

Impact of Reciprocal Teaching Strategy on Students Academic Achievement in the Subject of General Science at Elementary Level

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Abstract

The study aimed at examining the effect of reciprocal teaching strategy on students' academic achievement in the subject of general science at elementary level. The objectives of the study were; (i) to investigate the effect of using reciprocal teaching strategy on academic achievement of 5th grade students, (ii) To investigate the effect of reciprocal teaching strategy on high achiever and low achiever of 5th grade, (iii) To observe the participation of the students in reciprocal teaching strategy. Sample of the study was consisting of 40 students studying general science in class 5th. A Pre-test Post- test equivalent group design was used to conduct the study. For collection of data teachers made test and observation sheets were developed. Statistical techniques such t-test, percentage, S.D and mean were used to analyze the collected data. The study is equally significant for students, teachers, curriculum developers and future researchers. It was found that the participation of students was significant in reciprocal teaching strategy during treatment. The participation of students in reciprocal teaching strategy reported an increasing trend after the first week to week 6. With the help of reciprocal teaching strategy students readiness to learn, their attention to reading and listening, their ability to generate questions from the text, their activeness during the discussion and their confidence about sharing their ideas in a group increased hundred percent. Reciprocal teaching had great effect on student's academic achievement.

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Keywords: Reciprocal Teaching Strategy, Academic Achievement, Elementary Level.

Introduction

Education could also be a technique of the tantalizing truth and opportunity to encourage and allow time for discovering. It is a common method—'a manner of living, and now no longer a practice for a destiny living. Education is over fostering understanding Associate in Nursing and appreciation of emotions and feelings. It's additionally attached change with however to spice up their lives and the lives of others, people will act with knowledge and awareness (Rose, 2014).

Science is seen as one of the foundations of development, as are the links between technological and socioeconomically progress. The ability of a country to create new industries and technology, ensure health, provide food for its citizens, fight disease and preserve the environment is dependent, among other things, on the knowledge as well as capabilities of its citizens. Science is one in every of the program that contributes to the event of people and nation (Ekine & Abay 2013).

Science is taken under consideration jointly with the supports of improvement and connections between technological and socio-economic progress. The ability of a country to develop new industries and technologies, ensure health, provide food for its citizens, fight disease, protect the environment and many other progressive things are dependent on the skills of its citizens (Ekine & Abay, 2013).

Reciprocal teaching is a technique that facilitates the exchange of ideas between teachers and students, as well as between learners and teachers, in such a simple way that allows for the division of the text into portions and the attempting to teach of those portions through four stages, beginning with summarizing a section, asking questions, clarifying difficult ideas, and finally foretelling what will come next. Reciprocal teaching is an activity in a nursing tutorial that provides a combination of a discussion between a teacher and a learner about a certain task, subject, or document (Zaitoun, 2003).

Related Researches

Reciprocal teaching is made public by Manohar (2008) as an Associate in the nursing tutorial activities that happens within the kind of discussions between the group of the students and the teachers regarding certain portions of the text that's structural by the use of 4 strategies: to predict, to ask questions, to share information, and to summarize the text or whole discussion. The reciprocal teaching methodology is an Associate in Nursing "instructional method that involves radio-controlled apply to reading comprehension. During this method, the teachers' role is to supply modeling, staging, feedback, and rationalization for the scholars.

Operationally, Reciprocal Teaching is an Associate in Nursing activity that takes the shape of a conversation between the instructor and his students, with four particular reading techniques in which the course actively and deliberately utilised to promote understanding: forecasting, interrogating, confirming, and condensing (Koul, 2007).

Hashey and player (2003) carried out their research and concluded that in a very jurisdiction inside the long island, Reciprocal Teaching was used to teach the four techniques independently to any or all pupils in third through eighth grades. Although the teacher was

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absent, the four approaches were used to determine and assess comprehension while reading a variety of books. Students got more confident as their abilities to read text grew, according to observations of student interaction throughout Reciprocal Teaching. While students practiced mistreating every approach, the teacher encouraged them to become independent in their maltreatment of Reciprocal Teaching.

