

A Comparative Study on the Effect of Activity Based and Traditional Methods of Teaching Science at Elementary Level

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Abstract

The aim of this research was to study the effect of activity- based teaching and traditional method of teaching on the students' achievement in the subject of Science at Elementary level. The research was experimental based on pre-test, post-test control group design. Five chapters were selected from 6th class Science book prescribed by Punjab Text Book Board for this research. Population of the research study was the students from GHS Model Town Lahore, Punjab (Pakistan). 70 students of class 6th were taken randomly from Govt. High School Model Town Lahore. A pre-test developed from the same book was administered on them for equalizing the groups. Students were randomly divided into two groups (experimental and control) on the results of pre-test. Tests were administered keeping cognitive domain in view. Selected units from 6th class Science Book prescribed by Punjab Text Book Board were taught to both groups (experimental and control) for the time of eight weeks. Activity based method was used for experimental group only and other group was taught traditionally. Time for the teaching was 40 minutes daily to each group. After completion of period of eight weeks a post test from the same book and content was administered to both groups. Independent sample t-test was applied on the pre-test and post- test scores to check whether there is difference in the performances of two groups. It was concluded that students taught through activity based teaching performed better in post-test. It is recommended that in future Science may be taught with activities at elementary level. Science kit containing material for activities may be provided to science teachers.

Keywords: Science, Traditional Method of teaching, Activity based Teaching/learning

Introduction

Science is a key subject of study. It is considered that Science is hard to learn whereas it has unique ideas and is called the study of logical thinking. It assists a person to provide precise clarification to his thoughts and decisions. Science is the establishment for achievement in child's instructive practice. The nation needs such persons who would be capable to handle difficult issues and have competency to take care of various issues. They ought to have the capacity to pass on their ideas to others affectively. Education of Science furnishes the learners with such abilities and manners that are vital for the effective lifespan in a civilization. Knowledge of Science creates inventiveness and unlocks the minds of the pupils. So, researcher selected this branch of knowledge for research study.

The greater part of teaching in our classrooms is done by traditional method generally. The kids sit silently in rows in the classrooms, the educator does all the speaking and the pupils inactively listen to the instructor. They talk just when approached and do just as they are told. In a conventional class room, the learning abilities of majority of the learners are restricted only to duplicate what is written on the board and they are not capable of effectively handling the data through thoughts, evaluation and investigation. Because of this constrained intellectual capability, learners lose interest in learning. Activity based teaching is a strategy focused on the idea that learners ought to be included through activities. Activity based teaching is a method adopted by a teacher to emphasize his or her technique of teaching through action in which the learners take interest comprehensively and realize effective learning practices. It is the procedure in which the child is effectively included in taking interest rationally and physically. Activity-based learning is interpreted as meaningful school learning settings

in which the learner creates Scientific ideas through dynamic contribution. This procedure may include the control of physical materials, the usage of games, or participating in experimentations with physical items.

Rationale of the study

Fundamentals of Science are taught at basic level. So researcher ought to instruct the essential concepts and ideas with full commitment and persistent work. Instructors ought to satisfy the pupils at this level and ought to uproot every one of their questions. Conventional technique of teaching Science is still utilized as a part of a large portion of the instructive establishments in Pakistan. In this strategy instructors do not utilize activity and AV aids in instructing with the exception of white board. Pupils don't appreciate this technique. Utilization of activities can make the education of Science further successful. Keeping this perspective in view the investigator has attempted to work on "finding effects of activity based teaching and traditional technique of teaching Science at students of Elementary classes".

Review of the Literature

Traditional Method of Teaching: In traditional method of teaching the instructor is viewed as the pivot in the classroom, responsible for all actions and guaranteeing that all class room message goes through him. According to Singh (2004), "Conventional technique is content focused. In this technique, instructor remains more dynamic, more subjective and less affective." In the view of Rao (2001), "Conventional techniques are concerned with the review of true information and mainly disregard higher levels of rational outcomes". Traditional teaching strategy works against the normal working of human mind (Weber, 2006). Students are involved in repetitive learning. Instructor forces the students to repeat the material that has been told to them. Corporal punishment, hatred of the teachers and frightening role of commanding teacher is noticeable generally in our classrooms. During the long conventional teaching periods, interests and consideration of learners can't be looked after (Cangelosi, 2003).

