CHAPTER 3

METHOD

3.0 Rationale

Although awareness regarding learning disabilities in India is growing and there has been increase in the research studies to understand the nature and processes of RD but they are few focusing largely on the fundamental cognitive processes involved in dyslexia (e.g. Gupta, 2002a, 2002b, 1997; Gupta & Garg, 1996; Gupta & Jamal, 2004; Karanth, 1992; Vaid & Gupta, 2002) and some are focused on the issues related to other aspects of RD such as family, relationship, emotional stability and so on (e.g. Jena & Awasti, 2004). The research and intervention practices are at the nascent stage in India and need greater focus. Some researchers have contributed in the intervention field in India (e.g. Patil, Saraswathi, & Padakannayya, 2009; Jena, 2009; Mahakud, 2008, 2010; Narayan, Kutty, Harpriya, Reddy, & Sen, 2003; Dixon, Schagen, & Seedhouse, 2011). The varied nature of the needs of children with learning disabilities demand various remedial measures like prevention, integration of affected children in mainstream schools, providing them special education, and creating awareness about learning disorders amongst the stakeholders, research on remedial intervention has not been taken seriously to deal with the problem. Usually remedial efforts focus on lower order reading skills, such as word attack, word recognition and reading comprehension.

In this context, the present study was designed to examine the comparative effectiveness of instructional programmes and to find the effective intervention method for children with RD.

In the past, interventions on reading problems have been plagued by serious measurement and methodological problems even in otherwise successful intervention protocols. The efficiency of an intervention is assessed in terms of its transfer, generalizations and maintenance of its effects (Shanahan & Barr, 1995). Still the basic questions regarding their reliability and validity remain there. It has been found that the outcome measures that have been used in many studies have varied enormously when the treatment is changed. This is
again a big concern. At present many questions remain open regarding the best measurement tools and models for evaluating the success or failure of a given intervention.

3.1. **Objective**

The purpose of the present study was to examine the comparative effectiveness of the peer-assisted learning strategies (PALS), computer-assisted instruction (CAI) and traditional classroom reading programme (TCR) on the reading skill acquisition of students with reading difficulties.

The primary emphasis of the study was to determine if the peer-mediated (i.e., PALS) programme would result in significantly greater gains in reading comprehension, word recognition and reading fluency scores than a traditional reading programme. Secondly, to compare the effectiveness of CAI with the traditional reading method. Thirdly, to compare the effectiveness of PALS programme with the CAI. However, the ultimate goal was to find out the most effective method of instruction for children with reading difficulties. Based on the above findings, we may design better instructional programmes for children with reading difficulties in Indian schools.

3.2. **Hypothesis**

The following hypotheses were tested in the study:

H$_1$: PALS intervention group would significantly result in greater gains in oral reading and comprehension than the traditional reading intervention programme.

H$_2$: There will be significant difference amongst the two groups receiving PALS intervention and CAI respectively.

H$_3$: There will be significant difference amongst the two groups receiving traditional reading intervention and CAI. CAI will be better in improving reading skills than traditional reading programme.

3.3. **Sample**

This study was conducted in three Primary Schools of Delhi. Approximately 120 fourth and fifth graders, in the age range of 8 to 10 years, mean age 9 years participated in the
research. Of these children, 48 children with reading difficulties were selected. All the 48 children were matched according to their intelligence, i.e., between 25\textsuperscript{th} to 50\textsuperscript{th} percentiles, i.e., intellectually average (Grade III-) as demonstrated on Raven Coloured Progressive Matrices (Raven, Raven & Court, 1998), previous reading ability and age. The demography shows that they were all from the low socio-economic status (SES) background, as indicated through government data regarding students who received free lunch. On the basis of their reading ability scores they were then divided into two groups- high scores and low scores. Six children were taken from each high score and low score group for the pilot study. They were then grouped into three groups representing PALS, CAI, and TCR respectively. There were 4 participants in each group. The remaining divided 36 matched children were then randomly assigned to the three intervention groups, i.e., PALS, CAI and TCR. Two basket representing high scores and low scores respectively were used for random assignment. From the first and second baskets children were randomly assigned to three intervention groups. These 36 children were put on actual intervention. They were selected initially on the basis of report of the class teacher which was later verified through their actual reading assessments. Thus the students were selected on the basis of their reading skills. Matching increased the power of the study by reducing the error in results due to previous learning, age, grade, teacher-rated class performance, and pretest. All the thirty six students were put under three different intervention programmes, i.e., peer-assisted learning strategies, computer-assisted instructions and traditional classroom teaching. Details regarding different groups are provided under procedure.

