CHAPTER III

REVIEW OF RELATED LITERATURE

3.1 INTRODUCTION

3.2 IMPORTANCE OF PEER RELATIONSHIP AND PEER TUTORING

3.3 PEER TUTORING IN GENERAL EDUCATION STREAM

3.4 PEER TUTORING IN SPECIAL EDUCATION STREAM

3.5 STRATEGIES FOR PEER TUTORING

3.6 DIFFERENT MODELS IN PEER TUTORING

3.7 DIFFERENT MODELS OF TEACHING MATHEMATICS

3.8 PEER TUTORING MODELS IN MATHEMATICS

3.9 ASSESSING PEER TUTORING

3.10 CONCLUSION
3.1 INTRODUCTION

Any worthwhile study in any field of knowledge requires an adequate familiarity with the work which has already been done in the same area. A summary of the writings of recognized authorities and of previous researches provide evidence to the researcher regarding what is already known and what is still unknown and untested. Review of related literature, which plays a significant role in any type of research work, allows the researcher to acquaint with current knowledge in the field in which the research is being done. Review of past research develops an insight into the present study and also helps to cite the problem with precision and accuracy. The availability and utilization of adequate sources or related information enable the investigator to complete the research fruitfully and thus make unique contribution in the field of education with special focus on the method of instruction, peer learning etc.

According to Mouly (1970) "Review of related literature promotes a greater understanding of the problem and its crucial aspects and ensures the avoidance of unnecessary duplication". Review of related literature serves the following specific purposes:

1. The review of related literature enables the researcher to define the limits of his field.
2. By reviewing the related literature, the researcher can avoid unfruitful and useless problem areas.
3. Through the review of related literature, the researcher can avoid unintentional duplication of well-established findings.
4. It can give a picture of the gap in knowledge in the criterion fields, which need to be covered.

5. Some good researches can also provide models, which can be followed by later investigations.

6. Subjects like Science where a kind of linear progress in knowledge can be clearly identified, the later researchers can consciously build on existing knowledge, and start from the end-point of knowledge reached by the latest researchers.

Citing studies that show substantial agreement and those that seem to present conflicting conclusions help to sharpen and define understanding of existing knowledge in the problem area. They provide a background for the research project, and make the researcher aware of the issue. For many years, educators and researchers have debated on the different strategies which influence the students’ achievements.

The review of related literature is an important pre-requisite to the actual planning and execution of a problem, development of a research design and determination of the size and scope of the problem. All depend to a great extent on the care and intensity with which a researcher has examined the literature related to the intended research. Also, it reveals the researcher what has been done and what needs to be done.

Though research in education and applied psychology has produced a number of insights into how students think and learn, the resulting impact on actual classroom instruction is uneven and unpredictable. Here studies that have been done will provide the
Chapter 3 Review of Related Literature

rationale for one’s research hypotheses, indication of what needs to be done, and will form the basis for the justification for the study. It also points out research strategies and specific procedures and measuring instruments that have and have not been found to be productive in investigating the problem. This information will help to avoid other researchers’ mistake and to profit from their experiences.

Therefore, an attempt has been made here to review the literature and studies related to the topic "Preparation and Testing of a Peer Tutoring Model in Mathematics at Secondary Level".

In the field of research, the research worker has to acquire up-to-date information about what has been thought and done in the particular area in which he intends to conduct the study.

The studies reviewed here are classified under the following headings:

**Studies on**

- Importance of Peer Relationship and Peer Tutoring
- Peer Tutoring in General Education Stream
- Peer Tutoring in Special Education Stream
- Strategies for Peer Tutoring
- Different Models in Peer Tutoring
- Different Models of Teaching Mathematics
- Peer Tutoring Models in Mathematics
- Assessing Peer Tutoring

### 3.2 IMPORTANCE OF PEER RELATIONSHIP AND PEER TUTORING

Bell (1898) was a superintendent of the military male asylum at Egmore and minister of St. Mary’s Church at Madras. He started a
school based on peer tutoring classes. Bell’s scheme was remarkably systematic. Every individual in the school had a specific role with associated tasks. Each class was paired off into tutors and pupils. To each class was attached an assistant teacher to supervise and instruct.

Bell’s school was arranged into classes with pupils grouped according to their achievement. If a pupil did well at his studies he could be promoted to a superior class; if he did badly he could be degraded to an inferior one. Each class was paired into tutors and pupils.

Advantages of the study

1. The sociable disposition, both in the tutor and pupil is indulged by the reciprocal offices assigned to them.

2. The tutors enable their pupils to keep pace with their classes, in which otherwise some of them would fall behind and be degraded to lower classes, or else continuing attached to their class, forfeit almost every chance of improvement by never learning any one lesson as it ought to be learned.

3. The tutor far more effectually learns his lesson than if he had not to teach it to another. By teaching, he is best taught.

4. There is a grant stimulus to emulation.

Bell’s system cultivates the best dispositions of the heart by teaching the children to take an early and well-directed interest in the welfare of one another.
In his work on moral judgment, Piaget (1932) introduced the notion that children live within 'two social worlds'. One of the unilateral adult child commands, the other of mutual peer cooperation. Developmental psychologists have elaborated this distinction further whereas adult-child interactions reflect a fundamental asymmetry of power and knowledge; peers interact on an equal footing. This means that adults usually direct and structure the agenda in their conversations with children, whereas children negotiate and 'co-construct' the agendas of their peer encounters.

Dallas (1974) conducted an experiment in which both 13 and 14 year old pupils (who were slow to learn, poorly-motivated, had poor self-concepts or who have discipline problems) were given ten hours of training as tutors and then given the chance to take part in tutoring in an elementary school. Their teachers reported that these 'high risk' pupils performed remarkably well. Their classroom behaviour and their attitude to school improved. They also produced remarkable results with younger children coming from similar backgrounds. This showed that peer tutoring helps to improve school children’s performance.

Moran and Oja (1977) developed a system of project technology power, University of Minnesota. It is an attempt to attract non-white and low-income students from inner-city schools to the Institute of Technology. The peer teaching programme was established by the institute with the goal of motivating the inner-city students towards the Mathematics and Science course which would qualify them for entry to the university.
The major suggestions of the study were:

1. Improve the attitude towards subject matter among the target group of students.
2. Increase individual attention to students.
3. Improve the self-concept, interest in academic studies, and knowledge of subject matter of the associate teachers themselves.
4. Improve achievement in subject matter by the students taught by the associate teachers.

Biddle, Bank and Maslin (1980) studied a diverse group of twelve-fifteen, and eighteen-year-olds in a large metropolitan area and found that peer behaviour was relatively more important than parental behaviour in predicting adolescents' preference for and use of alcohol but parental norms were more important than peer norms in predicting attitudes involving achievement in school. They also concluded that adolescents' own preferences are more important in their decision making than usually has been taken into account in previous research.

Kulik and Kulik (1982) had noticed in their study that through peer tutoring students felt comfortable in the group and felt that they could come up with any ideas without being negatively criticized. They conducted workshops with team building exercises to build confidence and team spirit and to get students the benefits of problem-solving through group work. Regardless of achievement, peer tutoring demonstrates effectiveness in facilitating progress in general education curriculum.
Eisenberg (1982) made a project known as the PERACH project, Israel. This project was a one-to-one tutoring project operating in Israel, in which university students helped socially disadvantaged children.

Aims of PERACH Project

1. The goal given to the university students was to help the tutored children in realizing their potential.
2. The main aims of PERACH were to increase the motivation, achievement, and self-confidence of the children through the establishment of a close personal relationship between tutor and child.
3. Tutors aimed at improving the children’s motivation and attitude towards learning in addition to assisting them with their studies.

The evaluation of PERACH Project

1. This project would influence the child’s motivation and self-confidence.
2. PERACH tutors were having a positive influence on the children with respect to attitude towards school.
3. The PERACH children were more satisfied with the school context, and were spending more time for reading than non-PERACH children.
Chapter 3  Review of Related Literature


Doise and Mugny (1984) suggested that the dominant rationale for the strategy of teaching novices together had been the Genevan construct of 'Socio-cognitive Conflict'.

The idea is that social interactions between peers will lead to disagreements of the present participants with both a social and a cognitive conflict. Such conflicts lead children to a number of important realizations. They become aware that there are points of view other than their own.

1. They re-examine their own points of view and re-assess their validity.
2. They learn that they must justify their own opinions and communicate them thoroughly if others have to accept them as valid.
In this way, children benefit both cognitively and socially from peer collaborations.

Goodlad (1984) and his colleagues conducted a study on the importance of the peer group in elementary and secondary schools was underlined in data collected in the early 1980s as part of their national research project titled 'A Study of Schooling'. Information was collected from 17,163 students and 1,350 teachers at 38 representative public schools. In response to the question, "What is the best thing about this school?" students in junior and senior high schools were much more likely to cite "my friends" than anything else about their schools. Yet it pervades the life of the child to a greater extent as he or she grows older, and it performs increasingly important functions in teaching the ways of society.

Hedin (1987) reviewed peer and cross-age tutoring in terms of (1) current use; (2) expected benefits to tutors, tutees, teachers and society; (3) research on academic and affective outcomes for tutors and tutees; and (4) tips for expanding the use of peer tutoring.

Jenkins and Jenkins (1987), in their article, "Making Peer Tutoring Work", described in detail the components of successful peer tutoring programmes, how to start a programme, how to recruit and schedule, etc. Thurston and Topping (1988) discussed the history of tutoring, how to organize and implement a programme, effectiveness of research, and how to evaluate a project. Bland and Harris (1989) traced peer tutoring back to the 'Monitorial System' of the early nineteenth century, which consisted of a 'wave-like delivery of the subject matter through monitors instructed by a single teacher'. They described lessons
conducted by the science department at a community school with its third-year chemistry classes working in pairs of more-and less-able students (as defined by departmental profiles). They concluded that these lessons were 'of a superior quality' in terms of students’ learning, motivation and enjoyment. The study also indicated availability of videotapes of trial lessons.

Thorkildsen (1989) presented the results of interviews of students aged concerning the relative fairness of five commonly used classroom practices. Peer tutoring was judged as fairer than fast workers were working ahead (acceleration), fast workers sitting and waiting, fast workers using the computer for enrichment, and all students 'moving on' although the slowest students never finish their work. Older students, however, saw peer tutoring as less fair than younger students and they access acceleration and enrichment as more fair.

