

A study of effectiveness of peer assisted learning strategy (PALS) as remedial program in 7th grade science

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Abstract

Designing effective teaching learning methods for a learner demands a teacher to be aware of what works better for a individual in a classroom. The effect of Peer Assisted Learning Strategy (PALS) on students' performance and learning satisfaction was investigated in this study. 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 second method involved the experiment group to answer a survey questionnaire using a 5-point Likert scale to address how PALS enhance students learning satisfaction and contribute to other students' learning satisfaction. While the Pre-test/ post-test test data showed change in mean marks, rating scores on questionnaires indicated effectiveness of PALS, suggesting that PALS can have positive impact students' performance and learning satisfaction.

Keywords: Peer assisted learning strategy, remedial program, science, 7th grade, effectiveness.

Introduction

The term Peer Learning refers to many different strategies that can be used in teaching and learning to help learners. Teachers today struggle to provide remedial and supplementary program, as an intervention measure, Peer Assisted Learning Strategy (PALS) is used to provide academic support. Peer learning is defined as the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions¹. It involves people from similar social groupings who are not professional teachers helping each other to teach and learn. Although remedial program help students who are having problems with concepts but students resent being forced to participate in remedial lesson and in Bhutan it has been felt that Science was being taught in a way it should not be taught and right approaches have not been in the focus². This suggests that the teachers teaching Science in grade 7 needs to grow and change as practitioners.

The purpose of the paper is to determine the effectiveness of PALS as a remedial program in 7th grade Science. By using Quasi Experimental method the data was collected by pre-test/post-test exam (the post-test questions was different with the pretest questions, but same in the content) and were devised for both the experiment and control group. Further to validate their learning satisfaction, students were asked to answer survey questionnaires.

Literature Review

Theoretical perspective: The theoretical perspective underpinning this study will be informed by Vygotsky's socio-

cultural theory and social constructivist pedagogy. Vygotsky³ posited while both biological and social forces play a role in knowledge building, learning is essentially an interactive, social process that involves the use of language. It highlights the active role students' play in obtaining the knowledge and the social construction of knowledge, which can be achieved through practical work and experiential learning. Another feature of this 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. It 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 peers³.

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 own³. By interacting with others, students get the opportunity to share their views and thus generate a shared understanding related to the concept.

Peer assisted learning strategy (PALS): Many students in Bhutanese 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.

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. Peer Assisted Learning (PALS) is defined as the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions¹. Research indicates by a wide margin that the PALS students raised their performance levels in comparison to non-PALS students^{4,5} and also a very strong positive effects of tutoring were seen on student performance and progression⁶.

PALS as remedial learning: PALS is not an much more experienced individual teaching the information, but the spread of this information via the learners own peers who have only recently learned this information, and the assistance being provided by the said peers too. However, 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 correct⁷. Peer learning strategies further provide ways for the teacher to take a step back and let the students do the teaching and talking for a little while⁸.

PAL is one the 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 the table⁸.

Empirical Research: Previous studies have identified many benefits of Peer Assisted Learning Strategy (PALS) in students learning. These benefits include the significantly greater progress⁴, keeps students actively involved and “on-task”⁹, effective supplement to conventional teaching methods⁵, scientific thinking and doing increased dramatically¹⁰, and are able to learn practical skills in how to teach and give critical feedback⁸ and PALS makes use of one of the greatest resources in our schools, the students themselves⁵. While there had been ample of research being carried out on effectiveness of PALS in reading^{4,5,10,11} and mathematics, research in effectiveness in science is very limited. However, Greenwood et al. (1990, as cited in¹² establishing PALS does consume organisational 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.

Action research question: How can I improve the performance in Science using Peer Assisted Learning Strategy (PALS) in grade 7?

Methodology

Participating Students: Respondents are selected using the purposive probability sampling method. In this method, the participants are chosen deliberately according to the pre-determined purpose¹³. The sample was stratified on the basis of

assessment procedure in grade 7. However, a sample drawn from the assessment tends to include only students from 7A and 7B (n=58). As a researcher wants to make a comparison between the PALS and No-PALS for the performance level in Science, 7A (n=30) is randomly selected as experiment group (where PALS will be administered) and 7B (n=28) as control group (No-PALS).

