
CHAPTER V

SUMMARY AND CONCLUSION

5.0 Introduction

The present study entitled “**Peer Assisted Learning Strategies (PALS) for Learning Science at Secondary Level in Inclusive School**” is related to the effective use of Peer Assisted Learning Strategy to enhance learning of science subject. PALS are a structured peer tutoring programme. The techniques adopted as Peer Learning Strategy in this study are Partner Reading, Paragraph Shrinking Technique, Quiz Activity and Project work with partner. This study was experimental in nature wherein Peer Assisted Learning Strategy was used to enhance reading which is basic and fundamental for all learning, resulting in overall learning enhancement. In this study Peer Assisted Learning Strategies were experimented for learning of Science Subject among VII Grade Students at Secondary Level.

5.1 Rationale of the Study

Designing effective teaching learning methods for a learner demands a teacher to be aware of what works better for an individual in a classroom. Vygotsky (1978) posited while both biological and social forces play a role in knowledge building, learning is essentially an interactive process that involves the use of language. It highlights the active role of students in obtaining the knowledge and the social construction of knowledge that can be achieved through practical work and experiential learning.

Another feature of his socio – cultural theory is the proposition that the potential for cognitive development is limited to a ‘zone of proximal development’. The person can learn only that which is within their development level. His theory further indicates the ‘zone of proximal development’ is created only when learning awakens a variety of internal development process that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers. The idea that knowledge is constructed via social discourse is integral to the process of peers learning from each other, reflecting the notion that social interaction facilitates more learning than that which would occur by students learning on their own. By interacting with others, students get

the opportunity to share their views and thus generate a shared understanding related to the concept.

Prior studies found that Peer Assisted Learning (PALS) as a effective supplementary remedial intervention in classrooms as together they can relate to each other better. Topping K.J. (2005) stated that Peer Assisted Learning (PALS) is defined as the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions. Research conducted by Fuchs D., Fuchs L.S., Mathes P.G. and Simmons D.C. (1997), and McMaster K.L., Fuchs D. and Fuchs L.S. (2007) indicates that by a wide margin that the PALS students raised their performance levels in comparison to non-PALS students. Parkinson M. (2009) reported that PALS had a very strong positive effects of tutoring resulting in student's better performance and progression.

PALS is not an much more experienced individual teaching the information, but the spread of this information via the learner's own peers . Topping K.J., Watson G.A., Jarvis R.J. & Hill S. (1996) suggested that though information and assistance are received from peers, there needs a close monitor to see the correctness of what pairs are doing, especially with weaker students, even if their help is not requested by the pair, who may be erroneously convinced that they are already correct. Wessel A. (2015) presented that Peer learning strategies provide ways for the teacher to take a step back and let the students do the teaching and talking for a little while.

Wessel A. (2015) believed that PALS is a method that can improve teaching and learning, provides a safe learning environment to promote learning and retention of knowledge. Students feel more comfortable asking questions to another student and in small or large group discussions, the students themselves have to hash out the different points that are brought to them while involved in PALS session.

Previous studies have identified many benefits of Peer Assisted Learning Strategy (PALS) in students learning. These benefits include the significantly greater progress (Fuchs D., Fuchs L.S., Mathes P.G. and Simmons D.C., 1997) , keeps students actively involved and “on-task” Fulk B.M. and King K. (2001) effective supplement to

conventional teaching methods (McMaster K.L., Fuchs D. & Fuchs L.S., 2007) scientific thinking and doing increased dramatically (Diana S., 2017), students are able to learn practical skills in how to teach and give critical feedback (Wessel A., 2015) and PALS makes use of one of the greatest resources in the schools, and for the students themselves (McMaster K.L., Fuchs D. & Fuchs L.S. 2007) .