Benard (1990) described the value of peer tutoring: "Peer resource programs, whether they be co-operative learning groups or one-on-one peer tutoring, are most effective when each person involved experiences both the helper and the helpee role. In fact, most studies find the tutor receives the most gains"! Diane Hedin’s review of students as teachers summarized the literature as 'replete with anecdotes of alienated, troublesome youth conducting themselves in a serious and dignified manner while teaching younger students'. Furthermore, according to a Stanford University study, peer tutoring is consistently more cost-effective than computer-assisted instruction, reduction of class size, or increased instructional time for raising both reading and Mathematics achievement of both tutors and tutees.
Fontana (1990), in his study, acknowledged peer tutoring benefits and discusses reasons for why peer tutoring isn’t more widely used, including inherited tradition and teacher resistance - which may be partly based on seeing peer tutoring as a substitute for properly organized teacher activity. Cautions against urgent advocacy of peer tutoring for reasons including possible disadvantages accruing to the tutor, possible tutor impatience, implications of tutor selection, parent cautiousness, implications for school organization, variable suitability of different subjects for peer tutoring, possible lack of expertise on tutors’ parts, etc.

Foot et al. (1990) differentiated among three main approaches to 'peer co-operation' - peer tutoring, peer collaboration, and co-operative learning - and defines each. They discuss children's interaction with other children vs. adults and how it leads to cognitive development, based in part on the theories of Piaget and Vygotsky. Reviewed peer tutoring research with particular emphasis on (1) the child’s perception of tutoring roles; (2) children’s teaching strategies; and (3) tutors’ sensitivity to the needs of learners. Foot opined that "If a teacher has ANY concern, it's usually more associated with the time and effort necessary for adequate training."

Wagner (1990) traced the historical origins of peer tutoring in Western civilization back to Greece in the first century A.D. and through Rome, Germany, other European locales, and finally America. He related changes in peer teaching to prevalent social, economic, and political influences.
Chapter 3 Review of Related Literature

Wellman (1990) discussed the distinction between mental and physical phenomena, young children’s understanding of belief, ‘belief-desire psychology’ and ‘everyday theories’. The study dealt primarily with children ages six and younger aged.

Wheldall and Colmar (1990) argued for using peers for reading tutoring because (1) parents may not always be available or appropriate tutors; (2) peer tutors are plentiful, available for training and can be readily monitored and organized; (3) low-progress readers respond readily to peer tutors; and (4) tutoring is beneficial to tutors and increases their caring for others. They described original study and four replication studies of ‘Pause, Prompt and Praise’ method, and concluded that peers can learn to use the method's procedures quickly and easily, tutors can gain reading skill from using it, and low-progress readers gain a great deal by being tutored with it. Average or better readers, meanwhile, do just as well if they simply have someone hear them read regularly. They emphasized the importance of teacher training in the method.

Salvin et al. (1991) summarize research on the impacts of alternative early intervention programmes to prevent school failure, examined the magnitude of estimates of program effects, and discussed policy implications of using the alternative approaches. Nine types of early schooling programs were reviewed: substantial reduction in class size, provision of instructional aids in the early grades, pre-school for four-year-olds, extended-day kindergarten, retention in kindergarten and first grade, provision of transitional first grade or developmental kindergarten, writing to read, one-to-one tutoring by teachers or para-
professionals, and success for all. They concluded that the most effective strategies preventing early school failure are programmes that involve one-to-one tutoring in reading for first graders, especially in structured models that use well-trained certified teachers as tutors.

Swengel (1991), in his article entitled "Cutting Education's Gordian Knot", proposed 'Mutual Instruction' (MI) as a more descriptive term than peer and cross-age tutoring and counseling. He proposed that the basic instructional unit of teacher-and-class has been the fundamental problem with formal schooling for thousands of years and proposes MI as the solution. He said that MI provides, in an integrated way, four elements as contributing most to mastery learning: reinforcement, acceleration, reading training, and cues and feedback. He also described how to restructure a school for Mutual Instruction.

Hartup (1992) conducted a study about friendship and their developmental significance. In this study he said that early peer relationships and peer competence are related to later personality development. First the behavioural repertoire of popular children is primarily made up of socially skilled behaviours that also lead to positive social outcomes in the long run. These children sustain stable peer relationships and friendships that are mutually beneficial. Friendships provide several functions for children involving: (a) emotional resources both for 'having fun' and adapting to stress; (b) cognitive resources both for problem solving and knowledge acquisition; (c) contexts in which basic social skills are acquired and elaborated; and (d) forerunners of subsequent relationships.
Chapter 3  Review of Related Literature

Hertz-Lazarowitz and Miller (1992), in a study about interaction in co-operative group, examined developmental foundations and social construction of knowledge and social skills, classroom factors influencing peer interactions, effects of task and reward structure on academic achievement, and factors influencing the promotion of positive intergroup relations. They also provided recommendations for application of the research.

Krappman (1992) conducted a study of children’s helping behaviour with peers found that peer interactions indeed can provide a unique context for learning many important intellectual skills, provided that such interactions are well balanced and mutual.

The author concluded: “These collaborative efforts of peers mostly friends, presented almost the only situations in which we found the capacities that the educational system promises to promote – exploration of different aspects of a problem change of perspectives, experimentation with ideas, reconstruction of failed processes, analysis of mistakes, verifications of the indubitable, search for criteria of good solutions co-constructively developed and jointly applied”.

Shukla (1992) studied social competence of children as a function of parental behaviour and peer interaction among different cultural groups. One Hundred and fifty families from high SES and 150 families from low SES were selected, with both parents living and each family having at least one son and one daughter. Thirty orphans were also included in the study. Social competence, parental acceptability, parental authority, peer interaction, and SES were measured using 'self-developed' as well as 'standardized' scales
(ShuklaK., 1992). The major findings of this study were, parental authority, peer interaction and SES have a significant effect on the social competence of children but parental acceptability and sex main effects were not significant. This was true for both boys and girls of the higher SES group compared to the lower SES groups. Pro-social attitudes, social competition, social tolerance, social leadership and social maturity are the major components of social competence. Parental acceptance has been estimated to be the most significant predicting factor of social competence in the multiple regression analysis. Next is parental authority. These findings only corroborate those of western studies.

Gieseckeetal. (1993) validated the positive effects of peer tutoring, particularly as they relate to low-achieving students as tutors. Four tutees correctly identified more sight words after a six-week tutoring program than they had before the program.

Strayhorn etal. (1993) in their study on Interaction Skills Training, hypothesized that peer tutoring as a training ground for relationship and academic skills would create better-adjusted children who would grow into better-adjusted adults, based on studies showing that exposure to warm social contact, and particularly peer acceptance, suppresses symptoms of psychological problems, and vice-versa.

Thorkildsen (1993) in his study, investigated high-ability and comparison of students' views of the relative fairness of acceleration for faster learners, peer tutoring, faster students waiting for slower students to catch up, faster learners setting the pace for instruction, and enrichment for faster learners.
Chapter 3 Review of Related Literature

Gartner and Riessman (1994) described a study funded by the Kellogg Foundation in which six New York high schools were test sites for Reciprocal Tutoring. They described Reciprocal Tutoring, which may be either cross-age or within-grade (with roles of tutor and tutee alternated).

According to Light and Littletonk (1997) Peer tutoring is an instructional strategy that consists of pairing students together to learn or practice an academic task. The pairs of students can be of the same or differing ability and or age range. Peer tutoring encompasses a variety of instructional approaches including Cross-Age Tutoring, Peer-Assisted Learning Strategies (PALS), and Reciprocal Peer Tutoring (RPT). Variations exist among instructional approaches. However, the underlying theory is consistent: Peer interaction can have a powerful influence on academic motivation and achievement.

Capossela (1998) in his book The Harcourt Brace Guide to Peer Tutoring firstly addressed pedagogical issues the tutor will encounter during sessions. The first chapter in this section defined the role of the 'peer consultant' and the following chapters discuss elements of the editing process (i.e., working with teachers’ comments, organization, and surface errors). The second section presented research on theories of writing center pedagogy: the co-learner model of tutor training, peer tutoring as discursive interaction, tutoring as meta-analysis of rhetorical problems, expectation and negotiation in tutoring, student rights to their own texts, arguments for the thesis statement, conferencing strategies for the ESL writer, and possibilities for online tutoring.
Gillespie and Lerner (2000) in their book, *The Allyn and Bacon Guide to Peer Tutoring*, examined tutor expectations, the roles of tutor and writer, and first tutoring experiences. The authors then moved on to more specialized topics: reading in the writing center, working with speakers of other languages, conducting writing center research through discourse analysis, online tutoring, and writing center ethics. In the final chapter they anticipated challenges in common scenarios and offer general advice.

Cairo and Craig (2005) differentiated Peer Tutoring and Cross-Age Tutoring. Peertutoring and cross-age tutoring are two student-to-student tutoring methods. Peertutoring occurs when tutors and tutees are of the same age. Cross-age tutoring refers to older students tutoring younger students. Studies of cross-age tutoring have reported improved academic performance for both tutors and tutees. This study was conducted to determine the extent to which cross-age tutoring employed in a rural setting would produce outcomes similar to those reported in urban settings and in other countries. A between/within repeated measures experimental design was used to gauge the effects of cross-age tutoring on learning and retaining knowledge of fraction manipulations. Participating students were randomly assigned to one of four groups: tutors, tutees, non-tutors, and non-tutees. Tutors and non-tutors were seventh-and eighth-grade students at one of two small elementary schools in the same rural district. Tutees and non-tutees were third-, fourth-, or fifth-grade students attending the same rural elementary school. Analyses of both knowledge gain and retention scores revealed no significant differences in knowledge of fraction
Chapter 3 Review of Related Literature

manipulations between tutors and non-tutors, tutors and tutees, or tutees and non-tutees. Lessons learned and study limitations are discussed.

What Works Clearinghouse Intervention Report (2007) indicated that 'PeerTutoring and Response Groups' aim to improve the language and achievement of English language learners by pairing or grouping students to work on a task. The students may be grouped by age or ability (English-only, bilingual, or limited English proficient) or the groups may be mixed. Both peertutoring pairs and peer response groups emphasize peer interaction and discussion to complete a task. Three studies of 'PeerTutoring and Response Groups' met the What Works Clearinghouse (WWC) evidence standards. These studies included 118 English language learners from first to sixth grades in Florida, Texas, and Washington State. No studies that met WWC evidence standards with or without reservations addressed reading achievement or Mathematics achievement. The WWC found 'PeerTutoring and Response Groups' to have positive effects on English language development.

