International Journal of Literacy Theory and Practice
Vol. 1, Issue 1, 2023, 33–42

EFFECTS OF RECIPROCAL LITERACY TEACHING ON STUDENTS' RETENTION

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Abstract

Reciprocal literacy teaching (RLT) takes place as an educational activity that involves a discussion between the teacher and the students through which the challenges of low-attention and less-comprehension ability are met successfully. The purpose of the study was to determine how reciprocal literacy teaching (RLT) affects secondary school students' retention of physics knowledge. Four strategies predicting, clarifying, questioning, and summarizing were used in rotation in this strategy. Two groups were included in the quasi-experimental design that was utilized for this objective. While the control group received standard therapy, the experimental group had an unusual course of RLT. 118 pupils from four secondary schools for girls were chosen as a sample, out of the 12696 girls enrolled in 38 Girls High Schools in Tehsil Nowshera. A retention test was administered after one month of the achievement test. The experimental and control groups were delayed-tested, and inferential statistics such as the t-test, and descriptive statistics were used to determine the significance of RLT by comparing the two groups. While substantial differences between the experimental and control groups were noted and discovered that the inclusion of RLT had more impact on students' growth of retention than the previous therapy. The implementation of the RLT-method was strongly advised for improving student retention. Pre and Post training for teachers may be provided to integrate RLT into the classroom setting.

Keywords: *Reciprocal Teaching, Retention, Secondary level, Physics Students*

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Introduction

Science is the information that is acquired through study or practice; it frequently refers to any organized discipline of study or the knowledge that is acquired through it. One of these methodical scientific disciplines that provides knowledge to create usable reality models in physics. Physical science is not a conservative phenomenon since it constantly veers away from established methods. Physical science refers to everything utilized in daily life, including all electric and technological devices. Physical science improves quality, safety, and speed of living. Thanks to airplanes, modern medications, and diagnostic tools like lasers, X-rays, radiotherapy equipment, CT scanners, ultrasonic devices, etc., journeys that once took months may now be Science is the information that is acquired through study or practice; it frequently refers to any organized discipline of study or the knowledge that is acquired through it. The knowledge must be organized in a hierarchical manner that makes it simple to recall and link with prior knowledge to make it homogeneous and applicable. To acquire this knowledge, one must understand the basic principles and be familiar with the facts in a conceptual framework. The basic information produced by physics pave the way for new technologies and innovations as well as raises the bar of comprehension in other disciplines such as environmental sciences, chemical sciences, agriculture, and astrophysics that contribute to global economic growth. Yet frequently, students find it difficult to learn such things since the learning environment and retention of pupils in classrooms are affected by the teaching techniques (IOP, 2009).

According to Koch and Eckstein (2005) solving physics word problems that are presented as long sentences calls for high level application. Performance on math word problems and reading comprehension skills were closely connected to one another. A similar approach may be used in physics numerical problems when the reciprocal technique is needed to enhance reader comprehension. The term "reciprocal" refers to two-way, reciprocal action, taking turns, or going both ways between more than one person. Oczkus (2010) indicated that in reciprocal Literacy Teaching (RLT) four roles are used. These include “predictor, clarifier, questioner, and summarizer”, making it a scaffolding strategy to help students who struggle with reading comprehension.

Students often fail to solve the numerically represented in word form. This may be due to individual differences such as learning styles, prior knowledge, and motivation levels, teacher-student gap or student-student gap like less interaction and low feedback. This research will make it

simple to improve retention for physics students in ninth grade at the secondary level by overcoming the mentioned challenges. Students who need the help of their classmates to complete their assignments independently may benefit from it.

Statement of the Problem

When it comes to word problems, numerical problems, and laws, comprehension-based issues like poor attention, reading comprehension impairment, a lack of understanding of complex tasks, a lack of ability to predict and summarize the materials, and a lack of critical thinking are sensitive and focal challenges in the teaching-learning process for physics, mathematics, and other science subjects. One must be aware of these challenges to solve such problems. The goal of the current study, "Effects of Reciprocal Literacy Teaching on Students' Retention " was to overcome the aforesaid problems and meet students' learning objectives.

Objectives

This study had following objectives:

1. To determine reciprocal literacy teaching affects secondary students' retention in studies.

2. To measure the impact of reciprocal literacy teaching on students' academic achievement.

Hypothesis

$H0^1$: Reciprocal literacy teaching has no significant effect on students' retention in studies.