Conventional strategy is instructor focused technique in which educator is the turn of all the classroom work out. In the conventional technique a lot of tension is laid on the teaching of course book by utilizing the technique, which is like an adjustment of the Grammar-interpretation strategy. Traditional teaching strategies are defined as being teacher-arranged, in a speech style and are firm. Lessons are typically delivered by the teachers presenting skills utilizing a blackboard joined by a verbal clarification or lecture. According to reformers, traditional instructor-centered techniques concentrate on repetition learning. Traditional teaching strategies tend greatly toward class, address bookish knowledge through repetition and retention of actualities. Recitation as a general rule comprises of repeating without tending what the book or teacher has communicated. "The teachers are ignorant of the current investigations in the field of dialect educating. The part of instructor inside the class is dictator with the minimum contribution of the learners." (Behlol, 2009, p.2-3) The traditional teaching technique comprises of primarily conveying addresses by the instructors and pupils are mentally dynamic however physically sit without moving. Learners might be involved in note taking (Haghighi, Vakil and Weitba, 2005). In our classroom teaching learning sessions, the main physical task done by the students is either note-taking or remaining on the seat to answer any inquiry of the teacher. There is no way for learners to present somewhat in the class to talk in the class and thus pupils get to be inactive learners. It makes the entire procedure dull and dry for learning. It provides no room in any movement to the educator and to the learners. The learners think about the dialect yet they are not in situation to talk easily. A disadvantage of this technique is that students who have learning problems can't adjust how the lessons are conveyed.

Activity-based Teaching/Learning: Learning by doing is very important in successful knowledge because it is proved that more the senses are inspired, more a person learns and longer he/she retains. Activities bring activeness and smartness among the learners. Because we know that education means all round improvement of the child, therefore we have to organize numerous activities to build up the learners' personalities in several

ways. Activity-based instruction technique acts as a dynamic problem solver for the learners. It improves innovative part of experience and gives reality for learning. It gives various experiences to the learners to encourage the acquisition of information, experience, abilities and qualities. It builds the students self-confidence and creates understanding through work. It creates cheerful relationship and enthusiasm for them. If the student is given chance to investigate at his own and given an ideal learning environment then the learning gets more cheerful and durable. It inspires the learners to apply their innovative ideas, information and minds in solving problems.

Under activity-based learning instruction, key focus is on child or we can say that it is one of child focused approaches. It creates self-learning ability among the students and allows a student to learn according to his or her ability. As noted in Johnson, Johnson & Smith (1998) (referred in Ahlfeldt, Mehta & Sellnow, 2005, p.52), “It is the old pattern to give all the resources to the inactive learner by the teacher. The innovative pattern is to dynamically connect learners with the resources and each other.” As per Fallows & Ahmet (1999), “education is best when learners’ association, contribution and collaboration are maximized.” As McGrath & MacEwan (2011) clarified, “In activity-based instruction, the learner participates in the educational procedure during demonstration of ‘doing’ than in conventional technique.” According to Prince (2004), “Activity-based learning is a learning technique where learners are busy in the educating process.” Activities related to actual life practice help out students to exchange information into their individual information which they can relate in diverse conditions. (Edward, 2001)

Kenly (2007) said, “activity-based learning technique is diverse from conventional technique of instructing. Learners take active part in it. Activity-based learning is such education in which learner is dynamically involved in doing or in considering something prepared. As Churchill (2003) said, “such learning helps learners to make intellectual models that take into consideration 'higher-order' presentation, for example, applied critical thinking and exchange of data a skill”. According to Hake (1998) “learners’ inspiration by interfacing with other learners in instinctive activities is a feasible and useful technique for instructing difficult ideas. He described the significance of various activities correlated to the thoughts being displayed.” Learners’ inspiration is high if these activities are face-to-face to the learners (Hug, Krajcik and Marx 2005).