3.3 PEER TUTORING IN GENERAL EDUCATION STREAM

Klaus (1975) has sketched a lesson training plan, for the training of tutors in secondary education, synthesized from what is practiced in many United States schools.

1. Orientation to the programme
2. Description of the learners
3. Meeting the children
In this course, the high school pupil tutored for three consecutive hours once a week and had an additional two hours of classroom work.

The course provided the necessary practical instruction to help the pupils be effective as tutors in addition; it helps them to interpret their experience through an intellectual frame work. Finally, pupils are encouraged to initiate, plan, and execute projects which will directly benefit the lower school or a particular group of its pupils.

GoldSchmid and GoldSchmid (1976) conducted a study about the classification of peer tutoring in higher education. They summarize four basic types of peer teaching at undergraduate level.

1. Surrogate teaching
2. Proctoring
3. Co-tutoring
4. Teacher less groups

In these programmes students took on the role of individual tutors for fellow students who are at a similar or slightly lower stage in a course. It differed from conventional teaching in at least five ways:
Chapter 3 Review of Related Literature

1. Mastery-oriented
2. Student-proctored
3. Self-paced
4. Use printed study guides to direct students learning; and
5. Employ occasional lectures to stimulate and motivate the students

Finding of the study were

(a) Peer tutoring has many points of similarity with other activities in which students support one another
(b) Peer tutoring has for years been used to offer trainee teachers the school-experience they earnestly seek
(c) There is a spectrum of activities from those which give students greater control over the content of their study.

It helps the students to be reserved for activities in which there is systematic and explicit use of students to teach students.

Marton et al. (1984) conducted a study on the value of peer tutoring in higher education. The findings of the study were, peer tutoring may be one agency whereby 'deep' rather than 'surface' approaches to learning may be inculcated.

Wheldall and Mettem (1985) described the 'Pause, Prompt and Praise' method in which the tutor delays attention to a reader’s error for at least five seconds or until the end of a sentence, uses prompts rather than straightforward corrections, and praises the tutee. They described the results of a study of this method. After just 60 minutes of tutor training, tutors used the method well and tutees had finished 36 levels
of a graded reading program, while tutees working with untrained tutors had finished just 29, and students reading silently had finished 24. In addition, tutees who were tutored using 'Pause, Prompt and Praise' gained over six months in reading accuracy in two months compared with a one-month gain for the silent readers. Two months after the study ended, these students still showed substantial, though not statistically significant, gains on a comprehension test.

Palincsar and Brown (1986) in their article, described 'reciprocal teaching', in which adults and students took turns assuming the role of teacher using four comprehension-fostering and comprehension-monitoring strategies: predicting, question generating, summarizing, and clarifying. Seventy-one percent of students in six remedial middle school teachers’ classes achieved 70 percent accuracy on criterion measures for four out of five days, while 19 percent of control students did, when tutored by four of the best students in each class.

Wood (1988) discussed the nature of learning and thinking, stages of development, how children learn to think and learn language and learning communication in school, literacy, mathematical learning, and the implication of these for education.

Slavin and Madden (1989) discussed the results of reviewing research on "every imaginable approach designed to increase student reading and Mathematics achievement in the early grades”. They concluded that continuous-progress programs and co-operative-learning approaches are the most effective classroom change programs, and that remedial-tutoring and CAI programs are the most effective supplementary remedial programs.
Chapter 3 Review of Related Literature

Byrd (1990) assessed three review articles, six essays, and nine empirical studies about peer tutoring relating to special education and LD students, most of which pertained to (Greenwood et al.) Class-wide Peer Tutoring Technique. Found support for tutoring in each study, including support for integration of LD students into the regular classroom and beneficial effects on self-esteem, achievement, and classroom management.

Barbetta et al. (1991) conveyed the results of a six-week program of tutoring for six elementary tutees by six high school tutors. Tutees acquired and maintained a substantial number of new sight vocabulary words after tutoring and maintained words up to four months following instruction.

Cardenas et al. (1991) described the Coca-Cola Valued Youth Program, in which limited-English-proficient, middle school children at risk of dropping out became paid cross-age tutors of elementary students. They presented findings that tutors were more likely than controls to stay in school and to have improved reading grades, increased self-esteem, and improved attitudes toward school.

Heath and Mangiola (1991), in their study, described that 'literate activity' in linguistically and culturally diverse classrooms and more specifically, described cross-age, interactive tutoring programs for non-native, elementary English speakers in California and elementary students in Texas. Appendix lists steps for implementing cross-grade tutoring projects in literacy. Provides list of several oft-raised questions about cross-grade tutoring and answers to them.
Fantuzzo and King (1992) described that peer tutoring in a classroom context involves training students in instructional methods so that they can assist younger or same age students learning. Peer tutoring is a practice that classroom teachers can deliver in such a way that it allow them to cater for diverse needs within inclusive and responsible social context. Instructional strategy used here reinforces mathematical facts, computational skills and math concepts. This study provides a review of basic mathematical procedure for helping the students move from concrete thinking to generalization. Peer tutoring programme includes training supervision and time for students to work with other students.

Rekrut (1992) examined tutoring as a pedagogical tool to enhance tutor learning. High school students learned story grammar strategies and either did or did not teach these to fourth and fifth graders twice a week for six weeks. The group that tutored did significantly better on story grammar post-tests.

DuPaul and Henningson (1993) in their study found that Class-Wide Peer Tutoring caused one student with Attention Deficit Hyperactivity Disorder (ADHD) to show improved attention to instruction, a lower task-irrelevant activity level, and increased acquisition of Mathematics skills after two baseline periods.

Martino (1994) described a peer tutoring program begun at a high school three years prior to the article. List prerequisites of a successful tutoring program include several program documents: teacher referral form, parent/student contract, and peer tutoring guide.
Rosenthal (1994) described a cross-age tutoring program in which at-risk high school students tutored fourth graders using the SERIES (Science Experiences and Resources for Informal Education Settings) curriculum.

Thurston (1994) described implementation of cross-age tutoring in which high school students tutor elementary students in art in 16 classes on a biweekly basis. The study provides anecdotal evidence of the program's success.

Griffin and Griffin (2002) investigated the effects of Reciprocal Peer Tutoring (RPT) on achievement, self-efficacy and test anxiety. RPT is a cooperative learning strategy which capitalizes on the benefit students receive from preparing to tutor one another. In these experiments we investigated the effects of RPT on the academic achievement, academic self-efficacy, and test anxiety of undergraduate students. Undergraduate education majors enrolled in either human growth or development or educational psychology participated in the study. Students developed a series of test questions, used these questions to quiz each other prior to unit examinations, and provided corrective feedback to the questions. Statistically significant findings were inconsistent across the experiments. In short, reciprocal peer tutoring appears to have, at best, inconsistent effects on achievement, test anxiety, and academic self-efficacy.
3.4 PEER TUTORING IN SPECIAL EDUCATION STREAM

Geiser (1969) described a scheme in which troublesome ten-year-old pupils were given the job of tutoring. Despite the apprehensions of their teachers the child tutors acted like teachers while they were tutoring, conducting themselves in a dignified manner in the classroom. For most of the tutors, according to Geiser, this led to improved behaviour in their own classrooms and a better attitude towards schoolwork. When treated in an adult and respectful manner, they responded by behaving in more adult ways. Through adopting the teacher’s role the children developed sympathy with their teachers and began to co-operate with them.

Osgythorpe (1984) conducted a study on peer tutoring for special students. He suggested that it is frequently difficult for non-handicapped students to interact with handicapped peers who may lack comparable social and linguistic skills. By initiating a tutoring scheme in which students are given a role in the teaching of handicapped pupils, they are given a natural and rewarding way of interacting with these students. They can quite easily be trained to tutor in reading or linguistics, areas, which offer excellent opportunities for inter-personal communications.

Fenrick and Peterson (1984) designed a study to develop more positive attitudes towards moderately and severely handicapped students, attitudes of sixth grade students who participated in a peer tutoring programme towards moderately and severely handicapped students were compared with those of a control group. Prior to the peer-tutoring programme, tutors held more negative attitudes towards
their handicapped peers than they did towards their own classmates. After seven weeks of tutoring, attitudes of tutors towards handicapped students were changed.

Gurry (1984) pointed out the significance of 'Project Mainstream', a regional program for adolescents with severe special needs, aimed for maximum integration through involving students in common activities. A peer tutoring program was implemented based on needs of high school students for involvement, information, instruction, independence, and interaction. Peer tutors were instructed regarding behavior modification, data-keeping, emergency procedures, leisure, communication skills, performance levels, and individual differences. Beginning with one-to-one experiences, peer tutors gradually expanded to small group activities. The program was designed to be beneficial to both tutors and the handicapped students. The program helped to increase knowledge and acceptance of students with severe special needs.

Shisler (1986) conducted a study on the effectiveness of peer tutoring into special education students. They say that trained mildly handicapped children aged five to eight years to facilitate changes in the social interaction skills of similarly aged autistic peers. The non-autistic children were taught how to initiate interaction with autistic pupils, resulting in immediate and substantial increases in the number of interactions between these students. The interactions were also of longer duration than those occurring before the tutoring intervention began. Their work demonstrated that, overall the autistic students and their peer tutors, became more mutually socially responsive as a result
of the intervention. The findings of the study revealed that age peers can be successfully trained to encourage positive social behaviour by classmates who are withdrawn and unsociable.

In a recent review study, Scruggs et al. (1985) examined the efficiency of tutoring programmes involving behaviourally disordered students. Seventeen studies were identified in which the tutees were considered to be exhibiting learning and/or behaviour problems. The subject area most chosen for tutoring was reading, but other content areas were employed including Mathematics, spelling and social skills.

Of these studies, 13 examined the academic gains of the tutees as a result of the tutoring intervention. In all cases, tutees demonstrated measurable gains in the content area being tutored (regardless of the degree of exceptionality). It seems that peer tutoring of behaviourally disordered students can exert positive effects on their academic functioning.

Fowler (1986) presented 'Peer Monitoring and Self-Monitoring as alternatives to Traditional Teacher Management'. He reported findings of a study in which ten children in a special kindergarten class learned to use peer-and self-monitoring to decrease disruption and non-participation during transition activities. Inappropriate behaviors among three target children decreased.