Study on PALS in Indian context is rarely noticed. One of main reasons for dropout of students is lack of appropriate teaching method. Hence an attempt was made to implement PALS in Indian schools. There had been ample of research being carried out on effectiveness of PALS in reading and mathematics in the Industrial countries, research in effectiveness in science is very limited. However, Greenwood et al. (1990) cited that PALS does consume organizational time in designing and effecting appropriate peer selection and matching, and it may also necessitate some adaptation to curriculum materials and can be designed to apply in science.

Many Indian students in classroom find science is difficult and challenging. Therefore, science teachers try to create a conducive environment to help their students meet this challenge. One way to achieve this is by giving students an opportunity to learn and study together in pair and this study was attempted in this direction and intended to present the method of implementation of PALS for learning Science subject. In this present Experimental study, the effect of PALS on Partner Reading, Paragraph Shrinking, Quiz Activity and Partner Project work and ultimately the learning of the subject with comprehension were examined in relation to Gender and Medium of Instruction as Independent variables.

5.2 Objectives

The Objectives of the Study were to

1. Assess the effectiveness of Peer Assisted Learning Strategies on Learning of Science Subject among VII Grade students
2. Compare the Pre and Posttest scores of students in Control and Experimental Group with respect to Gender and Medium of Instruction.

3. Assess the effectiveness of Partner Reading Technique of PALS on Reading Performance of Students in Experimental Group.
4. Assess the effectiveness of Paragraph Shrinking Technique of PALS on Summarization of Science Concepts among Students in Experimental Group.
5. Assess the effectiveness of Quiz Activity Technique of PALS on Learning of Science Concepts among Students in Experimental Group.
6. Rate the performance of the Project Activity when students involved in PALS session.
7. Study the influence of Gender and Medium of instruction on PAL Strategies viz., Partner Reading, Paragraph Shrinking, Quiz Activity and their interaction on PAL Strategies when considering pre score as Covariate.

5.3 Hypotheses of the Study

1. There is no significant difference between Control and Experimental Group in the Test scores before and after introduction of PALS.
2. There is no significant difference between Pre and Posttest scores of students in Control Group.
3. There is no significant difference between Pre and Posttest scores of students in the Experimental Group.
4. There is no significant difference between scores of Boys and Girls in the Pre and Posttest.
5. There is no significant difference between scores of students in different Medium of Instruction viz., Tamil and English Medium.
6. There is no effect of Partner Reading of PALS technique on Reading Performance
7. There is no effect of Paragraph Shrinking of PALS technique on Summarization of the idea/concepts of the content in the paragraphs.
8. There is no effect of Quiz Activity of PALS technique on the comprehension of the content in the selected Science subject.
9. There is no significant difference between Partner students in the performance of Project Activity when Project Activity is considered as PALS technique.

10. There is no significant influence of Gender and Medium of instruction on PAL Strategies viz., Partner Reading, Paragraph Shrinking, Quiz activity and their interaction when considering pre score as Covariate.

5.4 Method

The method adopted in the study is described below:

5.4.1 Site Description

The study was conducted in Secondary Schools in Coimbatore district. The sample was selected from Grade VII Students for both Experimental and Control Group. Both groups had similar in nature in terms of location and Medium. Both Schools were Government run Higher Secondary School located in and around Coimbatore city.

5.4.2 Selection of the Sample

The study was Experimental in nature. The sample comprised of 188 students, both boys and girls from the class VII. The sample consisted of two groups of students namely Experimental and Control Group. The first group of 116 students with 58 individuals in each gender had been considered as Experimental Group and the next Group of 72 Students with almost equal number in each gender as Control Group. The adopted Purposive Sampling Technique.

5.4.3 Design of the Study

The study was designed on the basis of Pretest and Posttest Control Group Design. The sample of the study consisted of two Groups namely Experimental Group and Control Group. Pretest was administered to both the Groups. Peer Assisted Learning Strategies (PALs) was assigned to only Experimental Group.

5.4.4 Construction of the Tool

1. Personal Data Bank

To collect general information regarding Gender, Types of School programme and Grade, Personal data bank was developed.