**Inclusion Criteria**

The investigator used the following inclusion criteria for the selection of the participants for the study:

a. Only intellectually average children were taken for the research study.

b. The sample included those children exhibiting difficulties in oral reading like difficulties in pronunciation, word identification, letter identification, spelling problem, or slow reading, and difficulties in comprehension.

c. Children with low overall academic performance were also selected for this purpose.
Exclusion Criteria

The following were excluded from the selection criteria while selecting participants for the study:

a. Children with mentally retardation, cerebral palsy were excluded from the cohort.
b. Children having sensory impairments like visual, hearing or motor handicaps and other sensory disabilities were also not included in this study.
c. Children showing emotional disturbances were not preferred.
d. Other major psychiatric disorders influencing learning (e.g. Attention-deficit hyperactive disorder (ADHD)) were also excluded.

3.4. Measures

The materials used in the study were developed to determine the difference in acquisition and maintenance of oral reading (fluency) and comprehension skill (both semantics and critical reading skill) for children with reading difficulties. To measure oral reading, semantics of reading and critical reading skills, Ekwall Reading Inventory, Cloze Test of Reading and Curriculum Based Comprehension Test were used respectively. Students in all the three intervention groups received the same assessment instruments throughout the study. All the three groups received same questions and reading materials on daily learning sheets to guide through intervention. The only difference was that all the three groups were taught differently to answer the same questions.

Following measures were used in this study at various stages of work:

3.4.1 Raven’s Coloured Progressive Matrices (Raven, Raven & Court, 1998)

The Raven Coloured Progressive Matrices (RCPM) consists of 36 items in three sets of 12: A, Ab and B. It is designed for the young children and old people, who cannot understand or speak the English language, or the people suffering from physical disabilities, aphasias, cerebral palsy or deafness, as well as who are intellectually subnormal or who have deteriorated. Once the intellectual capacity to reason by analogy has developed, the Standard Progressive Matrices (SPM) is more suitable test to use. The three subsets constituting the CPM are arranged to assess the chief cognitive
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processes of children (less than 11 years of age). The three sets help a person to develop a consistent theme of thought and to assess the mental development up to intellectual maturity. The test is either in the form of coloured illustrations printed in a book, or as boards and movable pieces, thus making least use of verbal explanation. The five qualitative developments of the intellectual capacity are: Children are first able to distinguish identical figures from non identical figures, and later similar from dissimilar ones. After this they make out a figure’s orientation with respect to themselves and with other objects in the perceptual field. Later, they can make out similar changes in the characters perceived, and can then compare these changes. They can adopt this as a logical method of reasoning. Gradually, they are able to analyze the perceived whole into its constituent elements, or “characters”, and distinguish between what is given and what they themselves contribute. Finally, they are able to pick up two or more discrete figures as forming a whole organized individual entity. The test-retest reliability of RCPM was 0.80. From the point of validation it was stated that the correlation of RCPM with Terman Scale was 0.66. The correlation coefficient of RCPM with Crichton Vocabulary Scale was 0.65.

