Competitive Education Research Journal (CERJ)
https://cerjournal.com/index.php/cerjournal/issue/archive
ISSN(Print): 2709-9784, ISSN(Online): 2709-9792
Vol 5, Issue 1, 2024, pages 96-107

Investigating the Efficacy of Lecture and Demonstration Methods on Teaching of Science at Elementary Level in Azad Jammu and Kashmir

Author/s Affiliation: Saba Liaquat Kayani[1], Aabida Lateef[2], Faisal Ishaque[3], Ghulam Rabi[4]

ABSTRACT

Science plays a pivotal role in our life. Science is one of the most important channels of knowledge. Students' achievement in this subject at all levels of education had been consistently poor. In an attempt to seek solution to this problem this study determined the effect of lecture and demonstration method in the teaching of science atelementary level in Haveli Kahuta AJ&K. The objective of the study was to find out achievements scores of elementary students in the subject of science with demonstration and lecture method. The study adopted an experimental design. The participants of the study were students of class 8th of Govt. Girls High school Haveli Kahuta, for conducting the experiment, the investigator used pre-test and post-test comparison group design. Two groups were made to conduct this study i.e experimental group and control group. Experimental group was taught by demonstration method (18students) and control group was taught by lecture method (18 students). 100 items (MCQs) were made for data collection and data were analyzed using t-test at asignificant level of 0.05. 100 Items were same for both groups (Pre-test, post-test). The findings of the study revealed a significant difference in the mean scores ofthe students and a significant difference was noted between control group and experimental group. Results obtained revealed that student's performance better science when taught using demonstration method than when lecture method was used.It was therefore, recommended that the demonstration method be used with confidence to teach science at elementary level.

Key Words: *Demonstration Method, Lecture Method, Teaching of Science.*

To Cite: Kayani, S.L., Lateef, A., Ishaque, F. and Rabi, G. (2024) Investigating the Efficacy of Lecture and Demonstration Methods on Teaching of Science at Elementary Level in Azad Jammu and Kashmir, Competitive Education Research Journal, 5 (1), 96-107.

INTRODUCTION

The word Lecture is derived from the French language, which means to read. According to traditional definition, this academic practice involves an oral presentationintended to teach by conveying information about a particular subject, by a member offaculty (Gross Davis, Jossey –Bass 2009). Lecture method saves time and energy of theteacher, as teacher can speak one thing to the whole class at the same time .It helps thestudents to enhance and improve the ability to listen carefully to the teacher but it killsstudent's initiatives as it makes them passive learner. The female students prefer seeingthem than hearing on the other hand, male students prefer hearing them than seeing in teaching learning process (Hodkinson & Jeophcote,1996). Studying 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 students react by silently listening and taking notes. In this method, the teacher gives out all the facts he wants the students to know and master, caring very little if at all whether or not, the students are actively participating and contributing to the success of the lesson (Akem, 2007). This method is good for large class since muchwork could be easily covered in shorter time. Abah (2006) revealed that skills are bestlearnt through practices rather than mere listening.

The most suitable methods for teaching practical oriented subject like agricultural science are demonstration and discussion methods. Nowak et.al (2004) articulated this position and presented evidence that, demonstration method is generally effective in teaching sciences, mathematics, as well as subjects within vocational and technical education because it can be effective. There are two types of demonstration namely, teacher-demonstration and student-demonstration. Teacher- demonstration strategytherefore, is one whereby the teacher illustrates

a procedure to be followed and thereafter students follow those procedures to solve the given problem.

RESEARCH METHODOLOGY

Research design used for the current study was experimental method, which furtherinvolves pre-test, post-test, and control group design. In this design, two groups were formed randomly i.e., control and experimental. Both groups were based on pre-testedand post-tested on the same achievement test. The independent variable in present studywas teaching of science. And the dependent variable in present study was Lecture and demonstration method. The population of the study consisted of all the private elementary school's students of grade 8th in district Haveli Kahuta AJ&K for the academic year 2022. Total students of class 8th selected randomly from school. As a research instruments, researcher developed test to measure dependent variable. The pre-test and post-test reported inthis research study, were focused on answering the multiple-choice questions (MCQs). The pre-test consisted of 100 MCQs g each carry one mark. The total marks of this testwere 100. This pre-test was administered to determinebaseline equivalency in prior knowledge of students in the lecture-based treatment group. The same test was used aspost-test.