Goldstein and Wickstrom (1986) studied Peer Intervention Effects on Communicative Interaction among Handicapped and Non-handicapped Pre-schoolers. Two preschool children 'at or above age level' were assigned as "confederates" and taught strategies to facilitate
interaction with three language-delayed peers. All three handicapped children exhibited higher interaction rates over the course of 75 weeks.

In the first project ten upgrade BD students in an elementary school were assigned the role of tutor to 12 younger, well adapted tutees. Fifteen minutes tutoring sessions were held daily for 12 weeks. At the end of 12 weeks, there were significant gains for both tutors and tutees on reading achievement tests. Parents and teachers reported improved self-esteem to be one of the main benefits of the programme. Both parents and teachers held positive perceptions of the programme and were keen that such programmes should continue and expand.

In the second study, ten BD students tutored a total of 30 gifted peers in sign language. The purpose of this study was to see if the social distance between the BD students and well-adapted peers would be reduced through a programme and to see if the BD students would function in a socially acceptable way as tutors of gifted students.

Following the programme, student attitude questionnaires indicated that the gifted tutees were less likely to respond negatively towards their BD peers than those who had not been tutored. In addition, teachers confirmed that the tutors were able to maintain socially acceptable behaviour.

Lazersonet al. (1988) examined the Effectiveness of Cross-Age Tutoring with Truant, Junior High School Students with Learning Disabilities. They report results of a study of 16 truant and tardy junior high school students with learning disabilities who were used as tutors for younger, learning-disabled students. After six weeks of tutoring,
they all made significant gains in locus of control and most showed decreased truancy and tardiness.

Maheady (1988) described peer tutoring allows teachers to accommodate a classroom of diverse learners including students with mild disabilities. This instructional strategy increases response opportunities for students, provides additional time for feedback, and increases the amount of time a student is on-task. In this study the peer tutors have an opportunity develop life skills those students who have mild to moderate mental handicap. Duties include: learning and carrying out simple exercise programs learning techniques for assisting with eating assisting students on outings, assisting students with basic life-skills tasks and helping students to take part in school activities. The peer tutor will be respectful and empowering.

Trapani and Gettinger (1989) examined the Effects of Social Skills Training and Cross-Age Tutoring on Academic Achievement and Social Behaviors of Boys with Learning Disabilities. Their study compared Test of Written Spelling (TWS), Walker Problem Behavior Identification Checklist (WPBIC), and observed social communication skills of three groups of six or seven boys each. One group received social skills training and tutoring, another received only social skills training, and the last served as a comparison group. The group receiving both treatments performed better on the TWS and on the observed behaviors of greeting and answering questions, but not on the WPBIC or other observed behaviors.
Chapter 3 Review of Related Literature

The objective of the study was to examine the effectiveness of peer tutoring with mildly to severely handicapped students. The findings of the study were

1. In this research non-handicapped or mildly handicapped students typically tutored younger or more severely handicapped peers.

2. Regular and mildly-handicapped students could tutor students with disabilities and that the arrangement academically and socially benefited the tutor as well as the tutee.

This research has established that peer tutoring is an effective instructional strategy for these students. Mildly handicapped students have participated in peer tutoring programs in both tutor and tutee roles.

Mathur and Rutherford (1991) in their study reviewed 21 articles about peer-mediated interventions and their success in promoting social skills in children and youth with behavioral disorders, and finds that these approaches have immediate, positive treatment effects, that typologies of these treatments have been identified, and that there is a lack of evidence supporting generalization across settings and regarding maintenance of effects.

Gaustad (1992) explored the reasons for the effectiveness of tutoring, particularly for at-risk students; examines representative tutoring programs; and summarizes key elements that schools and districts should consider during planning and implementation of a peer tutoring program.
McLaughlin and Vacha (1992) made a review of the school programmes for at-risk children and youth. Their study reviews and evaluates literature regarding a variety of programs that assist at-risk students. Class-wide tutoring (as well as other models) was found to be effective in 'assisting the education of at-risk children and youth'. One program involved using middle-school students to tutor elementary school Chapter 1 students. Tutors who received weekly training gained 0.49 standard deviations in math on the Metropolitan Achievement Test over untrained tutors. Tutees gained 0.93 standard deviations.

Staub and Hunt (1993) studied the effects of Social Interaction Training on High School Peer Tutors of Schoolmates with Severe Disabilities. This study demonstrates that volunteer, peer and high school tutors can increase their rate of social initiation toward and interaction with severely disabled peers, and thereby increase targeted social behaviors in those peers, after relevant training. Eight tutors (four trained and four controls) worked with four severely disabled students. Trained tutors had significantly higher rates of social interaction with tutees than did controls.

Spencer (2006) presented an updated research synthesis on the use of students with emotional or behavioral disorders as tutors and/or tutees. Thirtyeight studies from 1972 to 2002 were identified in which students with emotional or behavioral disorders served as tutors and/or tutees in order to teach their peers a variety of academic and social skills. Within the instructional settings, a variety of peertutoring models and configurations were found, including cross-age tutoring, which involves older students tutoring younger students, and same-age
tutoring, which involves students of the same age tutoring each other. In some studies, a reciprocal component was implemented in which students exchanged roles during the sessions so that each student served as the tutor and the tutee. Overall, results suggest that students with emotional or behavioural disorders can successfully serve as tutors and tutees in reading, writing, and math classes while this replication and expansion of previous research offers promising results in social studies. In addition, recent peer-tutoring research has examined the use of explicit strategy instruction in content-area classes, moving beyond the basic skill and drill of factual information. Implications for future research and practice are discussed.

3.5 STRATEGIES FOR PEER TUTORING

Cloward (1967) evaluated the New York Homework Helper Programme. He assessed the effect on both tutors and tutees of taking part in a tutoring scheme designed to improve reading.

The study was intended to analyze the effect of tutoring on both tutors and tutees in: (a) their reading achievement; (b) their school marks and behaviour; and (c) their attitudes and aspirations. The pupils were randomly assigned to experimental and control groups.

Its findings were remarkable. The tutors in the experimental group showed significantly more improvement than control group. The average high school student can learn to be an effective tutor. High school tutors proved effective with pupils who were severely retarded in reading. In a tutorial situation, where emphasis is placed on
individual attention and basic-skills training, these youngsters can make substantial progress in reading. It also helps underachieving school pupils to improve their own academic skills.

Klosterman (1970) carried out an experiment using students of education as tutors and nine-year-old pupils as tutees. He selected three schools for experiment; the pupils were (a) either tutored individually; (b) tutored in a small group; or (c) given normal classroom instruction. The tutors were students majoring in elementary education.

The finding of the study showed that subject receiving individual tuition made significantly greater gains than those having an equal amount of classroom instruction. Pupils tutored in groups also made significantly greater gains than pupil receiving classroom instruction, and that being tutored in groups was as effective as being tutored one-to-one.

Gorrell and Keel (1986) presented eight categories of significant behaviors found in a field study of 24 pairs of eighth grade tutors and first grade tutees in a university laboratory school: on-task behavior, prompting and guiding, praise and encouragement, adjusting to the child's needs, managing behavior problems, allowing autonomous performance, bonding and cooperation.

Pigott, Fantuzzo and Clement (1986) studied the effects of Reciprocal Peer Tutoring and Group Contingencies on the Academic Performance of Elementary School Children. They report the results of study of 12 underachieving fifth graders who were selected based on low arithmetic performance to serve as reciprocal peer tutoring group trainers. In these groups of four, 'peer tutoring operations' were equated
with group roles. In addition, reward contingencies were in place. Thus the intervention is perhaps best called 'co-operative learning' rather than peer tutoring. The intervention increased the students' arithmetic performance 'to a level indistinguishable from their classmates' during treatment and 12 weeks later, and their 'peer affiliation' with other group members increased.

Topping (1987) conducted a study about paired reading. It is a strategy which emphasizes fluency in reading. He suggested that, it is based on a rationale incorporating six converging notions.

1. The involvement of 'significant others'
2. The child’s selection of interesting reading materials
3. Modeling by the child of a competent leader
4. The child’s control of the feedback of information about the text from the tutor
5. Positive reinforcement of the child’s reading
6. An increased 'time-on-task' by the well-motivated child.

Raschke et al. (1988) presented results of a study in which 70 kindergarten students were assigned to either a cross-age tutoring program utilizing sixth grade tutors (for weekly, one-hour exchanges) or to a comparison group. Those in the tutoring program showed significantly more positive attitude growth toward older students than the non-tutored group.

The study revealed that children become more confident and interested in reading as an activity after following this programme.
Some teachers observe a change in classroom atmosphere away from competition and towards co-operation and helpfulness.

Damon and Phelps (1988), in their paper entitled "Three Approaches of Peer Learning and Their Educational Uses" indicate three approaches to peer learning: peer tutoring, cooperative peer learning, and peer collaboration, and the degrees of equality and mutuality of interaction of each. Peer tutoring is low on equality, while peer collaboration is high, and co-operative learning is usually high. Peer tutoring and co-operative learning are variable on mutuality of interaction, while peer collaboration is high.

Greenwood et al. (1988) presented five limitations of the small number of effective and research-validated classroom intervention procedures for use with particular classroom situations and problems. They posit peer-oriented procedures for instruction and behavior management that have emerged in the last ten years and surmount these limitations. The differences between peer-influence and peer-mediated strategies and the benefits of both are also discussed. The study lists four potential problems/concerns related to the use of peer procedures. It also lists the purposes and goals of peer tutoring strategies and describes systematic tutoring procedures and recent advances.

Maheady et al. (1988) reported effects of Class-Wide Peer Tutoring (CWPT) on the academic performance of 14 mildly handicapped and 36 nondisabled students in three tenth grade social studies classes. Randomly assigned tutor-tutee pairs, belonging to one of two teams, quizzed each other verbally using study guides and took written weekly quizzes for points for their teams. Quiz scores changed
from approximately 70 percent during baseline, for both handicapped and non-handicapped students, to approximately 90 percent for both groups, and far fewer failures overall in this ABAB experimental design.