3.4.2. Ekwall Reading Inventory (ERI) 2nd edition, Grades pre-primer-9 (Ekwall, 1986)

This is a reading assessment inventory. ERI is a set of reading passages ranging from pre-primer through ninth grade level and contains instruments for assessing students’ knowledge of letters, phonics, basic sight words, vowel rules and syllable principles, and contractions. The manual may also be used to determine students’ listening comprehension levels. ERI is a highly popular, commercial Informal Reading Inventory (IRI) using traditional administration procedures as well as criteria recommended by many reading authorities (Baumann, 1988; Betts, 1946; Pikulski & Shanahan, 1982). ERI has both silent and oral reading passages that purport to identify a student’s independent, instructional, frustration, and listening levels. Ekwall (1986) developed a 30-items checklist which assesses specific reading errors as well as the actual number of errors. Some of the errors are: (1) *Word by word* (WWR) Reading word by word with pauses (e.g. “I ……want……to……eat.”). (2) *Poor Pronunciation* (PP) Inability to use proper accent/pronunciation (e.g. “Green as “gh..reen”) or the child may read the word incorrectly like” all” as “aall”. (3) *Inversions and Reversals (I/R)* Alteration of letters
within an existing word (e.g. “bat” as “tab”). (4) Omissions (O) Skipping letters, words, phrases or sentences, even paragraphs is also there. (5) Insertions (I) Adding letter or couple of letters in a word or insertion of a word in a sentence (e.g. “tag” as “taig” or “I eat apple” as “I eat the apple”). (6) Substitutions(S) Replacing word/words by some other word/words. e.g. “I want to play” as “I want to sleep”. (7) Addition (A) Add a letter or a couple of letters in the word or at the end of the word. e.g. “book” as “books” or the word “as” is read as “ass”. (8) Letter by letter (LLR) Reading words in terms of letters instead of the whole word e.g. “flower” as f..l..o..w..e..r”. (9) Repetitions (R) Reading the same word or sentence repeatedly e.g. “I want want to go home.” (10) Guessing (G) Supposing incorrect word/non word for the correct word (e.g. the word “bird” may be read as “birth”). (11) Pause (P) Hesitation or Refusal of a child to read a word. If a child doesn’t speak for a word in 15 seconds, this comes under deficiency for reading skills (Appendix-1).

3.4.3. Cloze Test for Reading (Taylor, 1953)

A cloze testing procedure is typically considered an integrative measure of language proficiency. In this study, to measure the semantics of reading, Cloze Test for Reading was used. Cloze testing was first introduced by W.L. Taylor (1953), who developed it as a reading test for native speakers. He defined the term "cloze" from a gestalt concept that says that any task can be completed only when an individual recognizes its pattern. The “cloze procedure” is based on the Gestalt idea of closure, i.e., the impulse to complete a structure and make it whole by supplying a missing element. Closure is a pivotal concept in cloze theory. Closure does not merely mean filling in items in a cloze, but filling them in a way that reveals the meaning to intersentential context and this measures “higher-order skills” and thus the psycholinguistic processes underlying the reading act. This programme is comprised of six levels with vocabulary appropriate for grades 4 through 5. Skills focus on meaning completion, context, and syntax; however, interpretation, opposites, definitions, similarities/differences and signal words and phrases are also included. The procedure has been used successfully as a test of reading comprehension, as a measure of readability or assessment of the difficulty level of a reading selection, and as a method of improving reading. Cloze tests require the ability to understand context and vocabulary in order to identify the correct words or
type of words that belong in the deleted passages of a text. This exercise is commonly administered for the assessment of native and second language learning and instruction.

The procedure was applied to the reading process as follows: every “nth” word in a printed passage was omitted and the reader was asked to make closure by supplying the missing words. In order to write appropriate words in the blanks, the test subjects had to use their knowledge of language. Because words were deleted at random, both *lexical* words (words carry primary meaning and are roughly similar to the verbs, nouns, adjectives and adverbs.) and *structural* words (consist of those words which indicate relationships, such as articles, prepositions, conjunctions, and auxiliary verbs) were omitted. During intervention sessions, clues were available upon request and after two incorrect responses; the correct response with an explanation was presented. Summaries of performance and reinforcement after correct responses were provided. But at the time of assessment, clues were not presented. The aim of a cloze test is to evaluate (1) readability and (2) reading comprehension. It is also regarded as a valid test of reading comprehension. Many standardized reading tests use cloze tests, e.g. the Stanford Proficiency Reading Test.