Pilonieta and Medina (2009) keep up the changes of reciprocal teaching inside the first-class degrees through mistreatment hints playing cards with pictures and entire phrases of a book. The researchers observed development in scholar comprehension through enhancing Reciprocal Teaching to be age suitable for number one college students. Analysis performed through Magnuson (2009) concentrated on the impacts of reciprocal teaching on shape college pupil's conception, college pupils' angle in the direction of study, and time on the challenge at some point of the dialogue of the studying. The results showed there wasn't much dissimilarity in studying behavior or comprehension in the direction of studying with Reciprocal Teaching, but speak among college students turned into plenty of focus at the studying way to the instructor sculptural and scaffold dialogue.

Takala (2006) investigated reciprocal teaching classroom of fifth and sixth grade. In the notion classes all college pupils used explicit guidance in the four reciprocal teaching ways. Instructor guides the pupils as they commenced to direct dialogue during treatment of five weeks. As a result of pretests, posttests and upkeep assessments while treatment created via way of means of a lecturer indicated reciprocal teaching become useful in growing college students' comprehension.

Statement of the Problem

Reciprocal teaching strategy is an effective technique for students to learn General Science. The purpose of this study is to practice this technique for primary level students. Problem under investigation is to examine the effect of reciprocal teaching strategy on students' academic achievement in the subject of general science at elementary level.

Objectives

The research study aimed at:

- To investigate the effect of reciprocal teaching strategy on academic achievement of 5th grade students.
- To investigate the effect of reciprocal teaching strategy on high achiever and low achiever of 5th grade.
- To observe the participation of the students in reciprocal teaching strategy.

Hypotheses

The hypotheses were as:

H₀1. There is no significant difference between the achievements of Students who practice the reciprocal teaching strategy on basis of pre-test and post-test.

H₀2. There is no significant difference between the high achiever and low achiever of 5th grade.

H₀3. There is no significant difference between the participation of Students in reciprocal teaching strategy during treatment.

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Method and procedure

Population

Population of the study comprised of all the Government Primary Schools Grade-V students studying General Science.

Sample

Government Girl's primary school Kurvi was selected to conduct the experiment. Forty students of Grade-V were selected as sample of the study. These forty students were divided in two groups by paired random sampling technique on the basis of pre-test.

Research Design

The research was experimental. The participants were divided into two groups: experimental and control. The pre-test and post-test equivalent group design was used to measure the effectiveness of treatment that involved two equivalent groups the following was the symbolic representation of research design (Farooq & Tabassum, 2017).

$R_E = O_1$	T	O_2
$R_C = O_3$		O_4
$dR_E = O_2 - O_1$		
$dR_C = O_4 - O_3$		
$D = dR_E - dR_C$		

Where,

R_E = Randomly Selected Experimental Group

R_C = Randomly Selected Control Group

O_1 & O_3 = observation of pre test

O_2 & O_4 = observation of Post-tests

T = Treatment (teaching by experiential learning model)

d = difference between mean scores of Pre-test and Post-test

Research Instrument

Data was collected by the following tool.

Pre-test and Post-test

Pre-test and Post-test were developed for the students of the General Science subject. There were 25 items in the test. The test consists of multiple choice questions.

Observation Sheet

An observation sheet was also developed to observe participation of students. It consists of twelve items and conducted for six weeks.

Treatment

Two teachers of the same experience and same qualification were selected for control and

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experimental group. While starting the treatment pre-test was arranged to the sample students. For experiment, sample students were divided into groups one was control group and other was experimental group. Three lessons from General science book of grade-V, (i) Environmental pollution, (ii) Matter and changes in its states, (iii) Forces and machines, were taught to both the groups, for the duration of six weeks. 36 Lesson plans were developed according to reciprocal teaching strategy. The experimental group was treated by reciprocal teaching strategy. The control group was treated by traditional lecture demonstration method. Both groups were taught same course contents. After instructional treatment post-test was conducted.

Three Chapters Environmental pollution, Matter and changes in its states and Forces and machines were taught to the grade-V students by two different teachers, one teacher for control and other one for experimental group.