Statement of the Problem: This study was aimed at comparison of the effects of activity based teaching and traditional method of teaching science at students of elementary classes.

Objective of the Study:

1. To analyze the students’ achievement taught through activity based teaching and the traditional method of teaching Science.
2. To check the retention power of students taught through activity based teaching.

Hypothesis of the Study:

1. There is no important difference in mean achievement scores of students instructed by activity-based teaching and the traditional technique of teaching in science at elementary school.
2. There is no important difference in mean score on retention power of science learners instructed through activity based teaching at elementary level.

Methodology of the Study:

Population of the Study: All student of class 6th from Govt. High School, Model Town, Lahore constituted the population.

Sample of the Study: For selection of sample 70 students of class 6th were taken randomly from Govt. High School Model Town, Lahore.

Content of the Study: First five chapters of the book of science published by Text Book Board Punjab were selected to teach to both groups.

Research Design: The research was experimental based on pre-test, post-test control group design.

Tools of Research/Instrument/Data Collection: Two tests (Pre and Post) were developed from the 6th class Science Book published by Punjab Text Book Board. The circulation of the questions keeps on similar for every area (knowledge, understanding, application, analysis and synthesis) in both tests. Tests were administered keeping cognitive domain in view. Items of all levels (knowledge to synthesis) were included in tests because students learn more effectively if easy to difficult and concrete to abstract way is be used. Content validity of the tools was checked by different science teachers teaching at elementary .

Procedure of the study: A pre-test was prepared from 6th class science book prescribed by Punjab Text Book Board. Pre-test containing 100 items was administered to the 6th class before the start of the experiment. On the basis of result of the test, two equal groups were formed experimental group & control group. Selected units were taught to both groups (experimental and control) for the time of eight weeks. Experimental group was taught with activities and control group was taught traditionally. Time for the teaching science was 40 minutes daily to each group. Post-test was administered to both groups after the teaching of specified units from 6th class science book prescribed by Punjab Text Book Board in order to find out the effectiveness of treatment.

Analysis and Interpretation of the data

Mean score and *t*-test were used to evaluate and analyze the test marks of two groups. Independent sample *t*-test at 0.05 level of significance was applied on both the tests scores to check whether there is significant difference in the performance of two groups before and after the treatment. Mean value, standard deviation, *t*-value and *p*-value were calculated for the purpose of data analysis.

Table 1: Comparison of the performance of pre-test of both groups

Groups	N	Mean	SD	<i>t</i> -value	df	Significance/P-value
Experimental Group	35	18.47	4.125	.000	58	1.000
Control Group	35	18.47	4.091			

Table value of “*t*” at 0.05 = 2.00

It shows that the mean score of pre-test of experimental group is 18.47 with SD 4.125, and the mean score of pre-test of control group is 18.47 with SD of 4.091. The tabulated-value for df 58 is 0.000 whereas table value is 2.00. As calculation of *t* is less than table value. Therefore, it may be concluded that results of both groups were the similar before the treatment.

Table 2: Comparison of the performance of post-test of both groups

Groups	N	Mean	SD	<i>t</i> -value	df	Sig/P value
Experimental Group	35	48.80	2.140	33.876	58	.000
Control Group	35	20.00	4.136			

Table 2 demonstrates, the mean score of post-test of experimental group is 48.80 with SD of 2.140 and the mean score of post-test of control group is 20.00 with SD of 4.136. The computed *t*-value for df 58 is 33.876 whereas table value is 2.00 which is not as much as table value. As computed *t*-value is greater than table value

so H_0 (There is no important differentiation in students' mean achievement marks instructed by activity based teaching and the traditional teaching method in science at elementary school level) is rejected and alternative hypothesis, H_1 (There is important differentiation in mean achievement marks of learners instructed by activity based teaching and the traditional teaching method in science at elementary school level) is accepted. Therefore, it may be concluded that results of both groups were the different in post-test.