Some alternative versions of cloze procedures (Ikeguchi 1995; Weir 1990; Klein-Braley & Raatz 1984) available to language teachers are: (1) *Fixed-rate deletion* means after one or two sentences, every *nth* word is deleted. Usually every fifth or seventh word is deleted, but longer texts with every eleventh or fifteenth word deleted can be used with subjects who have a lower level of language proficiency. (2) *Multiple choice cloze tests* provide the subjects with several possible items to choose from for each blank. (3) The *cloze elide* inserts words which do not belong in the text, and require the subjects to identify the incorrect words plus write appropriate items in their place. (4) *The C-test* consists of deleting only part of every second word in a text, and asks subjects to complete each truncated word. (5) In the *selective deletion or rational cloze*, the tester chooses which items he or she wishes to delete from the text. The purpose is to adjust the level of difficulty of the text and to measure the knowledge of grammatical and vocabulary items. Thus, the cloze test is considered to be more efficient and reliable than reading comprehension.
3.4.4. *Curriculum Based Comprehension Test (CBCT)*

Curriculum Based Measures (CBM) is a set of testing strategies that measures the student’s oral reading fluency and comprehension so as to make assessments about students’ reading skills. Curriculum Based Comprehension Test (CBCT) is basically Curriculum Based Measures (CBM) for measuring Comprehension. Here the student is given brief, timed exercises to complete, using materials drawn directly from the child’s academic curriculum. These CBM tests are given under standardized conditions like there are certain set directions for a given CBM test and certain fixed time for every test to be completed. The child’s performance on a CBM test is scored for fluency, accuracy and comprehension performance. As these tests are quick to administer and simple to score, they can be given repeatedly say twice per week. The results are then displayed graphically so as to assess the academic progress of the targeted child. CBM probes in math, spelling and writing are quite time-efficient, as they can be simultaneously given to whole groups of children.

Commercially available achievement tests are not always congruent with curriculum objectives. Informal observation of performance is the approach used and preferred by teachers since long. Unfortunately, the reliability and validity of teachers’ informal observation of student’s academic performance is unknown. An alternative to commercial standardized tests and to informal observations is curriculum based measurement (CBM) that combines the advantages of both. CBM is also referred to as a general outcomes measures (GOMs) of a student’s performance in either basic skills or content knowledge. CBM began in the mid 1970’s with the research headed by Stan Deno at the University of Minnesota. It was developed to help teachers in evaluating and assessing their students in the standardized way to generate reliable data and thus to formulate instructional programme for the students (Deno, 1985).

Reading comprehension (or Critical Reading) test questions measure one’s ability to understand a passage and to answer question on the basis of what is stated and implied in the passage. The comprehension test used in this study was developed by the investigator using the text materials from the participant’s curriculum text book.
3.5. Pilot Study

Prior to the implementation of the present study, a pilot study was conducted by taking 12 children, four in each intervention group. They participated over a period of four weeks and follow-up after one week. The present study evolved through a process of repeated trials, repeated errors and repeated feedbacks that determined the levels at which, the instructional material had to be prepared and the kind specific instruction to be given to the children with reading difficulties. The children were piloted for 5 weeks during that year.

3.6. Research Design

A pre-post-follow-up design with matched random assignment (Kazdin, 1998) was employed for the study. Students were clustered by classroom and divided into three groups representing three intervention programmes. The objective for all the three groups was to improve the reading skills. Since one-to-one matching was used in this analysis, the instruction was a within-subject factor.

The dependent measures, i.e., oral reading, cloze ability and comprehension skills were analyzed for all the three intervention groups for pre-treatment, post treatment, and maintenance. A repeated measures analysis of variance was used to determine if any significant differences existed between the intervention groups on post treatment and maintenance measures. Because students were matched on pretest assessment, the pre-treatment scores did not significantly differ.

Given the complexity of human behaviour and the sheer number of factors that can influence behaviour, it becomes exceptionally difficult to restrict every factor from confounding influence, especially if there are multiple treatments. A matched subject design uses separate experimental groups for each particular treatment, but relies upon matching every subject in one group with an equivalent in another. The idea behind this is that it reduces the chances of an influential variable skewing the results by negating it.

In a matched subjects designs, researchers attempt to utilize some of the strengths of within subjects design and between subjects design (Shuttleworth, 2009). Matched subjects designs are often used in education, giving researchers a useful way to compare treatments without
having to use huge and randomized groups. It is also possible to match for more than one variable.

A within subjects design tests the same people whereas a matched subjects design comes as close as possible to that and even uses the same statistical methods to analyze the results. This eliminates the possibility of differences between individuals affecting the results. The matched subjects design also utilizes the strength of the between subjects design, in that every subject is tested only once, eliminating the possibility order effects, affecting the results. Thus, the overall goal of a matched subjects design is to emulate the conditions of a within subjects design, while avoiding the temporal effects that can influence results.