Procedure

The subject students were divided into four groups. Each member of the group was given one note card to identify each person unique role (summarizer, questioner, clarifier and predictor). One student of each group read few paragraph of assigned selected manuscript. At starting point, the summarizer highlighted the key ideas, the questioner posed questions about the selection, the clarifier addressed the confusing and unclear parts and predictor offered predictions about the text. The roles in the group then switched one person to the right and the next selection was read.

Data Collection

Data was collected using tests (pretest and posttest) which were delivered to the sample learners. An observation sheet was also developed to observe participation of students. It consists of twelve items and conducted for six weeks.

Data Analysis and Findings

Data was analyzed through mean, standard deviation and t-test. The mean scores were used to determine the overall performance of the groups, and the t-test was used to find out whether there was a significant difference in pre-test and post-test scores between the experimental and control groups.

H₀1. There is no significant difference between the achievements of Students who practice the reciprocal teaching strategy on basis of pre-test and post-test

Table 1 Significant difference between the achievements of Students who practice the reciprocal teaching strategy on basis of pre-test and post-test

Group	N	Mean	SD	V	Df	t-value	Effect
Pre-test Experimental	20	7.7	3.21	10.32	19	12.02	Significant

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Post-test Experimental	20	14.2	3.95	15.64			
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Degree of freedom=19, Significance level = 0.05, Table Value =2.093

Table 1 depicts that the calculated t-value 12.02 was greater than table value 2.093 which was significant at 0.05 level of significance; hence the null hypothesis is rejected. It means that there is significant difference between the achievements of Students who practice the reciprocal teaching strategy. On the basis of pre-test and post-test results, mean and SD showed the significant difference between pre-experimental and post-experimental groups. The table value shows that the experiential learning is significantly better than traditional learning. It shows that there was significant effect of reciprocal teaching strategy on student's achievements skills.

Table 2 Significant difference between the achievements of Students who practice the reciprocal teaching strategy and traditional method

Group	N	Mean	SD	V	df	t-value	Effect
Post-test Control	20	7.9	3.16	9.83	38	5.53	Significant
Post-test Experimental	20	14.2	3.95	15.64			

Degree of freedom=19, Significance level = 0.05, Table Value =2.024

Table 2 indicates that the calculated t-value 5.53 was greater than table value 2.024 which was significant at 0.05 level of significance level; hence the null hypothesis is rejected. The mean score in post-test in control group was 7.9 while the mean score in post-test in experimental group was 14.2. It means that there is significant difference between the achievements of Students who practice the reciprocal teaching strategy and traditional method. Comparatively the achievement of experimental group students was much greater than the achievement of control group students.

H₀₂. There is no significant difference between the high achiever and low achiever of 5th grade.

Table 3 Significant difference between high achiever and low achiever of 5th grade

Group Experimental	N	Mean	SD	V	df	t-value	Effect
High Achiever	13	16.30	3.09	9.56	18	5.613	Significant

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Low Achiever	7	10.28	1.7	2.904			
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Degree of freedom=19, Significance level = 0.05, Table Value =1.734
 Table 3 depicts that the calculated t-value 5.613 was greater than table value 1.734 which was significant at 0.05 level of significance level; hence the null hypothesis is rejected. It means that there is significance difference between high achiever and low achiever of 5th grade.

H₀₃. There is no significant difference between the participation of Students in reciprocal teaching strategy during treatment.

Table 4 Significant difference between the participation of Students in reciprocal teaching strategy during treatment week 1

S.No	Statement	N	Yes	No
1	The students are ready to learn?	20	17 (85%)	3 (15%)
2	The students pay attention to reading and listening?	20	20 (100%)	0 (0%)
3	The students respond to the questions during discussion?	20	18 (90%)	2 (10%)
4	The students try to apply reciprocal teaching method during their discussion?	20	19 (95%)	1 (5%)
5	The students are discussing the text?	20	16 (80%)	4 (20%)
6	The students make prediction about the text?	20	15 (75%)	5 (25%)
7	The students are able to generate question from the text?	20	18 (90%)	2 (10%)
8	The students clarify the unclear parts from the text?	20	14 (70%)	6 (30%)
9	The students summarize the text?	20	18 (90%)	2 (10%)