Instruments: Pre-test/post-test test - The first instrument used to collect data was quasi-experimental method, which has administered the pre-test/post-test design (same levels of thinking, Appendix B). The pre-test/post-test (the post-test items was different with the pretest items, but same in the content) was devised for both the experiment and control group to measure their performance level in science before and after PALS and No-PALS.

Questionnaires: The second method was used to address how PALS enhance students learning satisfaction and contribute to other students’ learning satisfaction. This method involved the experiment group to answer a survey questionnaire using a 5-point Likert scale with the following ratings: Strongly agree=5; Agree=4; Neither=3; Disagree=2; Strongly disagree=1 (Appendix A).

Results and discussion

Pre-intervention: Baseline Result: It was observed that, the students in my class resent being forced to participate in remedial program even though they score very low in science test. To address the gap between high achiever and low achiever and to make remedial program an enjoyable, the researcher felt students are more likely to learn more from peer lead sessions than from teacher. The baseline/ pretest data was taken from the class test on chapter 5 (Classifying Materials). The pretest result indicates that both the classes (experiment and control) performed very low with a mean of 38 and 33, pass percentage of 33.3% and 21.4% respectively. These data will serve as a benchmark for the remedial program and serve the basis for forming a pair for PALS.

Intervention: Scaffolding through application of PALS

A split list procedure was used to form a reciprocal pair for the experiment group (PALS) based on the assessment data (Baseline data). In this procedure, the entire class is ranked on ability and split in half⁹. The student with the highest marks was paired with the highest-ranking student of the lower marks. Adapting the 9 general guidelines for beginning to implement class wide peer tutoring⁹, the researcher designed PALS for two times in a week for a month long (August 4th week to September 3rd week) program.

The researchers had taught the students to grow accustomed to the roles of tutor and tutee and provided sample scripts for student to practice the roles. The tutor and tutee had reciprocated the roles and the teacher monitored and provided

feedbacks. This supported the Vygotsky’s notion of ‘how expert scaffolding from peers or near-peers enables new knowledge to become meaningful’³.

Coaching and practicing phase: After the coaching phase, either a quiz or test questions were given to tutees by tutors to practice what they have learnt. This method will make them comfortable asking questions to another student rather than to a teacher.

Partner reading and paragraph shrinking: During the instruction, the tutors teaching style covers the various scaffolding strategies. Each student in a pair took turns to read the text. Each student took turn to reread and the first reader restated the main idea of the paragraph in ten words. After five minutes, the students switched roles and restated the main ideas in second paragraph. This method encourages ‘interacting with people in their environment’ and ‘enables cooperation with their peers’³.

Predict, Read, clarify, Question, and summarize: It is believed that the participants might never have truly grasped a concept until they had to explain it to another, embodying and crystallizing thought into language¹⁴. In this method, both the tutor and tutee were asked to skim and scan the text glancing at the diagrams. After reading, both the tutor and tutee were asked to underline the sentences provided in a worksheet and then they were to discuss the underlined sentences to clarify. Later, the pair had designed a question and asked each other as a follow up to summarize a lesson.

Collaboration (Inter PALS pair competition to design mnemonics for first twenty elements).

This intervention will stress collaboration and cooperation rather than competition. It will help those who face difficulty in remembering long list of elements.

Post-Intervention Findings: The question that the researcher tackled was on how to improve the performance in science using the Peer Assisted Learning Strategy (PALS) in grade 7. To answer this question, students were treated with intervention program for a month and conducted the test before and after PALS and No-PALS. The summary of their test result is presented in Table-1.

Table-1: Pre- and post-test performance before and after PALS and No-PALS.

Groups	Pretest		Posttest		Difference Mean
	Mean	SD	Mean	SD	
Experiment	38.00	17.50	49.40	16.30	11.40
Control	33.00	14.10	38.00	14.70	5.00

From this results it is clear that the experiment group were little over 6 marks greater an average than control groups. The experiment group has an average difference of 11.40 and the control has an average difference of 5.00. The experiment group had a higher standard deviation (SD) of 17.50 and 16.30 respectively, whereas the control group had a SD of 14.10 and 14.70 respectively. The experiment group having a higher SD tells that the test results is more spread out or dispersed than the control group.