2. Assessment of Understanding the concept and Comprehension of Science Lesson taught in the Conventional method(Before PALs introduction)

The test aimed to measure the understanding the concept and comprehension of the Science Lesson named ‘**Universe and Space**’. A 25 Multiple Choice Questions (MCQ) were selected covering all the concepts in the lesson. There were **four** choices for each question which had very minimal differences between choices. This test was considered as Pretest which was administered for both Control and Experimental Group.

3. Assessment of Understanding the Concept and Comprehension of Science Lesson taught using PAL Strategies

The test aimed to measure the understanding the concept and comprehension of the Science Lesson named ‘**Polymer Chemistry**’ after introduction of PALS. A 25 Multiple Choice Questions (MCQ) were selected covering all the concepts in the lesson. There were **four** choices for each question which had very minimal differences between choices. This test was considered as Posttest which was administered for Control and Experimental groups. For both Pretest and Posttest, MCQ was framed in a similar pattern

4. Reading Skill Assessment

Reading activity using the reading strategies was a routine activity during PALS session. For assessment of reading skill, a passage containing 75 words was selected which was used for both Pre and Post testing.

5. Summarization of Main concept of the lesson with Key Words using Paragraph Shrinking Strategy

During Partner reading, Paragraph Shrinking strategy was used. Paragraph shrinking was designed to develop comprehension through identification of main idea in the paragraphs. The investigator with the help of the classroom teachers selected five passages in the lesson which consisted of around 360 words for this purpose. Fifteen words were selected for identification of main idea from the passages. The Partners were allowed to read the passage and shrink it to get the main idea for 30 minutes. Soon after 30 minutes, the partner who was the tutor would ask to identify the main idea by naming within 15 words.

6. Quiz activity

Quiz activity aimed to test the comprehension ability of the students when involved partner reading. From the paragraph shrinking passage, a set of ten questions for one word was prepared to test the comprehension.

5.5 Implementation of Peer Assisted Learning Strategy

The PALS was implemented for a period of three months with 36 sessions.

5.5.1 Pairing of Students

First and foremost step involved in PALS is pairing of students. In this study, students were listed from highest to lowest according to their reading ability and their pretest score. Classroom teachers were also involved in pairing of students. After listing the students from highest to lowest, the investigator divided the list in half. Placing the top student in the first list with the bottom student with the second list. This list was continued until all the students have been partnered. There were four students who were found to be in need of intensive attention were partnered with the average level ability students who received additional support from the investigator during PALS session.

5.6 Techniques Adopted as PALS in the Study

Peer Assisted Learning Strategy was implemented for a period of three months which excluded pretesting and post testing time duration. The techniques adopted as Peer Learning Strategy are

1. Partner Reading
2. Paragraph Shrinking technique
3. Quiz Activity
4. Project work with partner

5.6.1 Partner Reading

The first activity in PALS is partner reading. All the students in the class were oriented to the partner reading strategy. This includes that students should establish a routine for reading and to adopt the step by step method:

- Read aloud

- First the tutor reads and then the tutee
- Read aloud simultaneously
- Take turns with each person reading a paragraph
- When one student reads, the other listens
- Re- reading misread word
- Adjusting reading speed if reading simultaneously so that they stay together
- Students offer feedback and praise frequently for correct reading
- Signal to the teacher(investigator) if any difficulty arises

5.6.2 Paragraph Shrinking Technique

During Partner reading, Paragraph Shrinking Strategy was used. Paragraph shrinking is a routine students used during PALS session, The aim of using this technique was to practice finding the main idea by summarizing a text.

The Main features of the techniques are

- Either tutor reads or the tutee reads and the other listens for 10 minutes without re-reading.
- The tutor asks what the main idea in the paragraph is.
- He / she summarizes main idea in the paragraph- what or who or how about the paragraph.
- Ask to write the main idea of the text in 10 or fewer words depending on the length of the paragraph.
- Receiving feedback from the partner.
- Paragraph shrinking was designed to develop comprehension through identification of main idea in the paragraphs.
- Paragraph shrinking activity would usually take 30 minutes in a 45 minutes class session.