Though this design is an excellent compromise between reducing order effects, practice effects or fatigue effects, it is certainly not perfect. Even with careful matching of the pairs, there will always be some variation.

Many a times, the researcher might miss a major confounding variable. Even the single variable may have been measured incorrectly. For example, if the reading comprehension of children is assessed and on the day of assessment one of the children may have had a really bad day because of illness, giving her a much lower score than her reading comprehension would indicate.

Despite these disadvantages, matched subjects designs are useful, allowing researchers to perform streamlined and focused research programmes while maintaining a good degree of validity. The investigator adopted this design for her study as the number of subjects being small (n=36), and with three intervention programmes, this design was suitable and efficient to see the effect of all the three intervention programmes. The investigator conducted the baseline assessments of the reading performance (pretest) prior to the actual intervention then post test was taken after intervention which was then followed by another round of assessments in the form of follow-up. This procedure was followed with all the 36 students with reading difficulties. Each intervention session lasted for 12 weeks with 3 sessions a week followed by assessment tests after every week.
3.7. Setting

The study was conducted under two settings: school and laboratory setting. The RCPM test and the baseline sessions were done in the school premises whereas intervention sessions were done in a well ventilated (20x20 sq. ft.) laboratory setting in Applied Psychology Department. The students were seated at a distance of about 3 ft. from each other thereby not disturbing each other and the investigator could easily observe the performances of each student from distance. Informal consent was taken from the parents. These students were paid Rs. 10.00 per session as an incentive for their participation.

3.8. Procedure

The research was conducted in the following manner:

Phase 1: Identification

In the initial stages of the planning of the present research, ethical approval of this study was obtained from the Head of the Primary Schools of Delhi. They were explained about the purpose of this study. For the diagnosis of the children with reading difficulties, class teachers were contacted for getting the lists of those students who were having reading difficulties. The data were again verified by administering reading tests. The relevant information of these students was recorded in their personal data sheet (Appendix-2). The verbal consent of the parents was taken for their ward’s participation in the research. The researcher was able to maintain and sustain rapport with the children. The researcher of the present study remained sensitive to the level of interest and motivation of the participants throughout the assessment process. Moreover, the children were provided with the rationale and information as regards the research; it was only after receiving verbal consent from their parents that the study was proceeded with. In order to rule out the possibility of mental retardation Raven’s Coloured Progressive Matrices to assess their intellectual ability (Appendix-3). Those students obtaining average intelligence were taken for further assessments.
Phase 2: Screening and Baseline

The assessments were completed in twelve sessions using all the three reading measurements, i.e., Ekwall Reading Inventory, Cloze Test and Curriculum based Comprehension Measurement and the RCPM intelligence test used in this particular study. All the assessments were completed in three sessions of 45 minutes each with breaks as appropriate. A standardized procedure was adopted in the order of the administration of tests. The intelligence test was always used first in the sequence of administration, followed by the reading assessments with a gap of at least one day. The rationale for this order is embedded within the design of this research as it was important to determine the intellectual functional of the children first. Only those children who were intellectually average were taken for further assessments. The children were encouraged and given positive feedback as and when it was considered appropriate, such as during moments when there was an indication of a child’s boredom, low attention, frustration or tiredness, etc. All the 48 screened students were administered cloze test so as to assess the reading comprehension of the students. The cloze procedure was used as a measure to assess the psycholinguistic processes underlying the reading act. Ekwall Reading Inventory was used to assess the reading skills of the students in terms of the reading errors as well as the actual number of errors such as word by word reading, poor pronunciation, omissions, etc. Since no standardized reading test is available in India to assess reading disability/difficulty quantitatively, the above tests were used as indicators of reading difficulty. A curriculum based comprehension test (based on CBM) was developed by the investigator so as to assess the reading comprehension. All the three tests i.e., Ekwall Reading Inventory, Cloze test and Curriculum Based Comprehension test were administered three times so as to form the baseline for the study and the average were taken. The reading assessment was done in the first language, i.e., Hindi. These aforesaid tests ascertained reading difficulty in the selected sample. In this manner all 48 children with reading difficulties were selected. All the 48 students were first ordered systematically from high score ranking to low score ranking on the basis of their scores on reading tests. Then two groups were formed, one group comprising 24 students with high score and the other group comprising 24 students with low score. Now, from these two groups, 12 students were randomly selected 6 from high score group and 6 from low score
group for the pilot study and the remaining 36 were included in the actual intervention. All
the 36 students from two groups were then randomly distributed to three intervention
groups namely: Computer- Assisted Intervention (CAI), Peer-Assisted Learning Strategies
(PALS) and Traditional Classroom Teaching (TCR).