Table-2: How PALS enhance students learning satisfaction.

Items	Mean	SD
I. Professional Manner	4	0.6
Tutor showed genuine interest and concern	4	0.5
Tutor listened carefully to what I said	4	0.6
Tutor made me feel comfortable and at ease	4	0.5
Tutor treated me in a respectful / professional manner.	4	0.7
II. Knowledge	4	0.5
Tutor is knowledgeable about subject / material	4	0.5
Tutor uses instructional delivery strategies used throughout the PALS session	4	0.6
Tutor is knowledgeable about PALS policies and procedures	4	0.4
III. Effectiveness/ Students learning satisfaction	5	0.5
During PALS session, the time and effort was well spent.	5	0.5
During PALS session, I got the help that I needed	5	0.5
After PALS session, I have a better understanding of science lesson	5	0.5
After PALS session, I feel better prepared to succeed in science lesson	4	0.5
After PALS session, I have more confidence in my ability to retain the knowledge	4	0.5
Overall, The PALS session personally rewarding.	5	0.6
I would recommend this program to others	5	0.3

Note: Strongly Agree=5 Agree=4 Neither=3 Disagree=2 Agree=1.

Questions related to the professional manner, knowledge, and effectiveness were asked to the students (Table-2). The open-ended questions (Appendix-A) were also given for students’ aspects towards the PALS. The data collected from this research

helped the teachers to evaluate their learning satisfaction so as to improve instruction.

Data Triangulation: Comparison between the two methods helps to gauge the effectiveness of PALS on students' performance and learning satisfaction. Table-3 illustrates how this method could be used to obtain and triangulate the pre/post test data and students learning satisfaction. The pre/post test data uses class test as an indicator of students' performance. A questionnaire is administered to experiment group, and a number of questions were included on professional manner, knowledge, and effectiveness. Statistical analysis is conducted to calculate mean and standard deviation of both the pre/post test and learning satisfaction. While the pre/post test looked at the students' performance before and after administering PALS and No-PALS, an experiment group included in the questionnaire is drawn on how they think about the learning satisfaction after the PALS. The rise in the mean from 38 during pre test to 49 in post test indicate the effectiveness of PALS (as indicated in Table-2). The rating scores on questionnaires also indicate clear benefit to better understanding of the Science lessons as noted by five participants, "we want to continue and we gained a lot of knowledge" (Please comment on any aspect of your PALS session, Appendix). The questionnaire also indicates 100% students' learning satisfaction (as indicated in Figure-1).

Discussion: Due to design limitations in a short period of time and small sample, this study cannot offer a definitive statement about the effectiveness of PALS. Still, these findings indicate ways in which the PALS approach can be improved for students in 7th grade Science as a remedial program. It is clear that intervention did have a positive impact on students'

performance and learning satisfaction (Figure-1), the mean marks both before and after did not have vast differences due to tutors least experience (professional manner and knowledge) during peer tutoring (as indicated in Table-1).

More time for intervention and pre-teaching the tutors might be necessary for greater performance in post intervention test. It would also be helpful to do more research on different strategies for forming reciprocal pairs and methods of scaffolding through application of PALS.

Table-3: Pre/ post- test performance and learning satisfaction by experiment group

Test	Mean	Students learning satisfaction
Pre test	38	-
Post test	49	100

Conclusion

While the limited time frame (4 weeks of 6 lessons) and methods for intervention may not have achieved the vast difference in mean before and after PALS, the fact that students' learning satisfaction gained was a form of positive impact in itself and it was an effective strategy as a remedial program. Notably, each participant in an experiment group reported strong recommendation for future use. Twenty six out of thirty participants expressed they would recommend this program to others and want to continue. Overall, this study indicated they learnt not only about subject matters but also grew more confident in their ability to retain the knowledge gained from PALS.

