructional approach within university level English learning in Taiwan. A qualitative descriptive approach was utilized to discover and interpret the elements of both Taiwanese teachers and students' perspectives toward CL Jigsaw as an instructional approach in English classrooms. The results of this study showed that the CL Jigsaw technique significantly contributed to the English learning of the university level freshmen students at Southern Taiwan University in Taiwan. The findings generated from the interviews, classroom observations, and survey questionnaires indicated that Taiwanese instructors and students had both positive and negative opinions about the C L Jigsaw technique. However, both teachers and students expressed their willingness to continue adopting this teaching approach to either teach or learn English in their future English classes. Additionally, teachers' difficulties about implementing the CL Jigsaw technique were analyzed in this study. Ultimately, both Taiwanese instructors and students highlighted the important factors that made the CL Jigsaw technique successful in their English classroom learning. The findings of this study have some pedagogical implications that inform suggestions for future English teaching in Taiwan's university institutions.

Arco-Tirado et. al., (2011) studied the impact of a peer tutoring program on preventing academic failure and dropouts among first-year students (N = 100), from Civil Engineering, Economics, Pharmacy, and Chemical Engineering careers; while, on the other hand, to identify the potential benefits of such tutoring program on the cognitive and metacognitive learning strategies and

social skills of student mentors in their last year of studies or already in a postgraduate program (N = 41) at the University of Granada (Spain). The results show differences in favour of the treatment group on grade point average, performance rate, success rate and learning strategies and, also, statistically significant pre-post differences for the tutors on learning strategies and social skills.

Sahin & Abdullah (2011) compared the Jigsaw III technique (of cooperative learning) with the instructional teacher-centered teaching method in six graders in terms of the effect of written expression on their academic success. The sample of the study consists of 71 sixth-grade students studying during 2009-2010 academic term in a primary school in the province of Erzurum. Two classes were randomly selected: one (n = 35) of which was the control group where teacher-centered teaching method was applied, the other being experimental group (n = 36) where the Jigsaw III technique was applied. In the study, one of the most common application, pretest/posttest with control group experimental design, was chosen. The data regarding the academic success of the groups were collected by means of the achievement test in Turkish course as pretest, posttest and retention test; the students' opinions about the group works were obtained through feedback form, group work opinionnaire, and data were analyzed through 11.5 SPSS program. The results of the statistical analysis of teaching a written expression course showed that the experimental group did significantly better than the control group in terms of academic success. In addition, it can be said that the students had positive impressions on the Jigsaw III technique.

Maden & Sedat, (2011) studied to compare the effects of Jigsaw I technique from traditional teaching method on academic achievement and retrieval of Turkish teacher candidates in the matter of written expression. The sample of the study consists of 70 students studying at the Department of Turkish teaching in the academic year of 2009 - 2010. One of the classes was randomly specified as control group (N=34) to which traditional teaching method was applied while the other as test group to which the Jigsaw technique (N=36) was applied. It was observed as a result of statistical analyses that there was not a significant variation in favor of the test group in terms of academic success and stability between the test group and the control group in teaching the written expression subject. It was also determined according to the results obtained from the study that the students stated positive views for the Jigsaw I technique.

Wang et.al. (2011) studied the impact of animation interactivity on novices' learning of introductory statistics. The interactive animation program used in this study was created with Adobe Flash following Mayer's multimedia design principles as well as Kristof and Satran's interactivity theory. This study was guided by three main questions: 1) Is there any difference in achievement improvement among students who use different interactive levels of an animation program? 2) Is there any difference in confidence improvement among students who use different interactive levels of an animation program? 3) Is there any difference in program perception among students who use different interactive levels of an animation program? A sample of 123 college students participated in the study and was randomly assigned into four groups. The students used the animation program in the computer lab and then took online surveys and tests for evaluation. The findings were as follows: 1) Animation interactivity impacted students' improvement on understanding ($p = 0.006$) and lower-level applying ($p = 0.042$), and 2) animation interactivity did not significantly impact student confidence and program perception. Students' lack of cognitive skills and the time limit might decrease the effect of the interactive animation.

Thomas (2013) studied on "A study on the effectiveness of a strategy based on cooperative learning for science teaching in class VII". Awasthi (2014) studied on "Impact of Cooperative learning on achievement, self esteem and cohesiveness of students of different personality types". Sivakumar (2014) studied on "Effectiveness of Cooperative Learning and Computer Assisted Learning on the Academic Achievement of IX Standard Students in Biology". Jeevan (2017) studied on "Effect of cooperative learning on academic anxiety social skills and achievement in social studies of secondary school students". Jose (2018) studied on "Developing a model based on cooperative learning for enhancing social intelligence and academic achievement among students at upper primary level". Khint (2018) studied on "A study of an effectiveness of C L L cooperative language learning and M I multiple intelligence on educational achievement and retention with reference to teaching of Gujarati language".

All these studies suggest that cooperative learning strategy is mostly implemented on upper primary, secondary and higher secondary students with mathematics, science, biology and language subjects. Researcher has also observed that in most of the studies academic achievement, social skills, social intelligence, cohesiveness of students is also studied by the

investigators. Here nature of studies are either experimental, descriptive survey, evaluative or comparative.

