ORIGINAL RESEARCH PAPER

Education

EFFECTIVENESS OF ACTIVITY BASED LEARNING IN DEVELOPING PRACTICAL SKILLS OF SCIENCE

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ABSTRACT

Humans are always interested to know the world around them. The inquiring and curious human mind observed the nature in many ways. The purpose of science teaching is not only to have knowledge of scientific facts, principles and concepts but also to develop scientific attitude and practical skills in students. Activity based education is one of the latest trends in science teaching and learning. The best way to learn science is by doing science. Practical work is generally defined as any teaching and learning activity that involves student's science process skills in observing and manipulating real objects and materials. The major objective of the study was to measure the effectiveness of Activity-based learning in developing practical skills of science of standard 7th students. Quasi Experimental method was adopted for the present study. In this study, non-randomized two group pretest-posttest design was used. In the present study, researcher constructed a rubrics to observe the development of practical skills of students after the use of activity-based learning. The data collected from rubrics was analyzed by employing t-test. The major finding of study was activity-based learning programme is more effective for developing practical skills in science as compared to traditional method of teaching.

INTRODUCTION
Science is the system of knowing universe through data collected by observation and controlled experimentation. Many National Curriculum Framework for school education has time and again focus on improving quality of science and education.

According to NCF 2005, "Good science education is one that is true to learner, true to life and true to science". As pointed out precisely in Secondary Education Commission (1952-53) that science curriculum is narrowly conceived because it only prepares students for college education not for life. According to Position Paper for science education (NEP 2020), science education at upper primary stage includes Process skills of science like observation, classification, decentration, critical enquiry, hypothesizing, etc.

Activity based learning (ABL) is based on principles of learning through activities & learning by doing. ABL is learner center in which importance is given to learner who gains knowledge by doing activity in environment.

Activity Based Learning In Science
Science learning starts when children understand the world around them and construct their own understanding through their experiences. "A child best learns to swim by getting into water; likewise, a child best learns science by doing science". (Rillero, 1994). Therefore, the best way to learn science is by doing science.

Activity based learning in science is one of the latest trends. It is useful for kindergarten to higher class students. ABL ensure the active participation of student in learning process. ABL also serve the purpose of objectives of science in learning like Exploration, Experimentation, learning by doing, Scientific attitude, etc.

Practical Skills in Science
Practical work is generally defined as any teaching and learning activity that involves student's science process skills in observing and manipulating real objects and materials. The primary process skills are observing, classifying, measuring, communicating, inferring predicting, recognizing space-time relations and recognizing number relations.

The integrated process skills are formulating hypotheses, making operational definitions, controlling and manipulating variables, experimenting and interpreting data. The activities described are not necessarily from the SAPA programme, nor do they indicate the complete scope of the process skills. Out of 17 practical skills in present research only six skills selected.
1) Observation
2) Identification
3) Classification.
4) Performance
5) Drawing & Labelling
6) Interpretation

Review Of Related Literature
Shana & Abulibdeh (2020) conducted a study on science practical work and its impact on students' science achievement. The major finding of this study was significant difference in the attainment scores of the experimental over the control groups. There is a positive correlation between practical work and the academic attainment of most students in science.

Mascarenhas (2017) conducted a study on Effectiveness of Different Methods of Teaching on Science Process Skills Academic Achievement and Scientific Attitude of Higher Secondary School Students with different Levels of Intelligence. The major finding of the study was Methods of Teaching had differential effect on developing Science Process Skills.

Yadav & Mishra (2013) conducted a study on A Study of the Impact of Laboratory Approach on Achievement and Process Skills in Science among ix Standard Students. The major finding of this study was achievement of student studied through laboratory approach was significantly higher than traditional approach.

Bhuyan (2013) conducted a study on Effect of activity-based teaching on attitude process skills and achievement in science of elementary students. The Major finding of the study was Activity based teaching had a positive impact on development of science attitude. The activity-based teaching has significantly improved the science attitude of elementary students.

Objectives Of The Study
1) To develop Activity-based learning programme for the students of standard 7th.
2) To measure the effectiveness of Activity-based learning in developing practical skills of science of standard 7th students.

Hypothesis of the Study
H_{01}: There will be no significant difference in mean gain scores of students of experimental group and control group in terms

of practical skills of science.

Variables Of The Study
Table 1 *Types Of Variables*

Sr. No.	Type of Variable	Variable	Why?
1.	Independent Variable	Activity Learning Based Programme Traditional Method	As present study was measuring the effectiveness of Activity based learning
2.	Dependent Variable	Practical Skills in Science	Affected by Independent Variable
3.	Control Variable	Medium of Instruction (English) Standard 7th Subject: Science	As present study is limited to standard 7th students of English Medium Schools only

Explanation Of The Key Terms
Activity Based learning
According to Panko et al., (2007) activity-based learning is defined as a learning process in which students are constantly engaged. Activity Based Learning is defined as a setup where students actively participate in the learning experience rather than sit as passive listeners.

Practical Skills of Science
According to Babu (2009) Practical work is generally defined as any teaching and learning activity that involves student's science process skills in observing and manipulating real objects and materials.

Type Of Research
Present study was conducted to measure effectiveness of activity-based learning in developing practical skills of science, so present research was classified in to applied research type.