Damon and Phelps (1989) in their study entitled "Strategic Uses of Peer Learning in Children's Education", described in detail the differences among peer tutoring, co-operative learning, and peer collaboration. They report results of a two-year longitudinal study of 164 fourth and fifth graders. Children in experimental peer collaboration pairs performed significantly better on ratio, proportion, and perspective-taking tasks on immediate and delayed post-tests offers a detailed vision of the ideal educational atmosphere - a mix of peer and adult instructional techniques. According to Damon and Phelps, peer learning approaches that focus on peer collaboration (an intense co-operative approach) to solve a problem are especially effective in fostering creativity, experimentation, problem-solving skills and the learning of deep concepts, a 'discovery learning' approach especially effective in science education. These are the critical thinking skills that report after report and commission upon commission warn us are not being learned in schools and yet are a necessity for meeting our future workforce needs. Findings from their two-year study showed, "Gains were made with virtually no instruction from adults other than the initial instructions to work together toward correct solutions. Feedback on right and wrong answers was given only by a programmed computer. The children managed their own interactions, invented their own problem-solving procedures, and discovered their
own solutions'. Furthermore, they concluded, 'Our emerging picture shows peer collaboration creating an atmosphere of social stimulation and supportthe two environmental attributes essential for healthy development to occur".

Damon and Phelps (1989) discussed the relative levels of equality (in which both parties in an engagement take direction from one another rather than one party unilaterally directing the other) and mutuality of engagement (in which the discourse is extensive, intimate and connected) in peer tutoring, co-operative learning, and peer collaboration. The study concludes that peer collaboration has high levels of both, while co-operative learning is high in equality but not mutuality, and peer tutoring has a low level of equality and a varied amount of mutuality. It contrasts peer approaches with 'guided participation' and recommends peer discourse as a useful supplement to effective adult teaching.

Fantuzzo et al. (1989) made a comparative analysis of the effects of Reciprocal Peer Tutoring on Academic Achievement and Psychological Adjustment. They present the results of a study of the dyad and structure (prescribed format) components of the Reciprocal Peer Tutoring (RPT) strategy as experienced by 100 undergraduate college students. Both the dyad and structure components of RPT were determined to significantly impact comprehensive examination scores.

Fresko and Chen (1989) reported the results of a survey study of the effects of tutor-tutee ethnic similarity, tutor expertise and perceived goal attainment on the satisfaction of 425 college student tutors of disadvantaged elementary children. The major factor directly
influencing satisfaction was the extent to which tutors felt they had achieved project goals, not tutor-tutee ethnic similarity or tutor expertise factors.

Greenwood et al. (1989) described a four-year longitudinal study of a Class-Wide Peer Tutoring (CWPT) program in which pairs of low-SES children are assigned to one of two competing teams, and tutor and tutee roles are reversed in every session. Tutees win points for their teams, which in turn win social rewards. These low-SES, elementary school, Chapter 1 students scored from 0.5 to 1.4 grade equivalents higher than the low-SES students who were not in the CWPT program on standardized reading, Mathematics, and language/arts tests. These differences were statistically significant.

Imich (1990) in his study entitled "Pupil Tutoring: The Development of Internality and Improved School Attendance", discussed results showing that peer tutoring may lead to a more internal vs. external locus of control and to improved school attendance. Possible theoretical reasons for these findings are also discussed.

Bartz and Miller (1991) provided brief research overviews of 12 teaching methods that have a sound theoretical basis, have demonstrated a positive impact on student learning, and have a substantial research base. One of these is peer tutoring. Its cost effectiveness, key factors in effectiveness of tutors, and several advantages of peer tutoring are discussed.

Miller et al. (1993) briefly reviewed positive academic outcomes and social benefits of peer tutoring and describes a systematic process for teachers to use to plan, implement and maintain a peer tutoring
intervention. Anliker et al. (1993) described an experimental study in which two groups of teens, ages 14-17, tutored children in nutrition for a summer. There were significantly greater gains for the 30 tutored children than for the 19 comparison children.

Dohn and Bryan (1994) outlined a nine-step system for using peer or cross-age tutoring to teach the "acquisition of self-referent thoughts" (for a more internal locus of control) on the part of learning disabled students, which, according to other studies referenced by the authors, lead to greater academic achievement gains.

Malone and McLaughlin (1998) compared reciprocal peer tutoring with a group contingency to a traditional vocabulary program in a regular middle-school classroom. The participants were 20 seventh and 12 eighth-grade students enrolled in a private parochial school. A counter-balanced time-series design was employed to evaluate the effects of reciprocal peer tutoring across the two groups of students. The overall results indicated that when students participated in reciprocal peer tutoring, scores on weekly quizzes in vocabulary were significantly higher. Reciprocal peer tutoring with a group contingency was beneficial to middle school students, easy to implement, and a cost-and time-efficient system for teachers and students.

Maheady et al. (2001) described the Class-Wide Peer Tutoring (CWPT) approach and list studies which have shown its effectiveness across different subject areas, age levels and instructional settings, all of which were conducted with at-risk students serving as tutors and tutees. They also describe the Class-Wide Student Tutoring Teams (CSTT) approach, a combination of CWPT and Slavin's(1978) Team-
Games-Tournament approach. They also cite studies showing that CSTT students' weekly math quiz scores increased by approximately 20 percentage points.

Dufreneet al.(2005) evaluated daily implementation of a reciprocal peertutoring procedure for Mathematics. Additionally, this study evaluated the reliability of progress monitoring data collected by students. The peertutoring procedure was designed such that completion of each treatment component produced a unique permanent product. Student integrity was defined as the percentage of treatment components completed. The effect of performance feedback for students with poor implementation was evaluated. Five of the 37 students who implemented the peertutoring procedure were provided additional follow-up support due to poor implementation. The accuracy of implementation of the peertutoring procedure improved markedly when they were provided performance feedback. With regard to the reliability of progress monitoring data collected by students, a very high level of agreement was obtained between adults who scored probes for digits correct per minute and tutor scoring of those probes. Implications for practice employing peer-mediated interventions and further research are also discussed.

3.6 DIFFERENT MODELS IN PEER TUTORING

Lundell and Brown (1979) described a peer tutoring model and provide suggestions for implementing peer tutoring. The seven steps in the development of a peer tutoring program are: establishing a need,
Chapter 3 Review of Related Literature

considering curriculum, assessing, selecting learners, selecting tutors, monitoring, and co-ordinating.

Holder and Lister (1982) provided a brief description on a successful peer tutoring model implemented by Portsmouth High School (New Hampshire) in which student tutors volunteer to work under the direct supervision of the special educator on reading, math, science, and pre-vocational skills. Peer tutor responsibilities on assisting students in reading are presented, with emphasis on tutor training in goals, lessons, and the use of individualized checklists. Organizational studies are advocated as a way peer tutors can aid students in organizing their work and study more effectively. Resource math courses are seen as an opportunity for 'reversed mainstreaming' in which peer tutors from regular education programs are integrated into special education programs to facilitate positive peer interaction as well as learning. Positive ramifications of peer tutoring are: additional one-to-one attention to students with special educational needs, shared social experiences, improved self-esteem, decreased disruptive behavior, improved work habits, reduced stigma of special needs, and new and positive peer friendships.

The use of a learning model in a peer tutoring program is discussed by Schmelzer (1984). Although the tutorial function is often a priority, the goal of the peer-tutoring program is to help students become independent learners. To eliminate the need for tutoring, it is necessary to determine why the student is having academic problems. To train peer tutors, a paradigm of the learning process is used that is based on a computer model of information processing. This Integrated
Learning Model (ILM) has five phases: preparation, input, processing, storage, and output. In an initial training session, tutors are asked to name activities that relate to the learning process. These activities are grouped according to the five main phases of the ILM. In additional training sessions, tutors are provided case notes of students that include diagnostic information. The tutor's task is to determine the possible contributing factors to problem areas. Finally, tutors learn interviewing strategies needed to determine in what phase the student's learning is breaking down. A list of key questions that tutors incorporated into their interviews is included. In addition to explaining the learning phases, the paper identifies the strengths and weaknesses of the ILM.

Kohler (1986) examined natural contingencies of peer reinforcement. He describes three supportive behaviors exhibited by third grade tutors that were not taught to them as part of the Class-Wide Peer Tutoring procedure: 'go faster prompts', 'praise' and 'help' (in which tutors correctly spell words misspelled by tutees). These behaviors increased academic response rates of three tutees and academic gains by one student whose weekly achievement was analyzed.

Davis and Kevin (1987) examined a comprehensive, three-dimensional model of peer tutoring, constructed by gathering current theories and research and locating them on a dynamic continuum of the tutoring process, allows researchers to break new ground in tutor research and might eventually offer a new heuristic for training peer tutors. The first axis in the model, the focus continuum, characterizes how the tutor interacts with the writer and text based on person-
centered, process-centered, text-centered, and/or rule-governed approaches. This continuum incorporates the views of those advocating mechanical competence, style, and writing as an individual process. The second axis locates the tutorial process along the attitudinal continuum, a perspective based on: pedagogical style, logic, and/or instinct. Together, these two axes comprise the focus of the tutoring situation. The third axis, the interactional continuum, describes the relationship that occurs during the peer tutoring process and is based on the following conversational modes: authoritarian, conversant (collaborative), and/or receiver (student centered). Overall, this three-dimensional model characterizes 36 basic tutoring types which allow for an infinite amount of variation. By identifying locations along the continua as a point of departure, researchers can use the model to designate roles, differentiate between concepts that address only one or two facets of tutoring, and eventually offer a new heuristic for training peer tutors.

Berliner and Casanova (1988) in their study reviewed a study by Levin and Glass and Meister which showed that tutoring was more cost-effective than reduced class size, increased instructional time, and CAI. Casanova discusses five steps needed to implement a successful tutoring program: class preparation, selection of tutors, preparation of tutors, monitoring by the teacher, and continuous assessment of student progress.

Webb (1989) studied Peer Interaction and Learning in Small Groups. In this study he discusses two kinds of peer interaction in small groups - (1) level of elaboration of help given and received and
(2) appropriateness of responses to requests for help and their relationship to student achievement presents a model of peer interaction and learning in small groups. He lists factors which have been shown to influence students’ interactive behavior viz., student ability, gender, personality, and group composition by ability and gender. Hypothesizes that students’ interactive behavior is influenced by the group's perception about the locus of control of the student needing help, the size of the group, the reward structure, and the task structure.

Walker (1989) described two sites in the South Carolina Cross-Age Tutoring Project that 'offer hope of becoming institutionalized': Tamassee-Salem High School and Branchville Elementary and High School.