2.1. Implications for the Present Study

The review of the related literature mentioned has the following implications for this study:

- ➢ The review of all the above mentioned studies reveals that cooperative learning is a very powerful strategy in the classroom. Reviews suggested that a large number of studies were done on cooperative learning in different subjects namely, Muthaiah (1994) Banerjee (1997), Siti Rahaya (1998), Armstrong (1999), Kosar (2003), Iqbal (2004), Arco-Tirado et.al (2011), Sahin & Abdullah (2011), Maden & Sedat (2011), Thomas (2013), Sivakumar (2014) and Jeevan (2017).

- ➢ Some studies were found on learning of their first language through cooperative learning namely by Khint (2018) and few were of foreign language learning through cooperative learning namely Krashen's (1985) and second language acquisition by Siddique (2003), Chien (2004), Lin & Li Li (2010).

- ➢ Cooperative learning not only enhances academic achievements but also enhances certain psychological constructs like scientific skills and enquiry learning Rahaya (1998); self esteem and cohesiveness Awasthi (2014); social intelligence Jose (2018); multiple intelligence Khint (2018) and social skills Jeevan (2017).

- ➢ Cooperative learning also helps in attaining mastery learning in Mathematics Jhala (2003).

- ➢ It is also found from the studies of Salvin (1953) and Vygotsky (1978) that cognitive development, problem solving and logical reasoning enhances from cooperative learning. One recent study done by Wang et.al (2011) shown positive results in learning of statistics through interactive animation. Three Meta analyses were done by Johnson et.al (1987), Newmann & Thompson (1987) and Salvin (1991) which reflects that cooperative learning is highly effective in learning.

- ➢ Slavin (1991) identified 70 studies and found that cooperative learning is effective at all grade levels in the same degree, in all major subjects and in urban, rural and suburban schools. Effects were equally positive for high, average and low achievers.

- On cooperative learning most of the studies were conducted on upper primary, secondary and higher secondary students and very few has been implemented on college level or at the higher education level.

- Investigator has come across Banerjee (1997) study which was conducted at undergraduate level and Lin & Li Li (2010) study which was conducted at university level. In both the study's results hold the same for cooperative learning.

- Investigator has come across only single study conducted by Sansanwal (1976) which is relating with learning of research methodology through PLM.

- It is being observed that most of the studies are of experimental in nature and very few of them are of evaluative, comparative or of survey type.

- In most of the studies mentioned above impact of Cooperative learning is affecting the academic achievement, social skills, social intelligence and perception of the students.

- In spite of all these research findings we can see that in our country there is a dearth of such studies related to cooperative learning in higher education and specifically in learning of data analysis techniques. Therefore, Investigator wants to study the effect on learning of data analysis techniques through cooperative learning strategy on M.Ed. students.

2.2 Research Questions:

1. How can we enhance research competence of M.Ed. students?
2. How can we reduce fear of M.Ed. students for learning data analysis techniques?

3.0 Rationale:

Education needs innovation and novelties in educational practices so that we can be at par with the modern world. Since innovations and novelties in education are brought up through educational researches and quality of these researches depends upon the quality of education received by the educational researchers. Therefore, the investigator has picked up this area for the study purposes i.e. a study on learning of data analysis techniques. From last few decades 'students' become the main focus in teaching –learning process and therefore now a days we are focusing on "student centered learning approaches". In this student centered learning approach student plays a pivot role instead of a teacher. Johnson & Johnson (1985) suggested that

Cooperative learning has been advocated as an instructional strategy because of its positive effect on achievement and on other attributes that accompany the acquisition of knowledge, including motivation, classroom socialization, the student's confidence in learning and attitude toward the subject being learned (as sited in G. Giraud, 1997). Similar results from all the studies reviewed by the investigator has been found and it is clear to see that cooperative learning is a highly effective strategy in classroom, whether the students are of upper primary, secondary, higher secondary level or of college level. In the similar lines Bligh (1972) reviewed close to 100 studies conducted at the college level over 50 years of period. He found that students who become involved in active discussion of their ideas with other students are more likely to have less irrelevant or distracting thoughts and spend more time in synthesizing and integrating concepts than students who listen to lectures. "All these comparisons are statistically significant and suggest during discussion students are more attentive, active and thoughtful than in lectures" (as sited in James Cooper, Susan Prescott, Lenora Cook, Lyle Smith, Randall Mueck and Joseph Cuseo, 1990).

As educational researchers learn data analysis techniques in depth at M.Ed. degree course where students come from various disciplines like science, humanities and commerce, it is necessary to cater to their needs of knowledge, understanding, proper utilization and application of Statistical data analysis techniques, so that, they can efficiently do their dissertations work for M.Ed. degree and further research work. By considering all these factors the investigator has decided to conduct a study on M.Ed. students for learning of Statistical data analysis techniques through cooperative learning.

4.0 Statement of the Problem:

Development of an Educational Program on Data Analysis Techniques for M.Ed. Students through Cooperative learning

5.0 Objectives of the Study:
i)   To design lessons on various data analysis techniques for M.Ed. Students.
ii)   To study the effectiveness of the Educational Program on data analysis techniques for M.Ed. Students through cooperative learning in terms of achievement of the students.

iii) To study the reactions of M.Ed. Students towards the Educational Program on data analysis techniques through cooperative learning for M.Ed. students.