The test material used in Ekwall’s Reading Inventory for the pretest/ baseline was taken
from the lesson “Bina Jarh Ka Perh” from the book “Rimjhim” of class 5 (Appendix-4).
The test material used in case of cloze test during baseline was taken from the same
lesson “Guru Aur Chela” of the same book but the content was different (Appendix-5).
These test materials were again the same for all the three intervention programmes. The
curriculum based comprehension test material for the baseline was also taken from the
same book and lesson “Bina Jarh Ka Perh” but with different content (Appendix-6). The
test materials were same for all the three interventions. The test materials used for
the baseline/pretest and intervention programme were the same and for the follow- up, it
were different.

Phase 3: Intervention

The three Intervention programmes carried out were: (Figure 3.1)

*Peer-Assisted Learning Strategies (PALS)*

The first intervention programme PALS was administered to all the 12 individuals. This
intervention programme was based on the peer- mediated procedures of Fuchs et al.
(1993). The investigator acted as a teacher who was responsible for conducting PALS
activities with all the students. Firstly a short training session was conducted. It was
given to all 12 students regarding the use of PALS. They were provided with a small
booklet comprising teacher presentations, information for students regarding principles
of PALS and their application, and teacher feedback regarding student’s performance.
Each training lesson lasted for about 30- 60 minutes. The PALS programme (Fuchs et
al., 1995) incorporates three essential reading activities: (1) Partner Reading (Simmons et
al., 1995), (2) Paragraph Shrinking (similar to summarization; e.g., Baumann, 1984;
Doctorow, Wittrock, and Marks, 1978; Palincscar and Brown, 1983) and (3) Prediction
Relay (Palincscar and Brown, 1983).
Figure 3.1: Schematic representation of how the whole procedure took place for comparing three reading intervention programmes
Following the training session, three 45-minute PALS sessions for each week took place. Twelve students were divided into six subgroups of two each. A pair in each subgroup was made. Every student was paired such that each pair included a higher and a lower performing student thus forming a dyad. The investigator evaluated the reading competence of each student. After ordering, the students from strongest to weakest, the investigator divided the list in half and so on. Although tutoring roles were reciprocal, the higher performing student in each pair read first for each lower reader. This dyad would be changed after every 4th session, another pair would be formed and the teams would be reshuffled. This way the children would be learning how to cooperate with every individual. Reading materials in PALS were books from their own course-curriculum. Students were encouraged to choose books, with the help of the investigator. Each subgroup represented an independent team. So, there formed six independent teams. Each pair had to earn points for their respective team. Points were awarded for completing reading activities correctly and maintaining proper tutoring behaviour and decorum in the class. Each pair kept track of points on a consecutively numbered score card. Each time a student earned a point, the tutor slashed the next number. Further, as the investigator led PALS sessions, she circulated and awarded points (slash numbers) for showing cooperative behaviour and exhibiting correct tutoring methods. At the end of the week, each pair reported the last number marked on the score card, the investigator calculated each team’s points, and applauded the winning team by giving them with prizes in the form of Tiffin boxes, pencil boxes, etc. Thus, on the one hand PALS exhibited the motivational spirit and on the other hand, there were both cooperation and competition amongst the team members reflecting the sports-like spirit.

As given by Fuchs et al. (1993), each session began with Partner Reading, which was designed to improve students’ reading accuracy and fluency. With Partner Reading, each student read aloud the text for 5 minutes from his/her own course curriculum, for a total of 10 minutes of sustained oral reading. Whenever a reading error occurred, the investigator asked the student to stop and figure out the mistake done. The reader would say the word. If the mistake was corrected by the reader, he would continue reading. After both the students had read, the lower-performing student went for retelling for 2 minutes the sequence of what had occurred in the text. Students earned 1 point for each
correctly read sentence (if a word reading correction would be required, 1 point would be awarded after the sentence was read correctly) and 10 points for the retell.