5.6.3 Quiz Activity

Questions were formulated from each paragraph to read. The investigator would assist the tutor in framing the questions

- The tutor will ask the questions to the tutee.
- The tutor will score the answer.
- This activity is considered quiz activity.
- This activity can be done after each paragraph shrinking and also after students involved in three or four paragraph shrinking activity.

5.6.4 Project with Partner

- A Partner project was given on the topic “Types of Plastics”.
- Partners collected various types of Plastics and explained each type.
- Rating was given as Outstanding, Above average, Average, Below Average, and Poor.

5.7 Results

The major results emerged out of the study are:

1. The study revealed that PAL Strategy enhanced the learning of Science subject in VII Grade students
2. The students in Experimental Group who were in PALS sessions secured higher score than students in the conventional teaching classroom (Control Group). The score of Experimental group (*M:16.11*) is higher than Control group (*M:9.02*).
3. **Reading Performance** score of students was increased after introduction of PALS (Pre reading *Mean:8.66* and Post reading *Mean:29*).
4. Students’ performance in **Summarization** of the concept through **Paragraph Shrinking** technique enhanced learning of main idea of the concept (Pre score *Mean:4.* and Post score *Mean:9.5*)
5. The score in the **Quiz Activity** was increased after introduction of PALS (Pre score *Mean:2.95.* and Post score *Mean:4.7*)

6. In Partner Project activity, **43 %** were at above average level and **43%** were at Average, **8.6 %** were at below average and **5.2 %** at Poor performance level.
7. The study presented that there is no significant influence of Gender and Medium of Instruction on two of the PALS techniques viz., Partner reading and Paragraph shrinking. They are independent of their own.
8. The study revealed that Gender and Medium of Instruction influenced on Quiz Activity. The mean score of Girls is 3.16 as against the mean score of Boys which is 2.7. The mean score of English Medium students is 4.86 as against 4.5 which is the score of Tamil Medium students. Hence Girls and English Medium had interaction with the Quiz Activity.

5.8 Discussion

The results of this experimental study show that Peer Assisted Learning Strategies have positive impact on learning. The present study is in line with the study conducted by Saenz, L., Fuchs, L.S., and Fuchs, D. highlighted the positive effects of PALS with English learners. The study sample used 12 classrooms with 108 total Spanish-speaking students and the classrooms were then randomly assigned PALS or control group. The classrooms were composed of all English language learners and within the classroom at least 2 learning disabled students for comparison data of achievement. Eleven students from each class were tested including: two students with LD, three low-achieving (LA), three average-achieving (AA), and three high-achieving (HA).

The present study is in congruence with the study conducted by Ugyen Wangmo, et.al. (2019) highlighted the effect of PALS on students' performance and learning satisfaction in seventh grade science. The Pre-test/ post-test test devised for both the experiment and control group to measure their performance level in science before and after PALS and No- PALS. The results indicated effectiveness of PALS, suggesting that PALS can have positive impact students' performance and learning satisfaction.

Doughlas, et.al. (2017), conducted the study to determine the effectiveness of a class wide peer tutoring program in reading for three learner types: low achievers with and without disabilities and average achievers. Findings indicated that, irrespective of type of

measure and type of learner, students in peer tutoring classrooms demonstrated greater reading progress.

Similar findings have been reported by the study conducted by Lynn (1999) who examined the effects of peer-assisted learning strategies (PALS) on students' literacy development and beliefs about reading, when PALS is implemented with secondary-level students in remedial and special education classes. Analyses of variance indicated that, compared to contrast counterparts, PALS students grew more on reading comprehension and reported more positive beliefs about working hard to improve reading.