6.0 Hypotheses of the Study:

1) Ho1: There will be no significant difference between mean scores of achievement of the students who studied data analysis techniques through cooperative learning and that with conventional method.

2) Ho2: There will be no significant difference between the observed frequencies against reactions of M.Ed. students who had learnt data analysis techniques from Cooperative learning and the frequencies expected against the equal probability.

3) Ho3: There will be no relationship between the achievement scores of M.Ed. students who had learnt data analysis techniques from cooperative learning and their respective cooperative scores.

7.0 Operationalization of the Terms:

i. **Effectiveness:** The scores which are obtained from an achievement test after the implementation of learning program of data analysis techniques through cooperative learning on M.Ed. students.

ii. **Reactions:** A reaction scale was constructed by the investigator and reactions of the M.Ed. students were recorded to know the impact of the educational program of data analysis techniques through cooperative learning.

iii. **Cooperative Score:** This is a score calculated for each student on the basis of their reactions on the reaction scale.

8.0 Delimitations of the study:

1) The medium of instruction for the study was English language.

2) The Educational programme includes selected Statistical data analysis techniques only.

9.0 Design of the Study:

For the present study the investigator has used Pre-Test Post-Test Experimental Control Group design. There were two groups namely Experimental Group and Control Group. The investigator has managed to take the experimental group students to learn with the data analysis techniques through cooperative strategy and no particular strategy was used for

control group students while learning data analysis techniques. Here in this study following variables was incorporated:

Independent variable: Cooperative learning strategy

Dependent variables: Scores on Achievement test

and

Reactions of M.Ed. students (in terms of six elements of cooperative learning)

O1 X O2	O1 O3 Pre - Test	X: Experimental Study
O3 C O4	O2 O4 Post - Test	C: Control group

10.0 Population and Sample:

The population for the study consisted of all the students perusing M.Ed. degree course during 2014-2015 in India. There were approximately 229 colleges in India where M.Ed. course was running. Out of these two colleges were selected purposely for this study. Since 2014, M.Ed. program was of two years instead of one year. Many M.Ed. colleges faced difficulties in getting sufficient enrolment. Hence two institutions, namely, Department of Education (CASE), Faculty of Education and Psychology, The Maharaja Sayajirao University of Baroda, Vadodara and Regional institute of Education, Bhopal agreed for this study where reasonable numbers of students were enrolled.   The two intact groups were considered as samples for the study. One group was treated as a control group and another group as an experimental group for the study.

In the academic year 2014-15 at Department of Education (CASE), The Maharaja Sayajirao University of Baroda there were 35 students admitted in M.Ed. degree course. But after one month one student left this course and one student met with an accident and dropped of this course for one year. Hence researcher was left with 33 students in this group. This group was treated as an experimental group in the study.

In this same academic year at RIE Bhopal there were 13 students admitted in M.Ed. degree course and all 13 were considered for this another group. Now this group was consider as a control group for the study.

11.0 Tools

There were three tools used for data collection. Details for each tool are given below:

i. Entry level check on statistical data analysis techniques: In order to know the entry behavior of both the groups i.e. experimental and control groups an Achievement test was constructed and administered by the investigator on M.Ed. students. There were 40 items in this test. The scores obtained on this achievement test were considered as covariates while doing hypothesis testing. This tool is based on four components. These four components were:

i.   Frequency distribution

ii.   Diagrammatic and graphical representation of data

iii. Measures of central tendency

iv.   Measures of dispersion

This tool was validated by my Ph. D. guide and five other experts, namely, three subject experts, one psychology expert and one language expert. Suggestions by the experts were incorporated. Then the tool was administered on both the groups of the students.

ii. Achievement Test on data analysis techniques: An achievement test was constructed to study objective-2. This tool includes multiple choice questions. Each question carries one mark. Question in this tool were on the selected data analysis techniques only. This tool was also validated by my Ph. D. guide and other five experts namely, three subject experts, one psychology expert and one language expert. Suggestions of the experts were incorporated. There were 70 statements in this test. This achievement test was administered on both the experimental and control groups. The scores obtained on this achievement test were considered as "the test scores of experimental group" and "the test scores of control group", respectively.

iii. Reaction Scale: A reaction scale was constructed by the investigator which was used for knowing the impact of cooperative learning of data analysis techniques on M.Ed. students. The reaction scale was filled by experimental group of M.Ed. students at the end of implementing educational program. This tool consisted of 61 statements on six major components of cooperative learning (positive interdependence, equal participation, individual accountability, simultaneous interaction, interpersonal and small group skills, structuring group processing).

This rating scale was validated by my Ph. D. guide and two subject experts, one language expert and one psychology expert.

12.0 Data Collection

The study was conducted in the following manner and the data were collected in the following phases:

Phase 1: Designing of Lessons

The lessons for each selected topic was designed by the investigator and then showed to my Ph.D. guide. The lesson plans were modified. The dialogue approach and cooperative strategy were used in the designing of lesson plans.

Phase 2: Seeking Permission

The investigator sought permissions from the Heads of both the institutions, namely, Prof. S.C Panigrahi, Head of the Department of Education (CASE), Faculty of Education and Psychology, The Maharaja Sayajirao University of Baroda, Vadodara and from Prof. H. Senapaty, Principal, Regional Institute of Education, Bhopal for conducting study in these institutions.