Bernard (1990) advocated a 'peer resource model of education', i.e., programs such as youth service, co-operative learning, peer tutoring, cross-age tutoring, peer helping, peer mediation, peer leadership, and youth involvement. Briefly reviews seven ways in which research indicates that peer relationships contribute to a child's social and cognitive development. Hediscusses the importance of social support to positive outcomes and details the many research-based positive outcomes of peer resource programs.

Doise (1990) studied the Development of Individual Competencies through Social Interaction. He presents a theoretical framework of the links between social interaction and the cognitive and social development mechanisms of co-ordination of interdependent actions, socio-cognitive conflict, and 'social marking' (correspondence
between social relations and cognitive [Piagetian] operations on properties of objects).

Kohler and Strain (1990) listed four types of peer-assisted interventions reported within the educational and applied behavior analysis literature: peer management of non-academic social behavior, peer academic tutoring, peer skill modeling, and group-oriented contingencies (e.g. co-operative learning). They concluded that the literature indicates 'some evidence of effectiveness, but little documentation of procedural practicality'.

Gartner and Riessman (1993) made an attempt to develop a new model for peer tutoring. They cite studies of the effectiveness of tutoring on tutor gains as a rationale for the Reciprocal Tutoring approach. The study also described this approach and says that support of administrators and school-based management teams is crucial.

Gartner and Riessman (1993) in their article "Peer-Tutoring: Toward a New Model" illustrated that peer tutoring is effective for tutors' as well as tutees' academic and social development. The first section of the article discussed a peer tutoring model developed by the Peer Research Laboratory at the City University of New York. The model makes the tutoring process a central instructional strategy and participants have the experience of playing dual roles of tutor and tutee. Participants become cognizant of their learning processes as a result of participating in programs designed according the Laboratory's model. The second half of the article discussed specific programs developed by the Peer Research Laboratory. The first program involved cross-age peer tutoring at an elementary school. In the
second, high school tutees participated in the planning and assessment of the program. The third program was integrated into a high school World Citizen Curriculum, where students received credit for coursework as well as for peer mentoring international students. The final programme gave high school students community service credit for tutoring elementary and middle school students; regardless of the achievement levels of the tutors, their effectiveness was consistent across the program. The Laboratory has found that youth-helping-youth programs increase students’ self-esteem, reduce stigma associated with receiving help-since all students participate as tutors and tutees-and contribute to the development of student-centered schools.

Riessman (1993) suggested and briefly described an 'institutional self-help model' in which older students earn credit for tutoring younger ones. He bases this suggestion on the effectiveness and low cost of tutoring.

Deese-Roberts and Keating (2000) in their book "Library Instruction: A PeerTutoringModel", proposed the application of peer tutoring to library instruction, primarily in the academic library setting. Chapter 1 provided a brief historical view of library instruction and current trends that make peer tutoring a possible form of library service. Chapter 2 described peer tutoring as currently practiced in higher education. Chapters 3 and 4 provided principles and guidelines for establishing peer tutoring programs with a focus on library instruction tutoring. Chapters 5 and 6 presented a conceptual curriculum and an eight-session model for a library instruction tutoring
Chapter 3 Review of Related Literature

program. Chapter 7 is composed of an analysis of experiences at the University of New Mexico General Library (UNMGL), including program improvements and future plans. Chapter 8 explored the application of the library instruction peer tutoring model to K-12 education. At the end of most chapters bibliographies of additional readings are provided. Appendices contain training materials and selected peer tutoring resources.

Nath and Ross (2001) examined the effects of peer-tutoring training on elementary school student communication and collaboration skills when used in conjunction with co-operative learning. Within six classes in an inner-city school, co-operative learning pairs were randomly assigned to two groups (control and training). Findings showed that, in general, the training group surpassed the control group in both communication and collaboration skills.

The results of the study of Lisa Facey-Shaw and Paul Golding (2005) on the effects of Peer Tutoring and attitude on academic performance of first year introductory programming students indicated little evidence of a positive effect of peer tutoring on the academic performance of students. It also reveals that attitude, and in particular, confidence in learning programming, plays an important role in students’ academic performance. This paper discusses the design of the study and analyzes the results gathered. The study revealed that various aspects of a person’s attitude contribute to academic performance. Personal confidence in learning programming contributed more
Chapter 3 Review of Related Literature

significantly than the usefulness of programming and the perception of teacher motivation; however these factors cannot be ignored.

Golding et al. (2007) conducted a study on the effects of peer tutoring, attitude and personality on academic performance of first year introductory programming students. The study sought to examine the effect of peer tutoring, and attitude on academic performance. A control and experimental group was established, and an instrument was administered to measure students’ attitude to programming along with the use of pre and post test scores. The study suggested that peer tutoring had a positive effect on students’ attitude, viz., personal confidence and academic performance. Further investigations were carried with a similar methodology and personality was explored as an additional factor affecting academic performance. Both studies revealed that personal confidence in learning programming contributed more significantly than the usefulness of programming and the perception of teacher motivation. The statistical analysis revealed no significant influence of personality types on academic performance, which suggests that it does not play an important role.

Veerkamp (2007) and his colleagues conducted a study on the effects of Class-Wide Peer Tutoring on the reading achievement of urban middle school students. This study investigated the effects of Class-Wide Peer Tutoring (CWPT) on the reading skills of urban middle school students using novels as the curriculum. Teacher-led instruction was compared with Class-Wide Peer Tutoring and Class-Wide Peer Tutoring plus a lottery contingency for appropriate on-task and tutoring behaviors. Three sixth-grade general education reading
classes under the direction of one teacher participated. Data were collected on all students from weekly written test of vocabulary and comprehension. Additional oral reading rate and academic engagement data were collected from three 'Low achieving' target students. Overall results demonstrated improved performance on weekly test under Class-Wide Peer Tutoring conditions compared with teacher-led instruction. Data also revealed differences in the types of academic responses made during teacher-led instruction and class wide peer tutoring and increases in oral reading rates for two target students. These findings suggest that Class-Wide Peer Tutoring; particularly Class-Wide Peer Tutoring plus lottery can improve the reading skills of urban middle school students.

Josh Peters (2009) – examined the effectiveness of peer tutoring in increasing activity levels and improving skill performance of students in inclusive elementary physical education classes. Peer tutoring as an effective inclusion strategy is decades old and widely used in integrated classrooms, particularly for socialization (Ernst & Byra, 1999). Surprisingly, very little research has been done on academic outcomes of peer tutoring, especially in physical education classes. The current research hints at positive results, but is inconclusive. Thus far, peer tutoring has proven to be a highly effective method for increasing activity levels in children with severe and moderate disabilities (SMD) (Klavina & Block, 2008), deaf students (Liebermann, Dunn, vander Mars & McCubbin, 2000), and visually impaired students (Wiskochil, Lieberman, Houston Wilson & Peterson, 2007), but only slightly effective in improving the motor performance
of autistic students (Ward & Ayvazo, 2006) in inclusive elementary physical education classes.

The study of De Smet, et al., (2010) examined the impact of three tutor training conditions (Multi Dimension Support, model/coach, and control condition) on peer tutors’ actual tutor behavior in asynchronous discussion groups and on tutors self-efficacy beliefs, perceived collective efficacy, and training evaluation. The results indicated that, compared to the control condition, in both the multi-dimensional support and the model or coach training the occurrence of social posting decreased whereas the presence of support stimulating tutees’ personal development increased. Regarding the evolution from modeling to coaching behavior, tutors started as a model in both experimental training conditions. Further, it appears that the experimental training conditions differ significantly with regard to peer tutors’ self-efficacy beliefs on fostering knowledge construction and with regard to the tutors’ personal training evaluation. Overall, it can be concluded that an explicit tutor training appears to determine the adoption of the expected types of tutoring activities. In this respect, providing novice peer tutors with guidelines by means of a specific training is fruitful for realizing more adequate online tutoring behavior and optimizing self-efficacy beliefs regarding tutoring competences.

### 3.7 DIFFERENT MODELS OF TEACHING MATHEMATICS

William and Richard (1981) conducted a study; having two-part-module and it was prepared to assist instructors in designing and implementing a peer tutoring program. After introductory material and
Chapter 3 Review of Related Literature

the presentation of a rationale for peer tutoring, Part-I begins by stating learning objectives and providing a present. It then presents an overview of peer tutoring, outlining a systematic tutoring programme. This section continues with a description of five steps in an implementation procedure including the selection and recruitment of tutors, the identification of instructional resources, the determination of who will be served, and the evaluation and modification of the tutoring programme. Part II, a peer tutoring manual, begins with an introduction to the concept of peer tutoring and nine learning objectives. After the tutor’s pre-test, the manual suggests ten learning activities for the tutor which focus on subject matter review, personal attitude assessment, investigation of the tutor’s role, hypothetical tutoring situations, designing learning activities for tutees, identifying additional resources, record keeping, and a personal growth seminar. The manual concluded with a pretest.

Bhalwankar (1985) conducted a study on the effects of expository and guided discovery methods of teaching Mathematics on the achievements of students of different levels of intelligence. The study revealed that guided discovery and expository methods were equally effective on achievement of knowledge and comprehensive objectives to both immediate posttest as well as retention test. The expository method was significantly more effective than the guided discovery method on the criterion of scores in the case of high intelligence. The study also revealed that when command over basic arithmetic skills improved, attitude towards Mathematics become more favourable and achievement in Mathematics increased.
Mahajan’s (1992) findings indicated that during the peer group sessions as well as classroom teaching sessions the group taught by Concept Attainment Model was found to be superior to the groups taught by Advance Organizer Model as well as the routine method as far as teaching ability of student teachers was concerned.

Meera Raj (1995) conducted a study on the effect of Advance Organiser Model (AOM) on Mathematics achievement in comparison with the conventional method of teaching at secondary level. The finding shows that AOM is superior to conventional method of teaching under the objectives: Understanding and Application, but not significant at the knowledge level. It was effective in fostering and retention of concepts in Mathematics among students.

Sinha (2000) conducted a review study of Concept Attainment Model in Mathematics and came up with the findings that (i) Concept Attainment Strategies was more effective over the traditional approach; (ii)Personality factors had no significant effect on the concept attainment process; (iii)A marked difference in the performance of boys and girls in concept attainment; and (iv) The learning through audio-visual materials and techniques cause prolonged retention than by the conventional method.