Research Methodology

This study used experiment and it was descriptive in nature.

Population, Sample and Sampling Technique

The population comprised on 12696 female students who were enrolled in 38 high schools. Female students/gender selection justification is that as the girls are on the more deprived side in education (World Bank Group, 2022 & Baron, et al. 2022) and having educational experiences, strategic

choices, and constraints the researcher focused on studying the girls for this study.

From the above population, 118 pupils from four secondary schools for girls were chosen as a sample.

Procedure of the Experimental Design and Group Selection

Two groups were created using the Posttest-only Quasi Experimental design: an experimental group and a control group. The experimental group was given the "Reciprocal Teaching Technique," a novel and unconventional treatment. Pakistani physics classes adopt a standard lecture approach, which was given to the control group (Tariq, Hussian, & Mubeen, 2011; Shakoor, Hussian, & Azeem, 2011). To determine if reciprocal teaching is more effective than the conventional approach for teaching physics in schools, two distinct treatments were applied. Following the therapy (X1, X2), both groups had post-testing (O1, O2). Delayed testing was also performed on the groups (DT1, DT2) and the outcomes were compared. There were the same number of pupils in both groups. A specialized training manual designed specifically for the approach of reciprocal teaching was used to train four teachers who had been chosen for the role.

Posttest-only Quasi-Experimental Design

X1	O1	DT1
X2	O2	DT2

Research Instruments

There were two instruments which were used in this study. First scale was achievement test and other was delayed test, for general academic achievement the achievement test was administered while delayed test was used to gauge the retention of the students.

Validation

Instruments' validity was checked through opinion of experts in the subject of physics and pilot testing. The pilot test was taken twice on two different occasions from 10 students at Govt. High School Behram kali. The results of the pilot tests were on the positive side to get what the researchers claims to get.

Data Analysis (Achievement test Analysis)

The outcomes were presented numerically. The achievement test & delayed test data from four distinct schools was analyzed using t-Value, Mean, and SD.

Table 1

Comparison of Control and Experimental group for Achievement test

	Groups	N	Mean	Std. D	Std. Error Mean
Academic Achievement	Experimental	59	22.29	5.666	.738
	Control	59	13.12	4.406	.574

Table 1 shows that for an equal number of students, the experimental group's scores in terms of Mean and Standard Deviation are looking better than those of the control group, indicating that a difference exists. However, to confirm that the difference is significant for Mean and Standard Error, Levene's test and t-statistics in the following table provide evidence for it.

Table 2

Difference on Achievement Test between Experimental and Control Group

	Levene's Test for equality of variances		t-value				95% Confidence Interval of the Difference	
Academic Achievement	f	Sig (p)		df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Equal Variances Assumed	3.649	.05	9.812	117	.000	9.169	7.319	11.020

*The mean difference is significant at the 0.05 level.

According to Table 2, the p-value for f is also.05 at the.05 level, which is statistically significant. Findings that are statistically significant for the t-distribution have a p value of.000 or less, which is less than the 0.05 threshold of alpha. The 95% confidence interval has lower bounds of 7.319

and upper bounds of 11.020 around the mean difference of 9.169, which is significantly true and demonstrates that the interval encompasses the actual population mean difference. Commentary /highlights the academic success gap between the experimental and control groups and demonstrates RT's efficacy.

Analysis for Retention

Table 3

Score Comparison of Students' Retention on Delayed Tests between Control and Experimental Groups

	Groups	N	Mean	Std. D	Std. Error Mean
Delayed Score	Experimental	59	58.20	14.979	1.950
	Control	59	39.88	12.385	1.612

Table 3 shows that the sample size in each case is the same; statistics show that the experimental group's mean score is 58.20 higher than the control group's score of 39.88. The experimental group's standard deviation is 14.9 more than the control group, which is 12.3. This shows the high achievement of experimental group on delayed test.

Table 4

Difference in Rate of Retention on Delayed test between Experimental and Control Groups

					95% Confidence Interval of the Difference	
	t-value	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Delayed Score	7.241	117	.000	18.322	13.310	23.334

*The mean difference is significant at the 0.05 level.

Table 4 reveals that the estimated p value for the delayed score is less than the typical 0.05 threshold of alpha, which yields statistically

significant findings. The 95% confidence interval lower bound and upper bound in the first example are 14.261 and 22.350, respectively, around the mean difference of 18.305, which is significantly correct. Hence, the 14.261 to 22.350 interval covers the actual population mean difference. Since the upper and lower boundaries of the 95% confidence interval do not contain zeros in their whole numbers, the null hypothesis that there is no difference between the control group and the experimental group for delayed learning was rejected. This demonstrates that there is a significant difference between the two groups for delayed learning, demonstrating the efficacy of the experimental group for RLT-method versus traditional method.