Phase 3: Testing for Entry Level of M.Ed. students

Entry level checks on statistical data analysis techniques tool were constructed and administered by the investigator on both the experimental and control groups and scores were obtained from them.

Phase 4: Conducting Classes

For each selected topic of data analysis techniques class were engaged by the investigator on experimental group of students. Each topic was treated through cooperative learning strategy.

Phase 5: Construction and administration of Achievement test on data analysis techniques

An achievement test was constructed by the investigator based on the content analysis for the selected topics of Statistical data analysis techniques. Each item was related to the specific instructional objective. The test was validated by two subject experts, one language expert and one psychology expert. This achievement test was administered on all the M.Ed. students of both the groups, that is, experimental and control group. Hence, achievement scores of both the groups of students were obtained.

Phase 6: Construction and Administration of Reaction Scale

A reaction scale was constructed and administered on only experimental group of M.Ed. students to study the impact of Cooperative learning of data analysis techniques on them. Students were asked to give their reactions against each statement and then the completed reaction scale was collected back by the investigator.

13.0 Programme of the study:

Pre-requisites of the Programme:

i.   Students were briefed about the expected behavior and the way of conduct required for a cooperative classroom.

ii. Every class (session) was of 90 minutes (45 + 45 minutes).

iii. The programme consisted of basic units of 5 or 6 students in each group. Each group was heterogeneous in terms of their disciplines and achievements of pre-test scores. The group formation of these 5 or 6 students was carried out through randomization.

Programme:

i.   **Announcement of Topic:** Three days prior, the investigator announced the topic inside the class. Relevant references were also informed to the students.

ii. **Distribution of Task:** Students read from various resources about the topics. According to their friend circle, the group students distributed their tasks among themselves and then interacted. Here informal group exchange of information took place.

iii. **Individual or grouped learning of students:** Sometimes students read the topic in group and sometimes they prepared individually also.

iv. **Orientation to Topic by the investigator:** Here investigator used dialogue approach and major teaching points of the stated topic were shared in the classroom.

v.   **Creation of groups:** Here groups of 5 or 6 students were created randomly using calling number technique or selection cum randomization technique. Now every group of students was asked to sit in circular way. So that every member could see and interact with the every other member in the group.

vi. **Allocation of classroom assignment:** Here different problems related to concerned data analysis technique were provided to different group of students. Generally one problem is provided to two groups. Since there were usually five or six groups, the researcher provided three different problems. And 15 to 20 minutes were given to complete this task. Students interacted, discussed, distributed tasks among themselves and worked out solutions to those assigned problems.

vii. **Within group and between group interactions:** when students were able to solve the assigned problem within group. They presented their solution but if one group failed to solve their problem then the other group who was addressing the same problem helped the other group. In case both groups failed to solve their problem then other groups who worked on similar problem helped them. In some situations the investigator facilitated.

viii. **Presentation of assignment: H**ere one student randomly selected from their group presented the solution of the assigned problem on the black board. When so ever some additional inputs were given by other group of students they added at the end of presentation. Usually, 5 to 7 minutes were allotted for each presentation.

ix. **Summarizing the topic:** This task was carried by the investigator where major teaching points under the topic were recapitalized by the investigator.

x. **Allotment of Home Assignment:** For practice the investigator assigned home assignment to the students. This assignment was common for all students. All students performed their assignment.

xi. **Announcement of a new topic:** At the end a new topic was announced for the next class and relevant references were also shared with the students.

14.0 Data Analysis

In this study following data analysis techniques were used with respect to each objective:

Sr. No	Objectives	Technique
1	I	-
2	ii	**Scatter plot:** To check linearity in dependent (post achievement test score) and covariates (entry level check on statistics data analysis techniques) of both groups (experimental group and control group). **ANOVA:** To check statistically, to test the hypothesis: There is no significant interaction between the treatment (post achievement test scores) and covariates (entry level check on statistics data analysis techniques). **Levene's Test of equality of error variance:** Testing for homogeneity of variance. **ANCOVA:** To test the significant difference between the mean scores of post test achievement scores of the two groups (experimental group and control group).
3	iii	**Cronbatch's Alpha:** To check reliability of the reactions made by Experimental group of students through the administered reaction scale on them. **Scatter Plot and correlation coefficient:** Scatter Plot of Cooperative Scores Vs Achievement Scores and the respective correlation coefficient. **Frequency distribution:** frequency distribution of the reactions made by Experimental group of students through the administered reaction scale on them. **Chi-square test:** There will be no significant difference in the observed frequencies and the expected equally distributed frequencies.