Hinrich (2003) conducted a study on The Effectiveness on Inductive Model on Achievement in Mathematics at secondary level. They measured 182 children’s application compliance at syllogic reasoning and in solving a series of problem requiring inductive reasoning. The finding showed that inductive reasoning gave more attention to students’ abilities in analyzing, classifying, comparing
formulating hypothesis and drawing conclusions, that is thinking skill essential to reasoning process. This study also measured the effectiveness in promoting concept formation or attainment and in fastening meta-cognitive strategies that are crucial to higher order thinking.

Lexman and Sundaram (2003) conducted a study on Effectiveness of Cognitive Development Model on Reasoning Ability and Achievement in Mathematics at Secondary Level. They concluded that teaching based on this model is effective under the objectives – understanding, application and analysis and it enhanced the reasoning ability of the students. The study also revealed that (i) in understanding the concepts; girls felt more difficulty when compared to boys; (ii) pupils have the knowledge of almost all the concepts compared to understanding and applications; (iii) pupils are not given sufficient practice in reading, understanding and analyzing the problem before answering it.

Tan and Aris (2006) conducted a study on GLOOT (Generative Learning Object Organiser and Thinking Task): A pedagogically enriched design frame work of learning environment to improve thinking skills. This study is comprised of two parts. In the first part, the authors examined the attributes of learning objects in providing a customized, individualized and flexible learning environment. The second part purposes a design and development frame work of GLOOT, a pedagogically enriched web-based learning environment designed to Higher Order Thinking Skills.
Jose (2007) conducted a Study on Effectiveness of Generative Learning Model of Instruction on Achievement in Mathematics at Secondary Level. This model helps in raveling the depth of students understanding and reinforces their previous knowledge. The findings show that the Generative Learning Model is more effective than the present method of teaching Mathematics under the category of objectives: knowledge, comprehension, application and analysis. Experimental method was adopted for this study and the sample was 90 students of Standard VIII.

3.8 PEER TUTORING MODELS IN MATHEMATICS

Hylock (1980) conducted a study on the influence of peer tutoring in fostering creativity at primary level. The instructional design with a peer tutoring strategy, a combination of other theories including Gagne’s instructional events has been used to improve mathematical creativity among students and includes developing test items, tutor’s development of learning materials and evaluation.

According to Wigg and Semel (1984) described Mathematics as "conceptually dense" which means that the students must understand the language and symbols of Mathematics because contextual clues, like those found in reading, are lacking in Mathematics. For example, math vocabulary like greater than, smaller than, denominator, equivalent and mathematical symbols (like =, < or >) must be understood to work problems as there are no contextual clues to aid understanding. In a Peer Tutoring activity vocabulary and symbolic understanding can be facilitated with peer interaction and modeling. In
more than 40% of the studies, students in the small-group approaches significantly outscored the control students on individual mathematical performance measures.

Dinwiddie (1986) described study results indicating that spelling, math, and reading achievement of both average and low-ability inner city, second grade students was greater in a year-long Class-Wide Peer Tutoring condition in which students earned points for their teams. However, no comparison group was used. Better outcomes for tutees were related to quality and intensity of peer tutoring.

Samuel (1987) studied the effect of Class-Wide Peer Tutoring on certain outcomes of Mathematics learning. Results showed that pupils taught through Class-Wide Peer Tutoring strategy acquired a significantly higher Mathematics interest and self-concept than pupils taught through conventional method. He reviewed more than 50 studies in Mathematics comparing student achievement in class wide peer tutoring versus whole class traditional instruction. The main objectives were to enable the teachers to discover the students learning difficulty in Mathematics and to suggest remedial measures to overcome them. The study revealed that the degree of relationship between the independent variables-socio-economic status, interest, intelligence and adjustment and the dependent variable academic achievement. The study concluded that all the three factors played a positive role in academic achievement in mathematic classes.

Britzet al. (1989) reviewed 1980-1989 study findings concerning the effects of peer tutoring on the Mathematics performance of low
Chapter 3 Review of Related Literature

achieving, mildly handicapped, or socially disadvantaged children. They concluded that peer tutoring usually resulted in significant cognitive gains for both the tutor and the tutee, while affective gains were not as conclusive. Both peer and cross-age tutoring had some benefit for the tutee and frequently the tutor.

Greenwood (1991) studied the longitudinal effects of Class-Wide Peer Tutoring (CWPT) on the Reading, Language, and Mathematics Achievement of At-Risk Students. He describes how CWPT puts effective instructional variables into practice and how it improves academic achievement. The effective instructional variables CWPT utilizes are: engaged time, time management, success rate or successful completion of tasks, academic learning time, monitoring, structuring, and questioning. Report’s finding was that CWPT, when systematically applied to oral reading, spelling and arithmetic facts, and increased students' performance on standardized measures of reading, language and Mathematics. It also discusses two CWPT drawbacks: first, that most of the evidence of its effectiveness is in the realm of acquisition of rote skills and that the content for tutoring sessions must be developed or adapted by the teacher.

Vacc and Cannon (1991) examined the effects of a six-week, cross-age tutoring program on four moderately mentally handicapped elementary students' Mathematics learning. Tutees' Mathematics skills increased during the program, but maintenance of or improvement in Mathematics skills varied two years later. The sixth grade tutors' attitudes toward their mentally handicapped peers improved.
Carol (1993) observed that peer tutoring involves the identification of specific segments of learning through interaction. It provides a structure for tutoring that includes class instruction followed by small group work. Also practical implications of using peer tutoring approach are described, followed by evidence of its effectiveness. He found out that peer learning is not much effective in basic Mathematics, but effective in consumer Mathematics, grammar, history and science. When results of all these subjects pried together, the overall effect consistently favoured the peer group, and peer learning strategy was more effective in increasing non-verbal creativity.

Fuchs and Fuchs (1994) examined the effect of previous training and experience in peer tutoring on the nature of student interactions. Sixteen classrooms were assigned randomly to two treatments with and without previous training and experiences in peer tutoring. Peer-tutoring teachers taught students a structured, interactional, explanatory verbal rehearsal routine that incorporated step-by-step feedback. Peer tutoring was implemented on a Mathematics operations curriculum twice weekly for 10 weeks. Each teacher had achiever to serve respectively as the tutor and the tutee during peer-tutoring generalization sessions. Video tapes were analysed at three levels: micro-level quantifications, global ratings, and transcripts of representative dyads. This study revealed that the cooperative efforts are more effective than that of competitive or individualistic efforts, for promoting achievements in important learning tasks such as concept
attainment, verbal problem-solving, categorization, spatial-problem solving, retention and memory, guessing, judging, predicting etc.

In their study Fuches, Hamlett and Duka (1997) revealed that mathematical concept can be easily explained through peer tutoring. Moreover, when students understand the benefits of peer tutoring and use the tools to become effective tutors and tutees, they make greater progress than those who are not given any instruction on how to work together. This study enables students to understand the fundamental concepts of algebraic, numeric and geometric representations and its relationship. Students develop proportional reasoning skills, they investigate more complex problem settings and move from concrete experiences in Mathematics to the formulation of more abstract concepts. Also this study is expected to be the foundation for future learning in Mathematics.

Bentley and Moore (2000) pointed out that the knowledge of basic arithmetic facts aids in the acquisition and speed of performance of arithmetic operations. A peer mediated instructional procedure; Class-Wide Peer Tutoring (CWPT) has been shown to increase the rates and accuracy of students’ performance on a variety of academic tasks. The present investigation evaluated the retention of 100 subtraction items by primary grade-age children with mild disabilities using CWPT for 10 weeks. Short and long-term retention of items and rate of correct responding to subtraction items practiced during CWPT was obtained. Students’ failure to learn particular item was not attributable to fewer opportunities to practice these items, less accurate
practice, or item difficulty. Students reported positive evaluation of CWPT and perceived positive social and self-esteem outcomes.

Sharpley (2002) conducted a study on Peer learning in a statistics class at London University. The researcher counted that majority of students involved peer learning activities and it revealed that working in pairs is a particularly effective form of learning statistics and they also feel that small groups are beneficial for developing statistical problem-solving skills. This study seems likely that there is something about the way the subject of statistics is taught and assessed in school which encourages children to think in narrow domains to rely on routine process and to think in a predominantly encouraging way about statistical problems whereas opportunities and encouragement to break form the stereotype to overcome fixations in thinking, to show less than rigid adherence to successful routine or to think flexibility and divergent qualities of mathematical thinking through peer tutoring.

Karns (2003) concluded a study on learning by teaching found that despite individual difference in the entry resources of students, these differences were not reflected in their final achievement. Here the interactions among instructional methods, gender and age were examined and the grade success rate was determined for each method. Here the Peer tutoring had a positive educational influence on the student’s achievement on Mathematics. The major objectives of the study focused on small group learning Mathematics as a method of raising the quality of teaching and learning and as a consequence pupil achievement in world wide. He is of the opinion that peer tutoring can
be used for practicing skills, collecting data, discussing concepts and principles in Mathematics. This study highlights the significant impact on the intensity of interactions of students in a group. From both theoretical and practical perspectives, peer tutoring has served as a catalyst for a paradigm shift from a dominant prediction-selection model to an emerging diagnostic developmental model.

Oateset al. (2005) reported the use of collaborative tutorials and peer-tutors in undergraduate Mathematics courses at The University of Auckland. Their paper reports on significant developments within the Department's programmes, including the extension of the collaborative small-class tutorials to cover all first-year undergraduate courses in the department. It provides evidence of the effectiveness of the tutorial programme, as gauged from a survey of students' perceptions. Many of the students enrolled in the 'Tutoring in Mathematics' course that initially trains and provides the peer-group tutors continue on as tutors in other Mathematics courses within the Department. Some subsequently enroll in the University's Graduate Diploma in Teaching (Secondary). The effects of the tutoring course on tutors continuing to tutor at higher levels, and their performances as novice teachers in the Diploma course are examined.