Table 3: Achievement scores of experimental group in pre and post-test

Groups	N	Mean	SD	<i>t</i> -value	df	Sig/p-value
Post-test Experimental Group	35	48.80	2.140	37.786	29	.000
Pre-test Experimental Group	35	18.47	4.125			

Table 3 demonstrates that, the mean score of post-test of experimental group is 48.80 with SD 2.140, and the mean score of pre-test of experimental group is 18.47 with SD of 4.125. The computed *t*-value for df 29 is 37.768 whereas the table value is 2.05 which is less than *t*-value. As calculated *t*-value is not as much as table value so H_0 (There is no important difference in mean score on retention power of science students instructed through activity based teaching at elementary level) is rejected and consequently alternative hypothesis H_1 (There is important differentiation in mean score on retention power of science students instructed through activity based teaching at elementary level) is accepted hence it can be concluded that students taught through activity based teaching has strong power of retention.

Table 4: Comparison of the performance of control group in pre and post test

Groups	N	Mean	SD	<i>t</i> -value	df	Sig/p-value
Post-test control Group	35	20.00	4.136	1.916	29	.065
Pre- test control Group	35	18.47	4.091			

It demonstrates that, the mean score of post-test of control group is 20.00 with SD 4.136, and the mean score of pre-test of control group is 18.47 with SD of 4.091. The computed *t*-value for df 29 is 1.916 whereas the table value is 2.05 which is not as much as *t*-value at 0.05 level of significance. As computed *t*-value is not greater than table value so H_0 (There is no important difference in mean score on retention power of science students instructed through traditional method of teaching at elementary level) is accepted and alternative hypothesis H_1 (There is significant difference in mean score on retention power of science students instructed through traditional technique of teaching at elementary level) is not accepted, hence it can be concluded that students taught through traditional method of teaching have almost same power of retention in pre-test and post-test.

Findings

1. The mean score of pre-test of experimental group is 18.47 with SD 4.125, and the mean score of pre-test of control group is 18.47 with SD of 4.091. The tabulated-value for df 58 is 0.000 whereas table value is 2.00.
2. The mean score of post-test of experimental group is 48.80 with SD of 2.140 and the mean score of post-test of control group is 20.00 with SD of 4.136. The computed *t*-value for df 58 is 33.876 whereas table value is 2.00.

3. The mean score of post-test of experimental group is 48.80 with SD 2.140, and the mean score of pre-test of experimental group is 18.47 with SD of 4.125. The computed t -value for df 29 is 37.768 whereas the table value is 2.05.
4. The mean score of post-test of control group is 20.00 with SD 4.136, and the mean score of pre-test of control group is 18.47 with SD of 4.091. The computed t -value for df 29 is 1.916 whereas the table value is 2.05.

Conclusion

1. Before the start of experiment both the groups were same in their mean scores. (Table.1)
2. There is significant difference in students' mean achievement scores taught by activity based teaching and the conventional technique of teaching in science at elementary school level. (Table.2)
3. There is significant difference in mean score on retention power of science students taught through activity based teaching at elementary level. (Table. 3).
4. Students taught through traditional method of teaching have almost same power of retention in pre-test and post-test. (Table.4)

Recommendations

It is recommended that:

1. In future Science may be taught with activities at elementary level.
2. Science kit containing material for activities may be provided to science teachers.
3. A separate room for Science may be allocated in every school and may be equipped with material for activities.
4. Different activities according to unit may be recommended in text books of primary, elementary and elementary classes.
5. Teachers may be trained for conducting activities in different subjects.
6. Activities according to content may be planned by the teachers at the start of academic session.
7. Studies may be carried out separately for each subject to know the effectiveness of activity based teaching.

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