15.0 Findings of the Study

The findings of the study are as follows:

i. The mean achievement score of the experimental group of students (i.e. the students learnt data analysis techniques through cooperative learning) is significantly high than the mean achievement score of the control group (i.e. the students learnt data analysis techniques through traditional method).

ii. There is high positive correlation between the cooperative score and the achievement score of the experimental group of students. It means that with an increase in cooperative score achievement score is also increased.

iii. For the components of cooperative learning (i.e. positive interdependence, equal participation, face to face promotive interaction, individual accountability, appropriate use of collaborative skills and group processing) the coefficient of skewness is significantly highly negative which indicates that most of the students have favourable or positive attitude towards learning of data analysis techniques through cooperative strategy.

iv. Using chi-square test it is found that students gave favourable reaction towards "Every member was having positive outlook to accept the task".

v. Using chi-square test it is found that students gave favourable reaction towards "Every member helped each other to complete the task".

vi. Using chi-square test it is found that students gave favourable reaction towards "Every member was fully involved in the task".

vii. Using chi-square test it is found that students gave favourable reaction towards "Every member respected the other ones".

viii. Using chi-square test it is found that students gave favourable reaction towards "Encouragement and support were provided mutually".

ix. Using chi-square test it is found that students gave favourable reaction towards "All the members converged on the solution".

x. Using chi-square test it is found that students gave favourable reaction towards "All members were involved to achieve the task".

xi. Using chi-square test it is found that students gave favourable reaction towards "Every member was treated equally".

xii. Using chi-square test it is found that students gave favourable reaction towards "Participation in team brought self confidence and fearlessness".

xiii. Using chi-square test it is found that students gave favourable reaction towards "Every member participated and presented".

xiv. Using chi-square test it is found that students gave favourable reaction towards "Members posed questions to each other".

xv. Using chi-square test it is found that students gave favourable reaction towards "Members listened to each other".

xvi. Using chi-square test it is found that students gave favourable reaction towards "All the members got chance to express their ideas to one another".

xvii. Using chi-square test it is found that students gave favourable reaction towards "There was discipline during the interaction".

xviii. Using chi-square test it is found that students gave favourable reaction towards "Members discussed in-depth to understand thoroughly".

xix. Using chi-square test it is found that students gave favourable reaction towards "Members were probing deeply together".

xx. Using chi-square test it is found that students gave favourable reaction towards "Members were explaining thoroughly".

xxi. Using chi-square test it is found that students gave favourable reaction towards "Very often interactions occurred during presentations".

xxii. Using chi-square test it is found that students gave favourable reaction towards "Students were always interested in learning in cooperative setup".

xxiii. Using chi-square test it is found that students gave favourable reaction towards "Every member of the team was eager to complete the task".

xxiv. Using chi-square test it is found that students gave favourable reaction towards 'Every one accepted the assigned role in the team".

xxv. Using chi-square test it is found that students gave favourable reaction towards "Every one completed the accepted task".

xxvi. Using chi-square test it is found that students gave favourable reaction towards "Every one contributed ideas, thoughts and suggestions to the team".

xxvii. Using chi-square test it is found that students gave favourable reaction towards "Members helped other team members if they faced difficulty".

xxviii. Using chi-square test it is found that students gave favourable reaction towards "Personal assignments were completed regularly".

xxix. Using chi-square test it is found that students gave favourable reaction towards "Everyone got chance to represent their own team in the presentation'.

xxx.   Using chi-square test it is found that students gave unfavourable reaction towards "All were regular in the class" because some students were not regular present in the class.

xxxi.   Using chi-square test it is found that students gave favourable reaction towards "All the team members were engaged in the completion of task".

xxxii.   Using chi-square test it is found that students gave favourable reaction towards "The team members were treated respectfully".

xxxiii.   Using chi-square test it is found that students gave favourable reaction towards "All the team members observed high moral".

xxxiv.   Using chi-square test it is found that students gave favourable reaction towards "Tasks were distributed properly among the team members".

xxxv.   Using chi-square test it is found that students gave favourable reaction towards "Conducive environment of learning was created".

xxxvi.   Using chi-square test it is found that students gave favourable reaction towards "Time was managed properly".

xxxvii.   Using chi-square test it is found that students gave favourable reaction towards "Suggestions of all the members were considered".

xxxviii.   Using chi-square test it is found that students gave favourable reaction towards "Team members were properly instructed".

xxxix.   Using chi-square test it is found that students gave favourable reaction towards "It was a collective learning through participatory approach".

xl.   Using chi-square test it is found that students gave favourable reaction towards "Interactions were done in a healthy learning environment".

xli.   Using chi-square test it is found that students gave favourable reaction towards "Every member was free to ask and respond to the questions".

xlii.   Using chi-square test it is found that students gave favourable reaction towards "Every member got chance to express the ideas".

xliii.   Using chi-square test it is found that students gave favourable reaction towards "Members were free to interact in different languages (Hindi, English & Guajarati)".

xliv.   Using chi-square test it is found that students gave favourable reaction towards "Members paid attention to the speaker".

xlv.   Using chi-square test it is found that students gave favourable reaction towards "Members were ready to work in randomly selected teams".

xlvi.   Using chi-square test it is found that students gave favourable reaction towards "All members were allowed to express their ideas".

xlvii. Using chi-square test it is found that students gave favourable reaction towards "Ideas of all were used to solve a problem".

xlviii. Using chi-square test it is found that students gave favourable reaction towards "There was full faith in the work done by others".

xlix.   Using chi-square test it is found that students gave favourable reaction towards "Other's explanations were relieved on".

l.   Using chi-square test it is found that students gave favourable reaction towards "Team work was fully observed".

li.   Using chi-square test it is found that students gave favourable reaction towards "Credit of success/failure was attributed to all members of the team".

lii.   Using chi-square test it is found that students gave favourable reaction towards "All the ideas were comprehended to arrive at a common solution".