Robinsonet al. (2005) reviewed a number of works on Peer Tutoring. This review of the literature on peer and cross-age tutoring emphasizes programs in Mathematics and suggests that such programs have positive academic outcomes for African, American and other minority students as well as for White students who participate as tutors, as tutees, or both. Such programs also appear to have a positive
impact on a variety of attitudinal and socio-emotional outcomes, such as students' attitudes towards school, their self-concepts, and their sense of academic efficacy. This review also explores whether specific features of the tutoring programs (e.g. tutor training and amount of tutoring) or characteristics of the students (e.g. academic level prior to tutoring and gender composition of tutor-tutee pairs) affect various outcomes. Role theory is used as a theoretical framework to explain some intriguing and surprising findings (e.g. why tutors show academic gains even when they do not receive additional subject matter instruction, why longer and/or more substantial tutoring programs may not foster greater immediate academic gains than shorter programs, and why mixed-sex pairs do not consistently reap benefits equal to those of same-sex pairs). Finally, implications of the review for the development of peer and cross-age tutoring programs are discussed.

Fulk (2006) gave an overview of a piece of qualitative research conducted at a University in United Arab Emirates. The aim of the study was to evaluate a Mathematical peer tutoring programme in order to highlight benefits and challenges, and to make informed improvements. The study drew particularly on participant perceptions and observations of the programme. It identified various benefits for tutors such as learning through teaching and becoming more responsible while doing something worthwhile to help others. Benefits for tutees include improved levels of self-confidence and Mathematical aptitude. The study also highlighted several challenges associated with the high dependence and low meta-cognitive awareness demonstrated by the tutees. In addition, tutors were not always able to offer
appropriate assistance. Improvements to the programme could include increasing faculty involvement, improving tutee awareness of the aims of the programme, and providing additional assistance to tutors.

Walker (2007) described in his conceptual article, a model of a school-based, student-led initiative that uses peertutoring to address under-achievement in Mathematics. The model is three pronged: a) it suggests a site-based approach to building on existing student excellence in Mathematics to drive improved student Mathematics achievement; b) it seeks to address the lack of teacher knowledge about urban students and their Mathematics understanding; and c) it aims to deepen existing Mathematics knowledge, confidence and interest among high school students. In the article, he share analyses of the interactions among tutors, tutees, advisors, and teacher; the mathematical discourse within those interactions; and the hierarchical and collaborative relationships that emerged over time.

3.9 ASSESSING PEER TUTORING

Bruner (1963) the main proponents of Youth Tutoring Youth argued that children who teach other children have to struggle to make the material meaningful to the learners and thereby have the opportunity of reflecting upon their own learning process.

The investigator also argued that this opportunity may increase the tutors’ awareness of the patterns of learning and consequently help them to develop their skill in seeing problems in new and different ways.
Chapter 3  Review of Related Literature

In the cognitive area, Bruner suggests that, the child having taught another may himself learn as a result of a number of processes. He receives the material, he has to organize, prepare, illustrate the material to present it to his students; he may try to reshape or reformulate it so as to enable his pupils to learn it and thus himself see it in new ways: he may need to seek out the basic character of the subject, its structure, in order to teach it better, and may thereby himself understand it better.

Gartner et al. (1971) conducted a study on cross age tutoring schemes. Based on this study they classified the potential benefits to tutors and tutees.

General benefits sought for participants in peer tutoring schemes.

Benefits to Tutors

1. Tutors develop their sense of personal adequacy
2. Tutors find a meaningful use of the subject matter of their studies
3. Tutors reinforce their knowledge of fundamentals
4. Peer tutoring offers those who act as tutors the experience of being part of a productive society

Benefits to Tutees

1. Tutees receive individualized instruction
2. Tutees receive more teaching
3. Tutees may respond better to their peers than to their teachers
4. Tutees can receive companionship from tutors.
Chapter 3 Review of Related Literature

Gartner too suggested that children will readily perceive relevant structures or patterns which make knowledge meaningful if they are invited to do so by people close to themselves in age and cultural outlook. The framework into which new knowledge has to be fitted may be more readily offered by peers than by others.

Bean and Luke (1972) used understanding 14 to 17 years-olds in a tutoring scheme. These teenage pupils were used to help in reading classes in an elementary school.

Through careful planning of lessons, they came to enjoy the experience of tutoring. The result of this study was that, by assuming the role of teacher, these teenagers assumed responsibility and thereby developed their self-esteem.

Weiner et al. (1974) described increased self-confidence and improved self-image among children who took part in the peer tutoring scheme.

In particular, a 12–year old girl with a history of traumatic rejection and regressive reactions, who had been a frequent client of social workers, tutored a younger child. In her tutorial sessions she showed none of the nervous, erratic behaviour which she displayed elsewhere and the new, more mature behaviour began to be transferred to other situations. This shows that peer tutoring is one of the best methods in classroom teaching.

Fuller (1980), Llewellyn (1980), Meyenn(1980), Davis and Kevin(1987) and Measor and Woods(1983) conducted similar studies about the staff room and the peer groups.
Cohen and Kulik (1981) briefly described a meta-analysis of 65 objective, comparative studies of tutoring located through computer searches. Effects on both tutors and tutees were positive in the areas of learning, attitude toward subject matter, and self-concept, although self-concept outcomes were small, especially for tutees.

Cohen, Kulikand Kulik (1982) described meta-analysis of 65 studies of tutoring winnowed down from 500 titles found through computer searching. To be included, studies had to (1) take place in actual elementary or secondary classrooms; (2) report on quantitative outcomes of tutored and non-tutored control groups; and (3) be free of methodological flaws. Fifty-two of the 65 studies described program effects on examination scores. Thirty of these concerned reading, 18 concerned math, and four concerned other subject matter. The meta-analysis showed that the average TUTEE scored at the 66th percentile of untutored (control group) students (in other words, the effect size or ES was 0.4). A smaller but significant effect (ES =0.29) occurred for tutees' attitudes toward subject matter (measured in eight studies). A very small and non-significant effect (ES =0.09) occurred for tutees' self-concepts (measured in nine studies). The effects on TUTORS were measured in 38 of the 65 studies. The average ES for academic outcomes was 0.33, for attitudes toward subjects it was 0.42, and for self-concept it was 0.18. Achievement effects were stronger for both tutors and tutees in math, and stronger for tutees in more structured programs of shorter duration, and when lower-level skills were taught and tested on locally developed examinations.
Their essays’ remarks about friendship show the major themes in adolescent pupils. They say that peer tutoring can function effectively as tutors if they are trained and supervised appropriately, and that these students experience academic and social benefits by functioning either as tutor or as tutee. Peer tutoring gives tutors a chance to make direct use of the knowledge they already possess and may, consequently inspire them to seek more of it. The findings were: (a) peer tutoring offers tutors to reinforce learning; (b) review and restructure the knowledge of tutors; (c) develop insight into teaching and learning; and (d) co-operate better with own teachers.

Walker (1985) reported results of training an autistic student to peer tutor. The tutor learned seven tutoring steps. These skills generalized to other tasks. The tutee also exhibited learning of three "prevocational tasks".

Cazden (1986) discussed differences between the communications of 'teachers teaching students' and 'tutors teaching students'. His study reveals that the 'tutor teaching program' is more beneficial when compared to 'teacher teaching program'.

Levin, Glass and Meister (1987) presented findings of a comparison of the cost-effectiveness of CAI, peer tutoring, reducing class size and increasing the length of the school day. Peer tutoring is more cost-effective than CAI, and both are more cost-effective than reducing class size or increasing the length of the school day. Effect size (generated by achievement test standard deviation units) and cost were both taken into account.
Pant (1990) developed a curriculum for the training of peer counselors which could be used for training teachers or students in limited counselling skills. The curriculum involved a series of sessions, which are geared towards developing various counselling skills such as sensitivity listening, responding, problem solving, decision making and conflict-resolution etc.

Greenwood, Carta and Kamps (1990) reviewed a variety of studies and concludes that peer-mediated strategies are as effective as, or more effective than, the traditional teacher-mediated practices to which they were compared, with regular and special education students and across a variety of subject areas. Cautions that peer-mediated approaches entail additional costs, responsibilities, and ethical concerns, which, however, the authors believe to be well worth it compared with the costs of many alternatives that are 'teacher-or computer-mediated'.

Gaustad (1993) described the benefits of one-to-one tutoring, several peer and cross-age tutoring programs, what makes tutoring effective, problems that are commonly encountered, and elements necessary for a successful program.

Fuchs, Mathes and Martiniez (2002) described that the peer tutoring experience is extremely valuable. Peer tutors will work in a variety of classroom settings to provide assistance to teenagers who experiences difficulties with their social and academic growth. Peer tutors will encourage students to achieve their best, act as social role models, and provide a line of communication between the students and teachers. A successful Peer tutor will be flexible, self-motivated,
Chapter 3 Review of Related Literature

creative and compassionate. The research base also suggests that a socialization experience that occurs during peer tutoring can benefit both the tutor and tutee by motivating students to learn and increasing their social standing among peers.

Cates (2005) made a comparative study of Peer Tutoring and Computer Assisted Drill on Mathematics Response Rates. This study investigated the functional relationship between student accurate response levels and two Mathematics drill procedures using a BCBC across participant's single case research design (in this case, 'B' represents peer drill and 'C' represents computer drill). Each of four elementary school students was randomly assigned to one of two dyads and presented addition flashcards under a computerized drill condition and a peer-mediated drill condition. In both conditions, students were drilled for 3 minutes on addition facts with immediate feedback (i.e., 'Correct' or 'Not correct'). Results suggested that the two somewhat older students showed higher levels of accurate responding in the computer condition, while the two younger students showed higher levels of accurate responding in the peer-tutoring condition. Discussion focuses on potential hypotheses for performance discrepancies across dyads, importance of matching instructional conditions with idiosyncratic variables, and implications for practice and future research.
Chapter 3 Review of Related Literature

3.10 CONCLUSION

Studies so far conducted indicated that among the various learning techniques, the most suitable one in Mathematics classroom setting is peer tutoring. Moreover, the reviews revealed that different models can be adopted successfully and effectively among students while learning varied branches of Mathematics.

It is evident from the forgoing research review that strategies based on peer tutoring have been attaining due importance and significance and attracting the attention of educational practitioners all over the world. Even if the impact of Peer Tutoring and different learning models have been analysed in large number of field level experiments of high methodological quality, studies on peer tutoring with adequate emphasis to learning styles of children need further investigation in the present scenario.

It can also be noticed that not much systematic studies were undertaken in this area in India especially in Kerala. Peer tutoring method can be easily implemented in Indian class room situations also, because here the student (tutor) is free to use his own instructional techniques and materials, which are suitable for his learning needs.