The researcher developed two versions of lesson plans. One version of lesson plan utilized the lecture-based strategy while the second version of lesson plan utilizeddemonstration-based strategy. Twenty (20) lesson plans for lecture-based strategy and 20 for demonstration-based strategy were developed with respect to four chapters taught during the experiment. The content for each lesson plans, across both thelecture-based strategy and demonstration based strategy, was based on the same educational objectives in both the experimental and control group. Test was MCQs based Achievement test **(**pre-test, post-test) was made from four chapter of class 8th science.100 items were included in achievement test (pre-test, posttest). Out of 100 questions 49 were based on knowledge, 33were based on understanding, and 18 were based on application

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 AND ANALYSIS

This section 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).

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			

Above table shows that the mean score of pre-tests of 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			

Above table shows that the mean score of post-tests of 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			

Above table shows that the mean score of pre-tests of experimental group is 36.16 withSD 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			

Above table shows that the mean score of pre-tests of 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. There is no significance difference between Experimental and control groups in pre -Test. (Table 1)
2. There is a significant difference between the posttest of experimental groupand control group. (Table 2)
3. There is a significant difference between pre and post-test of

experimental group. (Table 3)

4. There is a significant difference between pre-test and post-test of control group (Table 4).

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The findings of the present study supported the research hypothesis that revealed that there is a significant difference in the science achievement post-test mean scores of the student taught with demonstration method (Experimental) and students taught with lecture method (control) groups after controlling for the effect of the pre-test on science scores, and a noticeable difference was found to be in the favor of experimental groupstudents in terms of the post-test science academic success scores. The result agrees with Daluba (2015) who conducted a research on the effect of demonstration method of teaching science in secondary schools in Kogi East Education Zone of Kogi state and found a significant effect.

This result also agreed with Efe and khalil (2016) who investigated the effect of teacher's demonstration and lecture instructional methods on students learning outcomes in selected secondary schools in Kaduna, Nigeria and found that the demonstration teaching method was more facilitating. As Buguelski (1977) suggested the lecture model is not useful in teaching factual information. Samuel Johnson said in 1766 "People have a got strange opinion that everything should be taught by lectures. When compared,the effectiveness of lecture and demonstration method in learning science demonstration method was more effective than lecture method.

The findings of this study is in support of the finding of Okocha (1994) who reported that demonstration method was more effective in learning science concept. This showed that demonstration method was more effective than the lecture method. This is in line with Moore (1996) reports which said that students remember 90% of what they see and do what they hear. This finding is in line with Ernest (2010) whoreported that demonstration method was more effective in learning science in Esan,Edo state. The results agrees with Attah (2014) who using demonstration method and lecture method found out that demonstration method brought about increased in retention than the lecture method. The result is in line with the statement of Ibrahim

(2015) that demonstration strategy helps in presenting vivid illustration for quick grasping of facts,which is foster retention of learned facts. Veselinovskaa (2011) conducted a study on the comparison of teaching methods and their impact on student's motivation and academic achievement. The resultsshowed that students taught with practical task (maximum use in inquiry method) and demonstration method were high achiever than the students taught by lecture method. Veselinovskaa also mentioned that demonstration and experiment also attract and motivate students better than lecture method.

In a study on the effectiveness of demonstration, Hannus and Hyona (1999) found the results that illustration during the teaching process increases the comprehension level of high ability students but not for the students of low ability. In another study, Reid and Beveridge (1986) concluded that when picture is used along with the text during teaching process, students with low ability level disturb rather than improvement. The reason may be that students of low ability level may confuse in integrating information with text. In a Turkish high school study was conducted by Kaya and Geban (2011) and found that demonstration method develops positive attitudeamong students towards chemistry subject rather than traditional method of teaching.