liii.   Using chi-square test it is found that students gave favourable reaction towards "Team members were directed to carry out the distributed task".

liv.   Using chi-square test it is found that students gave favourable reaction towards "Results were drawn by   summarizing the work of all team members".

lv.   Using chi-square test it is found that students gave favourable reaction towards "All were made emotionally & mentally ready to work in a team".

lvi.   Using chi-square test it is found that students gave favourable reaction towards "Members were convinced logically on their arguments".

lvii.   Using chi-square test it is found that students gave favourable reaction towards "Necessary arrangements were made to work in a team".

lviii. Using chi-square test it is found that students gave favourable reaction towards "Conflicts were resolved amicable".

lix.   Using chi-square test it is found that students gave favourable reaction towards "New teams were constituted in the progressive class".

lx. Using chi-square test it is found that students gave favourable reaction towards "Members were selected randomly for team formation".

lxi. Using chi-square test it is found that students gave favourable reaction towards "Team goals objectives were made clear to all the team members".

lxii. Using chi-square test it is found that students gave favourable reaction towards "Each team work was assessed periodically by the teacher".

lxiii. Using chi-square test it is found that students gave favourable reaction towards "Actions facilitating learning in this setup were promoted".

lxiv. Using chi-square test it is found that students gave favourable reaction towards "Futile actions were dropped".

From statement no. (iv) to (lxiv) it is found that students gave favourable reactions towards the cooperative environment setup while learning data analysis techniques through cooperative learning strategy. Only in one statement i.e. "All were regular in the class", favourable response was not received as some students were not regular in class.

References:

Ahjuja, S. (2018). *An in depth studies of teaching competencies of higher education teachers and its relation to social capital.* Jamia Hamdard University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/211522

Arco-T., Jose L.; Fernandez, M., Francisco D. Fernandez, B. & Juan, M. (2011). *Higher Education: The International Journal of Higher Education and Educational Planning.* 62(6), pp.773-788.

Aronson, E., Blaney, N., Stephin, C., Sikes, J., & Snapp, M. (1978). *The jigsaw classroom.* Beverly Hills, CA: Sage Publishing Company.

Atula, J. (2016). *Teacher Education Programmes in Himachal Pradesh An evaluation Study.* Himachal Pradesh University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/202005

Awasthi, D. (2014). *Impact of cooperative learning on achievement self esteem and cohesiveness of students of different personality types.* University of Lucknow. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/70165

Balasubramanya, N. (2017). *Teaching competence of teacher educators in relation to their personality type and attitude towards teaching profession.* University of Mysore. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/209691

Banumathi, S. (2018). *Faculty competencies for effective teaching learning process in higher education institutes.* Anna University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/252681

Best, J.W. & Kahn, J.V. (1993). *Research in Education* (7th ed.). New Delhi: Prentice Hall of India Private ltd.

Bhatnagar, G. (2015). *A study of higher technical educational institutes in western UP and NCR with special reference to qualification and performance of faculty in delivering quality education.* Sharda University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/233079

CASE (2000). M.Ed. Syllabus, The Maharaja Sayajirao University of Baroda., Vadodara.

CASE (2013), *General objectives of Methodology of Educational Research.* Syllabus of M.Ed. Course. Published by Centre of Advance study in Education, Faculty of Education and Psychology, The Maharaja Sayajirao University of Baroda. P. 21

Chakraberti, M.i (1977). *An inquiry into strategies of classroom teaching.* The Maharaja Sayajirao University of Baroda. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/58465

Chandrasekarac, A. S. (2012). *Effective communicative english teaching techniques for non english speakers at the undergraduate programmee.* Periyar University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/198991

Chaudhary, A. (2019). *Outcome Based Education in Higher Education Institutions in India Assessment of Understanding and Application and Measuring Training Impact*. Manipal University Jaipur. Ph.D. Thesis.Retrieved from http://hdl.handle.net/10603/235719

Chien, Y.C. (2004). *Incorporating cooperative learning in Taiwan English as a foreign Language (EFL) classrooms*. An Unpublished Ph.D. Thesis, DAI, 65 (09), p.3311.

Cooper, J., Prescott, S., Cook, L., Smith, L., Mueck, R. & Cuseo, J. (1990). *Cooperative Learning and College Instruction.* California State University, Eduational Resources Information Center.

Devi, U. (2015). *Teaching competency of secondary school teachers in relation to teaching attitude personality and anxiety.* Maharshi Dayanand University. Ph.D. Thesis. Retrieved from   http://hdl.handle.net/10603/208011

Devries, D.L. & Slavin, R.E. (1978). Teams- Games- Tournament (TGT): Review of 10 classroom experiments. *Journal of Research and Development in Education*, (12).

Gay, L. R. & Airasian, P. (2000). *Educational Research: Competencies for Analysis and Application* (6th ed.).New Jersey: Prentice Hall, Inc.

Gerlach, J. M. (1994). *Is this collaboration?*

Gillies, R.M.(2007), *Cooperative learning : Integrating Theory and Practice.* Sage Publication.

Giraud, G. (1997). Cooperative learning and statistics introduction. *Journal of Statistics Education*, 5(3), University of Nebraska, Lincoln.

