INVESTIGATION OF LECTURE AND DEMONSTRATION METHOD IN THE TEACHING OF SCIENCE AT ELEMENTARY LEVEL IN HAVELI KAHUTA AZAD JAMMU AND KASHMIR

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Received: 18-01-2023 **Revised:** 11-03-2023 **Accepted:** 2-04-2023 **Published:** 30-06-2023

ABSTRACT

Science holds immense significance in our daily lives, serving as a vital source of knowledge. However, student performance in this subject has consistently lagged across educational levels. To address this issue, this study aimed to investigate the impact of lecture and demonstration methods on science teaching at the elementary level in Haveli Kahuta, AJ&K. The objective was to assess the academic achievement of elementary students in science using both teaching approaches. Employing an experimental design, the study involved students from the 8th grade of Govt. Girls High School, Haveli Kahuta. A pre-test and post-test comparison group design was utilized, with participants divided into experimental and control groups. The experimental group (18 students) received instruction through the demonstration method, while the control group (18 students) was taught using the lecture method. Data collection involved administering 100 multiple-choice questions (MCQs), identical for both groups during pre-test and post-test assessments. Analysis was conducted using a t-test at a significance level of 0.05. Results revealed a significant difference in mean scores between the two groups, indicating superior performance among students taught with the demonstration method. Thus, it is recommended to utilize the demonstration method with confidence when teaching science at the elementary level.

Keywords: *Demonstration Method, Lecture Method, Teaching of Science.*

INTRODUCTION

The term "Lecture" originates from French, signifying the act of reading. Traditionally, this educational method involves an oral presentation aimed at imparting information on a specific subject by a faculty member (Gross Davis, Jossey-Bass, 2009). The lecture approach is valued for its efficiency, allowing the teacher to address the entire class simultaneously, thereby saving time and effort. While it promotes active listening skills among students, it also tends to stifle their initiative, leading to passive learning. Interestingly, research suggests that female students typically prefer visual learning, while male students lean towards auditory learning during the teaching process (Hodkinson & Jeffcote, 1996).

The study may be helpful for teachers when teacher have lack of knowledge about suitable method students will not able to know about worth and use of science. The study may be helpful for students learning will better when teachers use

innovative methods. In this study, Researcher focused on students effective learning in science. The findings of this study may be useful for policy makers as it may provide them an opportunity to rethink and to remodel their priorities.

Lecture method is a teaching procedure in which there is a one-way channel of communication where the teachers make an oral presentation of the subject matter content and in this approach, students typically respond by quietly listening and making notes. The teacher presents all the necessary information for students to comprehend and master, with minimal concern for their active involvement or contribution to the lesson's effectiveness (Akem, 2007). This method is particularly suitable for large class sizes, as it allows for the efficient coverage of a substantial amount of material within a shorter timeframe. According to Abah (2006), practical application is key to skill acquisition, emphasizing the importance of hands-on learning over passive listening.

Nowak et al. (2004) advocated for the use of demonstration and discussion methods as the most appropriate approaches for teaching practical-oriented subjects like agricultural science. They argued that the demonstration method is particularly effective in teaching various subjects, including sciences, mathematics, and vocational and technical education, due to its practical nature. This method can be implemented in two ways: teacher-demonstration and student-demonstration. In the teacher-demonstration strategy, the teacher illustrates the procedure to be followed, after which students replicate the demonstrated procedures to solve given problems.

RESEARCH METHODOLOGY

Research design used for the current study was experimental method, which further involves pre-test, post-test, and control group design. In this design, two groups were formed randomly i.e.; control and experimental. Both groups underwent pre-testing and post-testing using the same achievement test. The independent variable in this study was the teaching method of science, while the dependent variable was the use of lecture and demonstration methods. The study population comprised all 8th-grade students in private elementary schools in the Haveli Kahuta district of AJ&K for the academic year 2022. The sample consisted of randomly selected students from these schools.

Research Instruments

As a research instruments, researcher developed test to measure dependent variable i.e. achievement test.