Findings and Discussions

The study's analysis of academic success showed that the experimental group's means and standard deviations (22.9, 5.666) were higher than those of the control group (13.12, 4.40). Results showed that the average score difference between the experimental and control groups was significantly favorable higher for the experimental group (Table 1).

Data showed that the significant p-value was.000 and that the lower bound and upper bound of the 95% confidence intervals were 7.3 and 11.02, respectively. As the mean difference in this case was 9.1, which lies between 7.3 and 11.02, i.e., 7.39.111.02, statistically significant results were produced, and this resulted in a significant difference in scores for academic achievement between the experimental and control groups (Table 2).

The facts revealed that, for the same sample size, columns of means and SDs statistically demonstrated that the experimental group's scores for the delayed test remained higher than those of the control group. This had produced statistically significant retention statistics. According to data, H01 was rejected (Table 3).

The findings indicated that the computed result of 7.241 for the delayed test utilizing table value was lower. The table value was determined by observation to be 1.98. Because the computed value is higher than the table value and the null hypothesis was rejected, it was determined that there was a significant difference between the two groups. Compared to the standard way, means and RT have favorable impacts on delayed learning achievements (Table 4).

In line with Palincsar and Brown's (1984) literature, the teachers and student’s role shift continuously from one another in the form of “predictor, clarifier, questioner, and summarizer”. This resulted in improved results that show that students scored better in the experimental group for the knowledge, comprehension, and application components of

the cognitive domain because RLT (new treatment given to the experimental group) was incorporated. Test-retest reliability is .9, in line with Gay (2005, p.151-52), and it indicates a significant improvement in the cognitive domain for students placed in the experimental group. Findings showed that students' recall of the experimental group in physics is greatly improved because of the novel treatment of RT, which is supported by Palincsar and Brown (1984). Additionally, this rejected null hypothesis, indicating that RT improves delayed learning. The results also supported Elsie's (2014) research, which found that there is a statistically significant difference between all groups from different schools, with the experimental group benefiting from this difference.

Conclusions

This study concludes that:

- Excellent learning results were produced because of reciprocal instruction; a large proportion of high achievers are found in the experimental group. Even though both the experimental and control groups' scores varied, the experimental group's learning outcomes were more uniform than those of the control group.

- It is found that students' delayed learning in physics at the secondary level is significantly impacted by the innovative treatment of RT-method versus conventional technique. Findings clearly showed that reciprocal teaching, as compared to the conventional approach, improved the experimental group's accomplishment in terms of retention, even though both groups were equally balanced before treatment.

- It is recommended that reciprocal teaching was proven to be more effective than traditional techniques for ninth-grade physics; as a result, it is advised that teachers of physics employ this method to enhance their students' learning outcomes.

- Because Pakistan's current educational system places a strong focus on cognitive growth, it is strongly advised that physics students use the RT-method to improve their academic performance and retention at the secondary level.

Potential Limitations of Reciprocal Teaching

Besides the successful results of RT as concluded, there are some limitations which are also concluded:

- **Dependence on teachers training:** Reciprocal teaching depends on teachers who have received adequate training in the technique. Its efficacy could be hampered if educators lack sufficient training or do not completely comprehend the underlying ideas of reciprocal teaching.
- **Time-consuming:** Reciprocal teaching takes time to put into practice, particularly in classes where there is a limited amount of time allotted for each subject. It could be difficult to fit the method's substantial student involvement and debate into a curriculum with limited time for instruction.
- **Resource Intensity:** For the procedure to work as intended, it could need extra resources, like materials or technology. It could be difficult for schools with little funding to put reciprocal teaching into practice in the way that it is intended.

Recommendations

- The implementation of the RT-method in physics at the secondary level may strongly be advised for improving student retention and learning.
- Pre and Post training for teachers may be provided to integrate RT into the classroom setting.
- The research proposed that this study may be expanded to cover more levels and topics in the public and private sectors.

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Citation of this Article:

Naz, I., & Mehmood, D. S. (2023). Effects of reciprocal literacy teaching on students' retention. *International Journal of Literacy Theory and Practice, 1*(1), 00-00.