Gunjal, Madhuri (2014). *Evaluative study of the relation between socio economic background with perception and attitude of B Ed students towards teacher training and teaching profession.* Tilak Maharashtra Vidyapeeth. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/37473

Hijam, R. D. (2015). *Management of the higher education in Manipur since 1972.* Manipur University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/39238

Ibrahim, M. D. B. & Aaijaz, N. (2011). Dynamics of Peer Assisted Learning and Teaching at an entrepreneurial university: an experience to share. *International Journal of Humanities and Social Science*, 1(12), p. 93.

Jeevan, J. (2017). *Effect of cooperative learning on academic anxiety social skills and achievement in social studies of secondary school students*. Panjab University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/235189

Jhala, B. (2003). *A study of the effectiveness of cooperative learning and mastery learning approaches in teaching of algebra in STD IX.* Sardar Patel University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/75528

Johnson, D.W & Johnson, R.T. (1995). *Learning Together and Alone: Cooperative, Competitive and Individualistic Learning.* USA: Allyn and Bacon.

Johnson, D.W. & Johnson, R.T. (1998). *Cooperative Learning and Social Interdependence Theory*. Retrieved on 15/9/2011 from http://co-operation.org/pages/SIT.html

Johnson, R.T. & Johnson, D.W. (1987). Cooperative Learning and the advantages and the socialization crisis in science and mathematics classrooms. In Champagne and Hornig (Eds.), *Students Sand Science learning* as retrieved on 12/10/2011 from http://www.eric.gov /ERICDocs/data/ericdocs2sql/content_storage

Jose, S. S. (2018). *Developing a model based on cooperative learning for enhancing social intelligence and academic achievement among students at upper primary level*. Mahatma Gandhi University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/247213

Kerlin, B.A. (1992). *Cognitive Engagement Style, Self - Regulated Learning and Cooperative Learning.* Retrieved from https://www.scribd.com/document/38455667/Cognitive-Engagement-Style on 5/4/2019

Kerlinger, F. (1986). *The nature of research and science* – Sage publication. P.10

Khan, T. (2015). *Higher Education In Punjab An Evaluative Study.* Punjabi University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/35749

Khan, Z. M. (2007). *To investigate into the effectiveness of microteaching as a techniques on general teaching competence gtc on pupil teachers.* Dr. Babasaheb Ambedkar Marathwada University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/101035

Khint, R. V. (2018*). A study of an effectiveness of C L L cooperative language learning and M I multiple intelligence on educational achievement and retention with reference to teaching of Gujarati language. Saurashtra University*. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/212840

Kholi, L (2011). *A study of environmental education attitude and awareness among the students in higher education in Nagaland.* Nagaland University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/220683

Kothari, C. R. (2010). *Research methodology: Methods and Technique* (ed. 2nd). New Delhi: New Age International (P) Limited publishers. p.1.

Krashen, S. (1985). *The Input Hypothesis: Issues and Implications.* California: Laredo publicating Co. Inc.

Larsen, F. D. (1997). *An Introduction to Second Language Acquisition Research*. New York: Longman.

Lin & Li, L. (2010), *Pro Quest LLC.* Ed. D. Dissertation, Alliant International University San Diego.

Maden & Sedat (2011), *Educational Science theory & Practice*, 11(2) pp.911-917.

Maragi, S. B. (2010). *A study of interaction of social and task cohesion in relation to performance out come.* Karnatak University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/95881

Mathew, T. K. (2003). *Feasibility of implementing Modern Instructional strategies in the Institutions of Teacher Education in Kerala.* Mahatma Gandhi University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/6204

McCulloch, J. (1985). Lickona's Curriculum for Cooperation. *Ethics in Education*, 4.

Mishra, S.G. (2018). *A study of relationship of academic achievement to aptitude attitude and anxiety of MEd students studying under Dr Babasaheb Ambedkar marathwada university jurisdiction*. Dr. Babasaheb Ambedkar Marathwada University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/210402

Moruskar, D. S. (2004). *A comparative study of the teachers trained through four year integrated course and one year course in secondary teacher education in respect of teacher competency and teaching effectiveness*. Shivaji University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/140149

Murray, C. (1994). *Underclass: The crisis deepens*. Institute of Economic Affairs.

Muthaiah, N. (1994). *A study of the effectiveness of cooperative learning strategy in enhancing achievement in mathematics and social interaction of high school students in Coimbatore.* Bharathiar University. Ph.D. Thesis. Retrieved from   http://hdl.handle.net/10603/101100

Nagaraj, P. (2005). *Effectiveness of reciprocal teaching technique in enhancing the reading skills of engineering students in English.* Bharathiar University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/101409

Nagarathna, S. (2018). *A study of the intended and implemented curriculum of internship at secondary teacher education in Karnataka.* University of Mysore. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/250076

Narayanan, S. (2010). Western School of Philosophy. In *UGC NET/SLET Education* (3rd ed.). New Delhi: Bright Publication, p.349.

Newman, F.M. &Thompson, J.A (1987). *Effects of Cooperative Learning on achievements in Secondary Schools. A Summary of Research,* Madison WI-University of Wisconsin, National Centre of Effective secondary schools, p.30.