Achievement Test

In this research study, both the pre-test and post-test were designed to assess students' understanding through multiple-choice questions (MCQs). The pre-test comprised 100 MCQs, each worth one mark, with a total test score of 100. This pre-test aimed to establish baseline equivalence in the prior knowledge of students enrolled in the lecture-based treatment group. The identical test format was used as the post-test.

Development of lesson Plans

The researcher devised two sets of lesson plans, each employing a different instructional strategy: one based on lecture delivery and the other on demonstration. A total of 20

lesson plans were created for each strategy, encompassing content from four chapters covered during the experiment. Despite the differing instructional approaches, the educational objectives remained consistent across both the experimental and control groups. The achievement test, comprising 100 multiple-choice questions (MCQs) and divided into pre-test and post-test sections, was crafted from the content of the four chapters. Of the total questions, 49 pertained to knowledge, 33 focused on understanding, and 18 assessed application skills.

Table of Specification

Chapters Name	**Knowledge**	**Understanding**	**Application**	**Total**
Acids, Bases and Alkalis	12	6	7	25 (25%)
Measurement of physical quantities	10	9	6	25 (25%)
Sources and effect of heat energy	13	9	3	25 (25%)
Force and pressure	14	9	2	25 (25%)
Total	49 (49%)	33 (33%)	18 (18%)	**100 (100%)**

RESULTS

This chapter deals with analysis and interpretation of data collected through achievement tests and attitude scale. For analysis of data and to find out the difference in performance of experimental and control group and to assess their attitude towards science, T-test was used. For this purpose, the researcher also took help from SPSS (Statistical Package for Social Sciences).

Analysis and Interpretation of the Data

Table#1. Pretest between Experimental and Control group.

Test	Groups	N	Mean	SD	T	df	Sig
Pretest	Control	18	32.33	**7.**66	1.53	34	.204
	Experimental	18	36.16	9.95			

The data presented in the table indicates that the mean score of pre-tests for the control group is 32.33 with SD 7.66, and score of experimental group is 36.16 with SD 9.95.

Table#2. Posttest between Experimental and Control group.

Test	Groups	N	Mean	SD	T	df	Sig
Posttest	Control	18	38.88	11.55	.824	34	.034
	Experimental	18	47.88	12.84			

The data presented in the table indicates that the mean score of pre-tests for the control group is 38.88 with SD 11.55, and score of experimental group is 47.88 with SD 12.84.

Table#3 Pretest and posttest of Experimental group.

Test	Groups	N	Mean	SD	T	df	Sig
Experimental	Pretest	18	36.16	9.95	-5.061	17	.000
	Posttest	18	47.88	12.84			

The data presented in the table indicates that the mean score of pre-tests for the control group is 36.16 with SD 9.95, and mean of post-tests of experimental group is 47.88 with SD 12.84.

Table#4. Pretest and Posttest of Control group.

Test	Groups	N	Mean	SD	T	df	Sig
Control	Pretest	18	32.33	7.66	-3.441	17	.003
	Posttest	18	38.88	11.55			

The data presented in the table indicates that the mean score of pre-tests for the control group is 32.33 with SD 7.66, and mean of post-tests of control group is 38.88 with SD 11.55.

Findings

1. No significant difference was observed between the experimental and control groups in the pre-test stage. (Table 3.1)
2. A significant difference was found between the performance of students in the post-test of the experimental group compared to the control group. (Table 3.2)
3. A significant difference was observed between the pre-test and post-test scores of the experimental group. (Table 3.3)
4. A significant difference was found between the pre-test and post-test scores of the control group. (Table 3.4).

Conclusion and Recommendations

The conclusions drawn from the study's findings are as follows:

1. The study concludes that during the pretest, there was a minor difference in the mean scores of the achievement test between both the control and experimental groups.
2. The study concludes that during the posttest, there was a major difference between the achievement test scores of the control and experimental groups.
3. It is concluded that there was a difference in achievement test scores of the control group both at the pretest and posttest stages.
4. It is concluded that there was a major difference in achievement test scores of the experimental groups at both the pretest and posttest stages.