Laura (2013), assessed the effects of Peer-Assisted Learning Strategies (PALS), a reciprocal classwide peer-tutoring strategy, on the reading performance of native Spanish-speaking students with learning disabilities (LD) and their low-, average-, and high-achieving classroom peers. Participants were 132 native 34 Spanish-speaking English language learners (ELL) in Grades 3 through 6, along with their 12 reading teachers. Teachers were assigned randomly to PALS and contrast groups. PALS sessions were conducted 3 times a week for 15 weeks. Students were tested before and after treatment. PALS students outgrew contrast students on reading comprehension, and those effects were not mediated by student type.

Calhoon (2005) looked at the combined effects of the Linguistics Skills Training (LST) and PALS (Peer Assisted Learning Strategies) programs on the reading skill acquisition of thirty-eight middle school students with reading disabilities for thirty-one weeks. Specifically, the researchers were interested in seeing if the combination of the peer mediated LST phonological skill and PALS comprehension programs result in significantly greater gains in reading comprehension, word recognition, and reading fluency scores rather than a whole-class remedial reading program. Results showed the LST/PALS program was found to be an effective method for increasing letter-word identification, work attack, and passage comprehension in comparison to students in the contrast group.

Sulistami, P. et al. (2018) conducted a study on improving students' reading comprehension by using peer assisted learning strategies (PALS) in EFL contexts among

class X students. The results indicated that in implementing PALS, the students not only improve their reading comprehension on text paragraph, but it increased their skill of pronunciation, understanding, summarization of the text, and the question appeared in reading test.

Overall, the majority of the research studies have a positive impact with gains for student learning at all levels. The current study though aligns with many studies, there are certain studies which are not accepting the results of this study. According to the study conducted by Saenz.(2005) which states that the main curricula area that has problems is found in reading fluency. PALS does not provide significant gains for all learners and actually no gains for some learners in reading fluency in some reading situations within certain demographic areas and grades. The main type of learner affected is poor or struggling reader. Similarly reading gains among disabilities are not strong in fluency of reading.

There were some points made by Richardson and Anders (1998) felt that there was not an opportunity for learning from errors, as students perceive learning as less important when learning is not teacher led. Besides, the teacher may not feel as responsible for learning in this situation and may miss instructional opportunities. Lastly, the hidden curriculum may work to ignore students' authority and limit their subsequent risk-taking behavior in relation to their tutoring.

In a review of literature in the present study included 74 studies and almost all studies indicate that PAL strategies have found beneficial effects on student's learning outcomes as found in the current study.

5.9 Suggestion for Further Research

The present study suggests researchers to investigate on

- Development of PALS in other subjects like Mathematics, Social Science and Languages.
- Development of PALS at various levels like Primary, Higher Secondary and Higher Education in Indian Context.
- Different strategies for forming reciprocal pairs and methods.
- A longer period of intervention can be studied for more reliability and effectiveness.
- Influence of PALS for Children with Special Needs.

5.10 Recommendation

Peer Assisted Learning Strategy is a system of student- student support and it is not much experimented in Indian context as it has been widely studied with its different variants' in the industrial countries. The current study revealed PALS' effectiveness on learning. Based on the results, certain recommendations have been made

1. PALS programme is cost effective, required minimum number of resources and minimum direct teaching and hence it can be easily implemented in elementary schools to higher education programme.
2. PALS has been proven increasing the reading score of students with low achieving ability and hence can be given importance to build reading skill which is the foundation for all learning.
3. The training institutes can incorporate PALS component in the curriculum so that teacher trainees may introduce the programme during their practice teaching and hence widely popularize the model for learning.

5.11 Conclusion

There is little research study in PALS in Indian context and published study using PALS in Science subject in India was rarely noted. This study attempted to study the effect of PALS on learning Science subject. The result of this experimental study showed improvement in reading and overall learning the concept of science subject. Therefore the study recommends that teachers can add PALS as an effective programme to enhance learning of science subject.