So, lecture method also can be considered as a popular teaching model in differentsubjects. The lecture model is the traditional style of teaching still found in many schools and colleges (Dececcos and Grawford,1977). It is still the lectures in sciences,engineering and medicine and they are still the most common method of teaching in universities throughout the world (Brown, 1987). This has to be noted that the lecture method just like any other method is inappropriate as all-purpose method, but it can serve many useful instructional functions. The lecture-explanation approach, when used properly can inspire enthusiasm and capture the student imagination (Leish, 1976).

Based on the findings of the study, the following conclusions were drawn: -

It is concluded that at the time of pretest there was minor difference in meanscores of achievement test of both control and experimental group. It is the concluded that at the time of posttest there was a major differencebetween achievement test scores of control and

experimental group. It is concluded that at the time of pretest and posttest there was a difference inachievement test scores of control group. It is concluded that at the time of pretest and posttest there was a majordifference achievement test scores of experimental groups.

Based take on the results, the following recommendations are made:

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 beorganize for science teachers.
3. In Government Sectors, Students strength is more as compared to private sectorsand 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.

REFERENCES

Abah, C.O. (2006). Universal basic education for national survival: The place ofprimary and integrated science. *Benue state university journal of Education, (1),161-170.*

Agbandinuno, M.C.K. (1987). Analysis of the enrolment and performance in the hard sciences in west African School Certificate in the 1960s. 28th Annual Conference Proceedings of

Akem, i.a (2007). Practices and teaching methods.an unpublished lecture notes of the college of education, katsina-ala benue state.

Akpan E.U.U. (1999). Towards Evaluation Chemistry Laboratory practices: Asurvey plateau state Secondary schools. In Evaluating Science Technology and Mathematic Education. 40th annual conference proceeding of STAN., 117-122.

Aliyu, M.M (2008). Subjects methods for business teachers.

Ameh, I-Ei, Daniel, B.p., & Akus, Y. (2007).Research and Methods in the Social Sciences.Ankpa: Rowis press.

Appleton, K. (2005). Elementary Science TeacherEducation: International perspectives. Mahwah, NJ:Erlbaum.

Attah, F. O. (2014). Effects of two teaching methods on secondary school students' achievement in writing and balancing chemical equations in Nsukka EducationZone of Enugu State. An unpublished MED thesis university of Nigeria Nsukka,Enugu State Nigeria.

Bedwell WL, Fiore SM and Salas E (2014) Developing the future workforce: An approach for integrating interpersonal skills into the MBA classroom. Academy of Management Learning & Education 13(2): 171-186.

Cadotte ER (1995) Businesssimulations. The next step in management training, selections, Graduate Management Admission Council 54 (2): 8-16

Cimer, A. (2007). Effective teaching in science: A review of literature. *Journalof Turkish science education, 4(1), 20-44.*

Daluba, S.Y. (2015). A comparative study of the effectiveness of lecture versus demonstration methods in teaching selected topics in chemistry". *Bichi Journalof Education 6(1) 21 – 24.*

Davis,E., Petish., & Smithey, J. (2006). Challenges new science teachers face. Review of Educational Research, 76(4), 607-651.

Dina, &Nugraheni, A.R.E. (2017). Profile of chemistry education student's independence and

interest in mathematics and sciences, insight and knowledgecourse through e-learning. Jurnal Inovasi Pendidikan Kimia ,11 (2), 1921-1931.

Efe M. O & Khalil, U. I. (2016). The Effects of Two Teachers' instructional methods on Students' Learning Outcomes in Chemistry in Selected Senior Secondary School in Kaduna Metropolis, Nigeria.*Journal of Education and Practice*

,7(15), 1-9.

Eilks, i., prins, g.t., &lazarowitz, r. (2013). how to organize the classroom in students- active mode. in i. eikles &a. hofstein(eds). teaching chemistry.a study book (pp.183-212) from indeed.com

Gardner, m. (1978). aha! insight. New York: scientific American. Gerber, b.l., cavallo,a.m.l., &marek, e.a (2001). relationships among informal learning environment, teaching procedure and scientific reasoning ability. *international journal of science education, 23(5), 533-549.*

Gross Davis, B., Toolsfor Teaching (2nd edition), SanFrancisco, Jossey-Bass,2009, p.148.