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10	The students are enthusiastically working in group?	20	17 (85%)	3 (15%)
11	The students are active during the discussing?	20	16 (80%)	4 (20%)
12	The students are confident when they share their idea in a group?	20	8 (40%)	12 (60%)

Table 4 indicate that 85 percent students were ready to learn, 100 percent students paid attention to reading and listening, 90 percent students responded to the questions during discussion, 95 percent students tried to apply reciprocal teaching method during their discussion, 80 percent students were discussing the text, 75 percent students makes prediction about the text, 90 percent students were able to generate question from the text, 70 percent students clarify the unclear parts from the text, 90 percent students summarize the text, 85 percent students were enthusiastically working in group, 80 percent students were active during the discussion, 40 percent students were confident when they shared their idea in a group.

Table 5 Significant difference between the participation of Students in reciprocal teaching strategy during treatment week 2

S.No	Statement	N	Yes	No
1	The students are ready to learn?	20	19 (95%)	1 (5%)
2	The students pay attention to reading and listening?	20	20 (100%)	0 (0%)
3	The students respond to the questions during discussion?	20	17 (85%)	3 (15%)
4	The students try to apply reciprocal teaching method during their discussion?	20	16 (80%)	4 (20%)
5	The students are discussing the text?	20	18 (90%)	2 (10%)
6	The students make prediction about the text?	20	19 (95%)	1 (5%)

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7	The students are able to generate question from the text?	20	18 (90%)	2 (10%)
8	The students clarify the unclear parts from the text?	20	17 (85%)	3 (15%)
9	The students summarize the text?	20	18 (90%)	2 (10%)
10	The students are enthusiastically working in group?	20	20 (100%)	0 (0%)
11	The students are active during the discussing?	20	20 (100%)	0 (0%)
12	The students are confident when they share their idea in a group?	20	20 (100%)	0 (0%)

Table 5 shows that 95 percent students were ready to learn, 100 percent students paid attention to reading and listening, 85 percent students responded to the questions during discussion, 80 percent students tried to apply reciprocal teaching method during their discussion, 90 percent students were discussing the text, 95 percent students made prediction about the text, 90 percent students were able to generate question from the text, 85 percent students clarified the unclear parts from the text, 90 percent students summarized the text, 100 percent students were enthusiastically working in group, 100 percent students were active during the discussion, 100 percent students were confident when they shared their idea in a group.

Table 6 Significant difference between the participation of Students in reciprocal teaching strategy during treatment week 3

S.No	Statement	N	Yes	No
1	The students are ready to learn?	20	20 (100%)	0 (0%)
2	The students pay attention to reading and listening?	20	20 (100%)	0 (0%)
3	The students respond to the questions during discussion?	20	19 (95%)	1 (5%)
4	The students try to apply reciprocal teaching method during their discussion?	20	19 (95%)	1 (5%)

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5	The students are discussing the text?	20	18 (90%)	2 (10%)
6	The students make prediction about the text?	20	18 (90%)	2 (10%)
7	The students are able to generate question from the text?	20	18 (90%)	2 (10%)
8	The students clarify the unclear parts from the text?	20	19 (95%)	1 (5%)
9	The students summarize the text?	20	20 (100%)	0 (0%)
10	The students are enthusiastically working in group?	20	18 (90%)	2 (10%)
11	The students are active during the discussing?	20	17 (85%)	3 (15%)
12	The students are confident when they share their idea in a group?	20	17 (85%)	3 (15%)

Table 6 reveals that 100 percent students were ready to learn, 100 percent students paid attention to reading and listening, 95 percent students responded to the questions during discussion, 95 percent students tried to apply reciprocal teaching method during their discussion, 90 percent students were discussing the text, 90 percent students made prediction about the text, 90 percent students were able to generate question from the text, 95 percent students clarified the unclear parts from the text, 100 percent students summarized the text, 90 percent students were enthusiastically working in group, 85 percent students were active during the discussion, 85 percent students were confident when they shared their idea in a group.