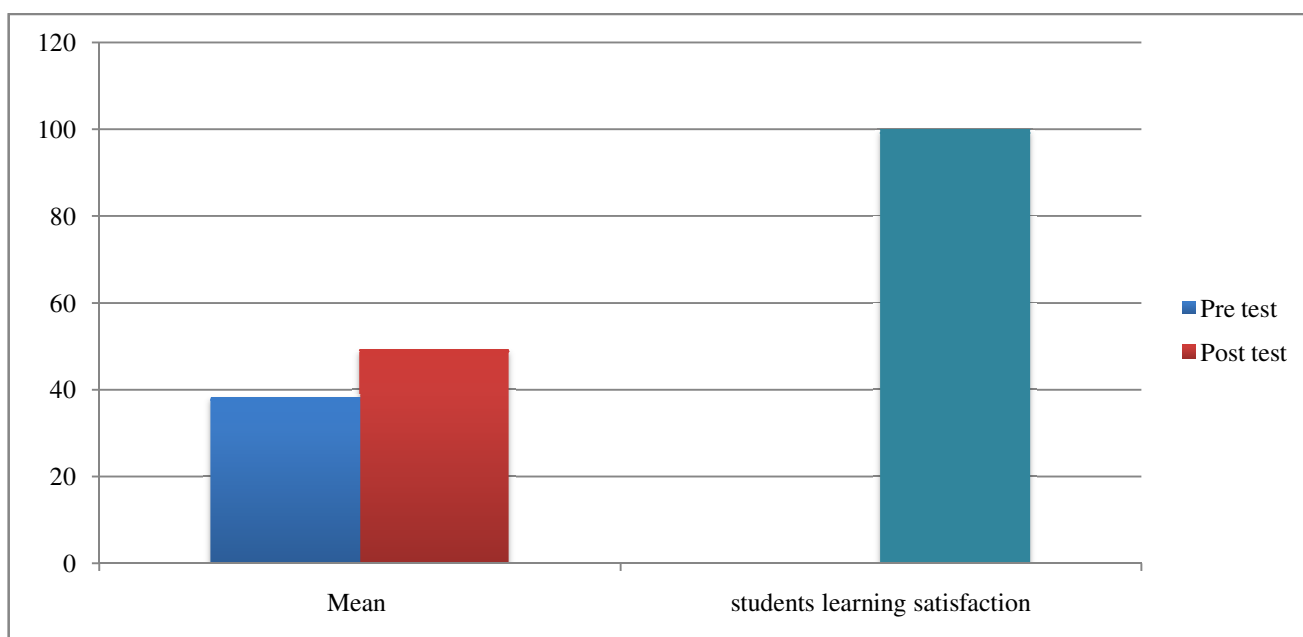


Figure-1: Triangulation of data from pre/post test performance and students learning satisfaction.

Appendix-A: Questionnaire

How Peer Assisted Learning Strategy (PALS) enhance students learning satisfaction and contribute to other students' learning satisfaction?

Circle which best describes your answer

I. Professional Manner					
Tutor showed genuine interest and concern	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
Tutor listened carefully to what I said	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
Tutor made me feel comfortable and at ease	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
Tutor treated me in a respectful / professional manner	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
II. Knowledge					
Tutor is knowledgeable about subject / material	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
Tutor uses instructional delivery strategies used throughout the PALS session.	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
Tutor is knowledgeable about PALS policies and procedures	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
III. Effectiveness/Learning Satisfaction					
During PALS session, the time and effort was well spent.	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
During PALS session, I got the help that I needed	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
After PALS session, I have a better understanding of science lesson	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
After PALS session, I feel better prepared to succeed in science lesson	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
After PALS session, I have more confidence in my ability to retain the knowledge	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
Overall, The PALS session personally rewarding.	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
I would recommend this program to others	Strongly Agree	Agree	Neither	Disagree	Strongly disagree
Comments (Please comment on any aspect of your PALS session)					

Appendix-B: Levels of Thinking for Pre/post test items

Qs	Remembering	Understanding	Applying	Analysing	Evaluating	Creating	Total
Pre-test							
Q1	IX	I, ii, iii, iv, v,x	vi, vii, viii				10
Q2	I, ii, iii,iv, v						5
Q3				I,ii,iii,iv,v			5
Q4		b	c		a		3
Q5		A B C D					4
Q6			3				3
Total	6	11	7	5	1	0	30

Post-test

Q1		1,2,4,5,6,7,9,10	3,8				10
Q2	1, 2,3,4,5						5
Q3				1,2,3,4,5			5
Q4	1(3)		2(3)				6
Q5		1,3,4	2				4
	8	11	7	5	0	0	30

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