Halpern df (2000). creating cooperative learning environments. aps observer ,8 (1):14-31.

Hodkinson, S. & Jephcote,M. (Eds) (1996). Teaching economics and business.Heinemann Education Publisher.

Hofstein, a., &Lunetta, v. n. (2004). thelaboratory in science education: foundation forthe 21stcentury. science education ,88,28-54.

Ibrahim, J. (2015). Effects of inquiry method on performance of junior secondary school students in Islamic studies in Kaduna State. An Unpublished M.Ed. Dissertation ABU Zaria.

Irwanto,Rohaeti, E., &Prodjosantso,A. K (2018b). Undergraduatestudent's science process skills in terms of some variables: A perspective from Indonesia.*Journalof Baltic Science Education ,17, Accepted Manuscript* .

Javed, T. (2012). A Study of Effectiveness of Dimensions of Learning Model for Science Teaching at Elementary Level (Doctoral dissertation, NATIONAL UNIVERSITY OF MODERN LANGUAGES (NUML) ISLAMABAD).

Johnson, D. W, and Johnson, R. T. (1989). Cooperation and Competition: Theory andResearch. Edina, Minn.: Interaction Books p.28, 25.

Kapur,R.(2020).Lecture Method: TheComprehensively Used Pedagogical Methodavailable on www.researchgate.com

Kaur, G. (2011). Study and analysis of lecture model of teaching. *International Journal of Educational Planning & Administration, 1(1), 9-13.*

Kumar, A. R., Sarathy, N. P., & Ravikiran, M. (2018). A Study on Knowledge, Attitudeand Practice on the Usage of Edible Salt among the Population in an Urban Area. *Indian Journal of Public Health Research & Development*, *9*(4).

M, Tariq. (2013). Science teaching practices in English and Urdu medium classes inpublic schools and their impact on student's achievement at elementary level.

Maizuwo, A.I. (2011). Effects of demonstration teaching strategy in remedying Smisconceptions in organic chemistry among students of colleges of educationin federal capitalterritory, Abuja. UnpublishedM.Ed. Dissertation,Ahmadu Bello University,Zaria Nigeria.

Mattern, N., & Schau, C. (2002). Gender differences in science attitude-achievement relationships over time among white middle-school students. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, *39*(4), 324-340

Mundi,N.E. (2006). The state of students' academic achievements in secondary school agricultural science in Kogi state. Teacher Education Journal(TEJ),12(1),14-19.National research council (2000).inquiry and national education standards. Washington, dc: national academy press.

Njoku,Z.C. (2007). The synergistic effect of polyacrylamide and ioded ions on the corrosion of mild steel in H_2SO_4. Mater. chem. phy.,106:387-393.

Olatian,S.O. (1984). Agricultural Education in the Tropics-Methodology for Teaching Agriculture. London: Macmillan Publishers.

Rosmaya Andriyanto, et al, 2018, Application of Demonstration methods to improve student learning outcomes in science learning energy sources material. Collase *journal of Education ISSN 2614 -4093 Vol. 01 No .05 Science Teachers Association of Nigeria: 1987:25-32.*

Shamoo, A.E., Resnik, B.R. (2003). Responsible Conduct of Research. Oxford University Press.

Sharma, m. (n.d.). Lecture method/teaching method. retrieved October 28, 2022 from biyanicolleges. or towns, m.h., &grant,e.r. (1997). i believe i will go out of thisclass actually knowing something: cooperative learning activities in physical chemistry. *Journal of research in science teaching, 34(8),819-835.*

Veselinovsk (2011). The effect of teaching methods on cognitive achievement,

retention, and attitude among in biology studying. Cypriot journal of Educational Sciences.4(1):175-185.Swork ethic skills: top 8 values to develop.(2020). retrieved on October 02, 2022 retention, and attitude among in biology studying. Cypriot journal of Educational Sciences.4(1):175-185.Swork ethic skills: top 8 values to develop.(2020). retrieved on October 02, 2022

Zembal-Saul, c., starr, m., &krajcik, j.s. (1999). Constructing a framework for elementary science teaching using pedagogical content knowledge. in n. lederman&j. guess – Newsome (eds). Examining pedagogical.