Table 7 Significant difference between the participation of Students in reciprocal teaching strategy during treatment week 4

S.No	Statement	N	Yes	No
1	The students are ready to learn?	20	19 (95%)	1 (5%)
2	The students pay attention to reading and listening?	20	19 (95%)	1 (5%)
3	The students respond to the questions during discussion?	20	20 (100%)	0 (0%)
4	The students try to apply reciprocal teaching method during their discussion?	20	18 (90%)	2 (10%)
5	The students are discussing the text?	20	18 (90%)	2 (10%)
6	The students make prediction about the text?	20	17 (85%)	3 (15%)
7	The students are able to generate question from the	20	17	3

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	text?		(85%)	(15%)
8	The students clarify the unclear parts from the text?	20	20 (100%)	0 (0%)
9	The students summarize the text?	20	20 (100%)	0 (0%)
10	The students are enthusiastically working in group?	20	19 (95%)	1 (5%)
11	The students are active during the discussing?	20	18 (90%)	2 (10%)
12	The students are confident when they share their idea in a group?	20	19 (95%)	1 (5%)

Table 7 indicate that 95 percent students were ready to learn, 95 percent students paid attention to reading and listening, 100 percent students responded to the questions during discussion, 90 percent students tried to apply reciprocal teaching method during their discussion, 90 percent students were discussing the text, 85 percent students made prediction about the text, 85 percent students were able to generate question from the text, 100 percent students clarified the unclear parts from the text, 100 percent students summarized the text, 95 percent students were enthusiastically working in group, 90 percent students were active during the discussion, 95 percent students were confident when they shared their ideas in a group.

Table 8 Significant difference between the participation of Students in reciprocal teaching strategy during treatment week 5

S.No	Statement	N	Yes	No
1	The students are ready to learn?	20	18 (90%)	2 (10%)
2	The students pay attention to reading and listening?	20	17 (85%)	3 (15%)
3	The students respond to the questions during discussion?	20	17 (85%)	3 (15%)
4	The students try to apply reciprocal teaching method during their discussion?	20	18 (90%)	2 (10%)
5	The students are discussing the text?	20	18 (90%)	2 (10%)
6	The students make prediction about the text?	20	17 (85%)	3 (15%)
7	The students are able to generate question from the text?	20	19 (95%)	1 (5%)
8	The students clarify the unclear parts from the text?	20	19 (95%)	1 (5%)
9	The students summarize the text?	20	20 (100%)	0 (0%)

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10	The students are enthusiastically working in group?	20	20 (100%)	0 (0%)
11	The students are active during the discussing?	20	19 (95%)	1 (5%)
12	The students are confident when they share their idea in a group?	20	19 (95%)	1 (5%)

Table 8 reveals that 90 percent students were ready to learn, 85 percent students paid attention to reading and listening, 85 percent students responded to the questions during discussion, 90 percent students tried to apply reciprocal teaching method during their discussion, 90 percent students were discussing the text, 85 percent students made prediction about the text, 95 percent students were able to generate question from the text, 95 percent students clarified the unclear parts from the text, 100 percent students summarized the text, 100 percent students were enthusiastically working in group, 95 percent students were active during the discussion, 95 percent students were confident when they shared their ideas in a group.

Table 9 Significant difference between the participation of Students in reciprocal teaching strategy during treatment week 6

S.No	Statement	N	Yes	No
1	The students are ready to learn?	20	20 (100%)	0 (0%)
2	The students pay attention to reading and listening?	20	20 (100%)	0 (0%)
3	The students respond to the questions during discussion?	20	19 (95%)	1 (5%)
4	The students try to apply reciprocal teaching method during their discussion?	20	18 (90%)	2 (10%)
5	The students are discussing the text?	20	19 (95%)	1 (5%)
6	The students make prediction about the text?	20	19 (95%)	1 (5%)
7	The students are able to generate question from the text?	20	20 (100%)	0 (0%)
8	The students clarify the unclear parts from the text?	20	18 (90%)	2 (10%)
9	The students summarize the text?	20	19 (95%)	1 (5%)
10	The students are enthusiastically working in group?	20	19 (95%)	1 (5%)
11	The students are active during the discussing?	20	20 (100%)	0 (0%)
12	The students are confident when they share their	20	20	0

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idea in a group?	(100%)	(0%)
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Table 9 shows that 100 percent students were ready to learn, 100 percent students paid attention to reading and listening, 95 percent students responded to the questions during discussion, 90 percent students tried to apply reciprocal teaching method during their discussion, 95 percent students were discussing the text, 95 percent students made prediction about the text, 100 percent students were able to generate question from the text, 90 percent students clarified the unclear parts from the text, 95 percent students summarized the text, 95 percent students were enthusiastically working in group, 100 percent students were active during the discussion, 100 percent students were confident when they shared their ideas in a group.