In the present study researcher wants to find out the effect of activity-based learning in developing practical skills in science. So, the study measures the cause- effect relationships. Therefore, the study is Experimental in nature.

Method of Research
Quasi experimental method was used by the researcher. Non-Randomized two equal group pre-test post-test design was used in conducting present study.

Population Of The Study
In the present study population was the students studying in standard 7th of English medium schools in Gandhinagar city.

Sample And Sampling Technique
In present study, researcher adopted convenience sampling technique for choosing school. So, school was selected by using convenience sampling. On the basis of pretest score, sample were arranged in descending order. Afterwards, sample were divided into 2 groups using odd even technique. Then, mean and standard deviation were calculated for equalling both the groups. After the student's selection, the control group and experimental group selected using lottery method.

From the selected sample, the students who appeared in both pre-test and post-test & secured 80% attendance during treatment implementation were considered as final sample.

Table 2 *Final Sample*

Sr. No.	Group	Sample
1	Experimental Group	20
2	Control Group	20

Research Tool
In the present study, researcher constructed an rubrics to observe the development of practical skills of students after the use of activity based learning. Rubrics was developed from the three chapters on which the programme was prepared.

Rubrics
A Rubrics has been developed to study the effectiveness of Activity Based Learning in Developing Practical Skills of Science. Based on the observations from pilot testing and suggestions given by expert's researcher prepared the final form of rubrics.

The final form of rubrics of 60 marks in which 11 marks are of performance skill, 4 marks are of observation, 12 marks are of identification, 8 marks of classification, 6 marks of drawing & labelling and 19 marks of interpretation.

Data Collection
Activity-based learning programme was implemented only on experimental group by the researcher. Thus, the experimental group only received the treatment and control group taught using traditional method. The duration for the implementation of programme was of 7 days. Afterwards, the students of both the group were post-observed using rubrics on same day. Thus, the scores achieved in rubrics is the data for present study.

Data Analysis Techniques
The data collected from rubrics was analyzed by employing t-test.

Data Analysis & Interpretation
Testing Of Hypothesis
For the testing of hypothesis researcher used independent t-test. Independent sample t-test is a statistical technique that is used to analyze the mean comparison of two independent groups. Results obtained by the test are presented in table.

Ho$_1$: There will be no significant difference in mean gain scores of students of experimental group and control group in terms of practical skills of science.

Table 3 *Group Statistics For Mean Gain Score Data*

	GROUP	N	Mean	Std. Deviation	Std. Error Mean	't-value'	Level of Significance
Mean Gain	Control	20	11.50	8.44487	1.88833	7.299	Significant at
	Experimental	20	29.55	7.14124	1.59693		

According to table 3, the obtained t value is 7.29, which is more than the table value of 2.58 at 0.01 level, therefore it is significant at 0.01 level. So, the hypothesis, there will be no significant difference in the mean gain score of on practical skills of science students of experimental group and control group is rejected.

Experimental group is having mean score of 29.55 and control group is having mean score of 11.50. It is concluded that activity-based learning programme has resulted in producing significant effect in developing practical skills of science as compared to that traditional teaching method.

Findings of Study
The activity-based learning programme is more effective for developing practical skills in science as compared to traditional method of teaching. It indicates that activity-based learning helps in developing of practical skills of science.

CONCLUSION

The present study problem is useful to school education and improving practical skills in science. NEP, 2020 emphasis on use of experiential learning among school student. Activity based learning facilitate in developing practical skills of science. It facilitates in developing interest among the students for the science learning. The present study concludes that school education should emphasize the practical skills in science with use of activity-based learning.

REFERENCES

1. Babu. (2009). Effectiveness of activity-based learning ABL as compared to conventional method of teaching in the context of developing practical skills in science. http://hdl.handle.net/10603/102124
2. Bhuyan, S. (2013). Effect of activity based teaching on attitude process skills and achievement in science of elementary students. https://shodhganga.inflibnet.ac.in/handle/10603/281045
3. Mascarenhas, S. (2017). Effectiveness of Different Methods of Teaching on Science Process Skills Academic Achievement and Scientific Attitude of Higher Secondary School Students with different Levels of Intelligence. https://shodhganga.inflibnet.ac.in/handle/10603/209350
4. Panko, et. al. (2007). Learning styles of those in the building and construction sector. Report for Building Research, New Zealand. https://www.researchgate.net/publication/236613267_ActivityBased_Teaching_For_Unitec_New_Zealand_Construction_Students
5. Rillero, P. (1994). Doing science with your children. East Lansing, MI: National Center for Research on Teacher Learning. https://eric.ed.gov/?id=ED372926
6. Shana, Z. & Abulibdeh, E. (2020). SCIENCE PRACTICAL WORK AND ITS IMPACT ON STUDENTS' SCIENCE ACHIEVEMENT. *Journal of Technology and Science Education, 10* (2), 199-215. https://files.eric.ed.gov/fulltext/EJ1272657.pdf
7. Yadav, B. & Mishra, K. (2013). A Study of the Impact of Laboratory Approach on Achievement and Process Skills in Science among Is Standard Students. International *Journal of Scientific and Research Publications, 3* (1), 1-6. http://www.ijsrp.org/research-paper-1301/ijsrp-p1382.pdf