Newmann, F.M. & Thompson, J. A. (1987). *Effects of cooperative learning on achievement in secondary schools. A summary research.* Retrieved on 6/10/2011 from http://www.eric.gov/ERICDocs/data/ericdocs2sql/content_storage

Panitz, T. (2011). *Collaborative versus cooperative learning- a comparison of the two concepts which will help us understand the underlying nature of interactive learning*. Retrieved on 10/11/11 from http://home.capecod-net/~tpanitz/tedsarticles/ coopdefinition.htm

Parveen, Q., Mahmood, S.T., Mahmood, A., & Arif, M. (2011). Effect of Cooperative Learning on Academic Achievements of 8th Grade Students in the Subject of Social Studies. *International Journal of Academic Research,* 3(1), pp.950-951.

 Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/36524

Pradhan, A. K. (2015*). A Study of the Materials and Methodology Used to Teach English in Colleges of Engineering*. The English and Foreign Languages University, Hyderabad. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/218030

Qureshi, S. (2016). *Teaching Aptitude Level of Intelligence Mental Health and Attitude towards Teaching of Student Teachers in Secondary Teacher Education Institutions of Jammu and Kashmir Divisions A Comparative Study.* University of Kashmir. Ph.D. Thesis. Retrieved from   http://hdl.handle.net/10603/193766

Rahaya, S. (1998). Cooperative learning of Science in Promoting Cooperative Learning in Science and Mathematics Education: A Malaysian Perspective. *Eurasia Journal of Mathematics, Science & Technology Education* retrieved on 02/11/2011 from http://www.ejmste.com/v3n1/EJMSTEv3n1_Zakaria&Iksan.pdf

Sachin & Abdullah (2011). *Asia Pacific Education Review*, 12(3), pp27-435.

Salvin, R. (1953). *Cooperative Learning. Review of Educational Research*, 50(2), pp.315-342.

Salvin, R.E. (1978). Student Teams & Achievement Divisions (STAD), *Journal of Research & Development in Education,* pp.9-49.

Sansanwal, D. N. (1976). *An experimental study in programmed learning for teaching research methodology course at M.Ed level*. An Unpublished Ph.D. Thesis, CASE, M. S. University of Baroda, Vadodara.

Santhakumari, K. (2014). *Study on the perception of teacher educators on the practical aspects of secondary teacher education*. Periyar University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/20821

Sarmah, A. (2015). *Inequality in access to higher education.* Assam University.

Seema, G. (2014). *Developing a package based on metacognitive strategies for promoting skills in teaching Mathematics among student teachers at secondary level.* Mahatma Gandhi University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/166893

Sharan, P., Hare, C.W. & Lazarowitz, R.H (Eds.). *Cooperation in Education.* Provo, Utah: Bringham Young University Press.

Sharan, S. & Sharan, Y. (1976). *Small Group Teaching, Englewood.* Cripps, NJ: Educational Technology Publications.

Singai, C.B. (2018). *Higher Education And University Governance In India*. Manipal University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/227010

Singh, K. K. (2015). *The growth of higher education in Manipur 1980- 2001.* Manipur University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/39397

Singh, P. S. (1990). *Effectiveness of VALUE Teaching Using Value Clarifying Strategies in Development Value Orienation of Student Teachers.* Dr. Rammanohar Lohia Avadh University, Faizabad. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/230858

Sivakumar, K.S.(2014). *Effectiveness of Cooperative Learning And Computer Assisted Learning on The Academic Achievement of IX Standard Students In Biology*. Bharathiar University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/51451

Slavin, R.E. (1991). Synthesis of research on Cooperative Learning. *Educational Leadership*, 48(5).

Subbulakshmi, T. V. (2016). An *Analysis of the Techniques Of Teaching Drama to ESL Learners.* Bharathidasan University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/248564

Tajeri, M. (2017). *An exploration of digital storytelling as a learning activity in teaching of English as a second language in higher education.* Panjab University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/226536

The U.S. Department of Educational Research (1992). *Education Research Consumer guide.* Retrieved on 13/10/2011 from http://www2.ed.gov/pubs/OR/ConsumerGuides/cooplearn .html

Thomas, V. (2013). *A study on the effectiveness of a strategy based on cooperative learning for science teaching in class VII*. The Maharaja Sayajirao University of Baroda. Ph.D. Thesis.

Trakru, M. (2017). *Effectiveness of e Learning in Higher Education An Empirical Study.* Shri Vaishnav Vidyapeeth Vishwavidyalaya. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/207916

UNESCO (1996). Learning to Live Together. Retrieved on 23/10/11 from http:// www.unesco.org/delors/index.html.

Vygotsky, L. (1978). Interaction between learning development, *Mind and Society.* Harvard University *Press,* pp. 79-91.

Wang et.al. (2011). *Computer & Education*, 56(1), pp.300-311.

Woolfolk, A. (2001). *Educational Psychology*, (8th ed.) Needham Heights: Allyn & Bacon, A Pearson Education Company.

Yazdani, G. M. (2016). *Professionalism among Teacher Educators of District Institute of Education and Training DIETs in Delhi*. Jamia Milia Islamia University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/197617

Yazdani, G. M. (2016). *Professionalism among Teacher Educators of District Institute of Education and Training DIETs in Delhi.* Jamia Milia Islamia University. Ph.D. Thesis. Retrieved from http://hdl.handle.net/10603/197617