The second PALS activity was Paragraph Shrinking which again involved the oral reading but the students had to stop at the end of each paragraph to identify the main idea. The investigator guided how to identify the main idea by asking the readers to identify (a) who or what the paragraph was about (b) the most important thing about the who or what. Readers were required to combine these two pieces of information in 10 or fewer words. When any paragraph summary error had occurred, the investigator would intervene and would ask for the better answer. The reader skimmmed the paragraph and would answer. The investigator then would decide whether to give points or to give the answer. If the error involved the use of more than 10 allotted words, the investigator would ask to shrink the answer. As with each PALS activity, the investigator formulated their own responses to questions to provide corrections and there were no answer keys. For each paragraph summary, students earned 1 point for correctly identifying the ‘who’ or ‘what’, 1 point for correctly stating the most important thing about the ‘who’ or ‘what’, and 1 point for using 10 or fewer words. Students continued to monitor and correct reading errors, but points were awarded on a sentence-by-sentence basis. After 5 minutes, the students switched their roles.

The last activity was Prediction Relay. This was the extension of Paragraph Shrinking to larger chunks of text and required students to formulate and (dis)confirm predictions. Prediction Relay comprised four steps: The reader (a) would apprehend what would be learned on the next half page and made a prediction accordingly; (b) would read the half page aloud while the investigator would identify and correct reading errors; (c) would confirm or disconfirm the prediction; and (d) would go for summarization of the main idea of the half page. This activity would help in enhancing the comprehension skill of students. Making predictions would help the child to comprehend the text perfectly. When the investigator would judge that the prediction was not reasonable, she would ask to think something better. Otherwise, the Partner Reading and Paragraph Shrinking correction procedures were used. Students earned 1 point for each reasonable prediction, 1 point for reading each half page, 1 point for accurately (dis)confirming each prediction,
1 point for each component (i.e., the ‘who’ or ‘what’, ‘what mainly happened’, etc. in 10 or fewer words) of each summary. After 5 minutes, the students switched their roles.

The aforesaid mentioned programme was carried out in all six subgroups. Their scores were noted down for all topics and sessions and accordingly they were applauded for their winning by giving them with rewards. Total 12-week intervention was given. At the end of each session reading assessments were done through Ekwall Reading Inventory, Cloze Test, and Curriculum Based Comprehension Test. After the completion of all the 12 sessions the intervention was over and three consecutive post tests were taken. The test materials for both pre-test/ baseline and intervention sessions were the same.

During the pilot study it was found that these students need extra aids to enhance their phonemes, graphemes and orthography. So, to build on the existing programme, extra aids were added to teach phonemic and phonological awareness. From time to time they were given knowledge and practice regarding different matras and varnas (letters) of Hindi language (Devnagri script) (Appendix-8). This helping aid was used to anchor the phonemic and phonological awareness. This practice was helpful in focussing students’ attention on individual letters within words. They were taught to pay attention to each grapheme- phoneme unit within a word so as to decode or build words. The investigator thus taught the students to form words from the letters and to develop them into sentences, thereby increasing their word acquisition power. The sound blending process was used to enhance the phonemic skills like word “alphabet” was rhymed as “alpha + bet”. Precisely speaking effort had been made to look into both, content and strategy (process) of learning, so that it could be generalized to the natural environment like a usual teaching process. A pre- and post-intervention assessment of all the three programmes was done by a blind observer (a Masters of Arts, Final Year female student).