Recommendations

Based on the results obtained, the following recommendations are proposed:

1. Demonstration teaching method is hereby recommended for science teachers because students take interest more in demonstration and students learn more in demonstration as compared to lecture method.
2. It was noted that teachers have lack of guidance about demonstrations. So, for proper training of teachers in demonstration Workshops and seminars may be organize for science teachers.
3. In Government Sectors, Students strength is more as compared to private sectors and forty (40) minutes are allotted for science class and it is difficult to manage
4. whole class in demonstration. The forty (40) minutes may be doubled to make it eighty (80) minutes when demonstration method is to be used.
5. Government may hire more qualified teachers to decrease the work load of teachers.
6. Resources are most important for implementation of demonstration. Government may provide adequate resources for implementation of demonstration method inthe teaching of science.
7. Basically, Science is a practical work, and students cannot learn more through conventional lecture method so, it is highly recommended for the teaching of science via demonstration method to be adopted in schools.

Discussion

The findings of this study support the research hypothesis, indicating a significant difference in the post-test mean scores of science achievement between students taught using the demonstration method (Experimental group) and those taught using the lecture method (Control group), after

accounting for the influence of pre-test scores on science achievement. Notably, the experimental group exhibited higher post-test scores in science academics. These results align with Daluba's (2015) research on the impact of the demonstration method in teaching science in secondary schools within Kogi East Education Zone of Kogi state, where a significant effect was observed.

Similarly, Efe and Khalil (2016) found support for these results in their investigation into the effects of teacher demonstration and lecture instructional methods on student learning outcomes in selected secondary schools in Kaduna, Nigeria. Their findings demonstrated that the demonstration teaching method was more conducive to learning. As suggested by Buguelski (1977), the lecture model may not be effective in conveying factual information. This sentiment is echoed by Samuel Johnson, who remarked in 1766, "People have a strange opinion that everything should be taught by lectures." Upon comparison, the demonstration method emerged as more effective than the lecture method for learning science.

The findings of this study align with Okocha's (1994) research, which concluded that the demonstration method was more effective in facilitating the learning of science concepts compared to the lecture method. This suggests that the demonstration method indeed outperforms the lecture method in terms of effectiveness. Moore (1996) further supports this notion by asserting that students tend to retain 90% of what they see and do, as opposed to what they hear. Similarly, Ernest's (2010) study conducted in Esan, Edo state, also found that the demonstration method was superior in facilitating science learning.

Moreover, Attah (2014) observed an increase in retention rates when employing the demonstration method compared to the lecture method, which corroborates the findings of this study. Ibrahim (2015) also emphasized the effectiveness of the demonstration strategy in providing vivid illustrations for quick comprehension, thereby enhancing the retention of learned information.

Furthermore, Veselinovskaa (2011) investigated the impact of different teaching methods on student motivation and academic achievement. The study revealed that students taught using practical tasks, particularly through the demonstration method, achieved higher academic performance compared to those taught through lectures. Additionally, Veselinovskaa noted that demonstration and experimental approaches are more engaging and motivating for students compared to traditional lecture methods.

In a study investigating the effectiveness of demonstration methods, Hannus and Hyona (1999) discovered that the use of illustrations during teaching significantly enhances the comprehension levels of high-ability students, though not necessarily for those with lower abilities. Similarly, Reid and Beveridge (1986) concluded that while incorporating pictures alongside text can be beneficial for high-ability students, it may actually hinder the learning process for students with lower abilities, possibly due to difficulties in integrating information.

On the contrary, a study conducted in a Turkish high school by Kaya and Geban (2011) revealed that the demonstration method fosters a positive attitude among students toward the subject of chemistry compared to traditional teaching methods. However, it's worth noting that the lecture method remains a popular teaching model across various subjects. Dececcos and Grawford (1977) noted its prevalence in schools and colleges, particularly in the fields of sciences, engineering, and medicine, where it continues to be the primary mode of instruction in many universities worldwide (Brown, 1987).

While the lecture method may not be universally suitable for all purposes, when employed effectively, it can inspire enthusiasm and engage students' imaginations (Leish, 1976).

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