Discussion

The current study was carried out to examine the effect of reciprocal teaching strategy on the achievement of students in the subject of General Science Of 5th grade. The nature of study was experimental. The design for this study was pretest post-test equivalent group design. Pretest was taken from the students before the treatment in already taught Chapters of General Science. On the basis of pretest score the sample students were divided into two equivalent groups through pair random sampling technique. On the basis of statistical analysis of pretest score of both experimental and control groups were found equivalent. The experimental group was taught in reciprocal teaching for a period of six weeks and control group was taught through traditional lecture demonstration method using same contents for both groups. The experimental group was observed by the researcher and the researcher recorded the behavior of the students towards learning narratively. After treatment post-test was administered to both groups and the data obtained were analyzed by using statistics and description.

The mean score (14.2) and SD value (3.95) of experimental group were greater than the mean score (7.9) and SD value (9.83) of control group on post-test. The result showed that the calculated t-value (5.53) was greater than table value (2.024) which was significant at 0.05 level of significance; hence the null hypothesis was rejected. It means that there is significant difference between the achievements of students who practice the reciprocal teaching strategy and who practice the traditional method. The result of the study supports the findings of the studies explored by Palinscar & Brown (1984) that reciprocal teaching had significant effect on student’s performance. The study also supports findings of the studies explored by Weedman and Weedman (2001) that reciprocal teaching had significant effect on students learning and reading comprehension.

The mean score (16.30) and SD value (3.09) Of high achiever were greater than mean score (10.26) and SD value (1.7) of low achiever of experimental group on post-test. The result showed that the calculated t-value (5.613) was greater than the table value (1.734) which was significant at 0.05 level of significance; hence the null hypothesis was rejected. It means that there is significance difference between the high achiever and low achiever of 5th grade. The findings are in the line with findings of the studies reported by (Dilorenzo, 2010) that reciprocal teaching had significant effect on students with various abilities. The study also supports the findings of the studies explored by Armbrister (2010) and Lederer (2000).

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The result showed that the participation of students was found significant in reciprocal teaching strategy during the treatment in week 1, week 2, week 3, week 4, week 5 and week 6. With the help of reciprocal teaching strategy students readiness to learn, their attention to reading and listening, their ability to generate questions from the text, their activeness during the discussion and their confidence about sharing their ideas in a group increased hundred percent. The result of the study support the findings of the studies explored by Hashay and Connors (2003), Diehl (2005), Myers (2005), Nagle (2012), Pilonieta and Medina (2009), Ramos (2012) and Williams (2010).

Conclusions

- It was concluded from the results that reciprocal teaching strategy had significance effect on students' achievement.
- The results showed that after the treatment with reciprocal teaching strategy the mean score between high achievers and low achievers had significant difference while before the treatment it was almost the same.
- It was concluded from the results that the participation of Students was found significant in reciprocal teaching strategy during treatment in week 1, week 2, week 3, week 4, week 5 and week 6.

Recommendations

- It was concluded from the results that reciprocal teaching strategy had significance effect on students' achievement. Hence it is recommended that teachers should teach subject of general science at elementary level through reciprocal teaching strategy. The education department should make arrangements through in-service teachers training to aware the teachers about reciprocal teaching strategy.
- It was concluded that the participation of Students was found significant in reciprocal teaching strategy during treatment in week 1, 2, 3, 4, 5 and 6. Hence it is recommended that government should arranged teacher refresher courses to acquire them with reciprocal teaching strategy.
- It was concluded that the traditional methods of teaching are neither according to the needs of our society nor according to the needs of the learners. Hence it is recommended that traditional method of teaching should be replaced with reciprocal teaching strategy.

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