Computer-Assisted Intervention (CAI)

The second intervention programme was computer-assisted instruction. All the 12 students were grouped into six groups so as to work comfortably on the computer. The entire programme was implemented through the computer. A laptop (Model No. CR VGN- CR23G/L) of 14.1” wide screen was used for administrating the intervention. At
the initial stage, the lessons were placed on the computer screen for reading and each child’s oral reading samples were recorded. Since the text used was in mother tongue, i.e., Hindi, a font named ‘Kruti Dev 010’ of the size 20 was used for the lessons and assessment texts. Subsequently, the formal comprehension errors committed by the child were identified to the child by the investigator replaying the audio files. The performance feedback was provided as a check on the errors committed by the subjects. The corrected versions of the oral reading and comprehension of the lesson were demonstrated by the investigator. This programme was continued by providing different reading materials such as stories or essays from time to time relating to their course curricula. Tutoring materials for all the three intervention programmes were same except that their mode of teaching was different. At the second stage, the child himself was engaged in detecting his/ her own errors (Self-correction which is a technique where good readers learn to monitor their own reading). When they confronted a difficult reading, they resorted to self- monitoring strategies like rereading the text or the specific portion of the text trying to figure out the meaning of unfamiliar words important in understanding the text. The investigator also tried to use programmed instruction package (as designed and made by N C E R T) in order to make the learning process enjoyable and self-sustaining. This type of 45 minutes session was carried out 3 times a week for 12 weeks. At the end of every week, the students were assessed on all the three tests, i.e., Ekwall’s Reading Inventory, Cloze test and Curriculum Based Comprehension Test. Accordingly they were given rewards for their good scores weekly. The scoring procedures were the same as were done during baseline sessions. When the intervention sessions got over after 12 weeks, three post tests were taken and averaged out to see the post treatment effect. It was found that the students eagerly waited for the tutorial day to come. They were given computers to play puzzle and other games on it after the session got over. This also proved to be a great incentive in bringing them to the laboratory setting and carrying out the intervention programmes smoothly. A pre- and post-intervention assessment of all the three programmes was done by a blind observer (a Masters of Arts, Final Year female student).
**Traditional Classroom Teaching**

This was the third and last intervention programme carried out on 12 students in the typical classroom manner. Here the intervention was carried out using classroom teaching’s typical chalk and talk method. In this the 12 students were taught at one time in the same way as being taught in the usual classroom. This group of 12 children represented a small classroom. In this no pairs were formed. All the twelve students in a group were taught at one time by the investigator herself who acted as a teacher. First the investigator demonstrated how to read the story. The students also read the story after her. Then she modelled how to answer the questions on the worksheet, and how to check their comprehension by looking back at the passage and how to segment words into syllables. The students followed the investigator and did the same on their own. This lasted for 12 weeks, 45 minutes session, 3 sessions a week. Different topics were selected for different weeks as was done with other intervention programmes.

At the end of every week, the students were assessed on all the three tests, i.e., Ekwall’s Reading Inventory, Cloze test and Curriculum Based Comprehension Test. Accordingly they were given rewards for their good scores weekly. Similar scoring procedures were done as were done during baseline sessions. After every intervention session, assessments were taken. On the basis of the scores obtained, the students were given rewards. After all the 12 intervention sessions were over, three post tests were taken to assess the post treatment effect of the intervention. A pre- and post-intervention assessment of all the three programmes was done by a blind observer (a Masters of Arts, Final Year female student).

**Phase 4: Follow-up**

After the intervention sessions and post tests, follow-up sessions were carried out in all the three intervention groups. The three follow- ups were done after one week, two weeks and three weeks of intervention respectively. The average of all the three sessions of follow-up was taken into consideration. The test material used in follow-up was different from that of pre-test and intervention. The test material used during follow-up was different from the baseline and intervention sessions. The test material for Ekwall’s Reading Inventory was taken from the lesson “Khillonewala” from the same book.
“Rimjhim” (Appendix-8). This was to avoid the practice effect of baseline and intervention sessions on reading skills. These test materials for follow-up were same in all the three intervention programmes. The test material used in case of cloze test during follow-up was taken from the same lesson “Khillonewala” of the same book but the content was different (Appendix-9). These test materials were again the same for all the three intervention programmes. The curriculum based comprehension test material for the follow-up was also taken from the same book and lesson “Raat Bhar Bilakate Chingharte Rahe” with different content (Appendix-10). The test materials were same for all the three interventions.

After the Interventions were over with pretests, post tests and follow-ups, results were calculated to find out the comparative effectiveness of the three intervention programmes. Repeated Analysis of Variance was performed on three groups of intervention (PALS vs. CAI vs. TCR) and three levels of occasions (pretest, post test, and follow-up).