



Journal of Education & Humanities Research (JEHR)

Institute of Education & Research (IER), University of Balochistan, Quetta-Pakistan

Volume: 11, Issue I, 2021; ISSN:2415-2366 (Print); 2710-2971 (Online)

URL: <http://web.uob.edu.pk/uob/Journals/jehr/jehr.php>

Email: jehr@uob.edu.pk

“Effectiveness of Activity Based Learning in General Science at Elementary Level”

Farkhunda¹

1. Allama Iqbal Open University¹ (AIQU)

Received: 07th May, 2021

Accepted: 20th June, 2021

Published: 1st July, 2021

KEY WORDS

Activity based
teaching, General
Science,
Elementary Level.

ABSTRACT

The present study describes that Activity Based Learning is effective for the development of Affective Domain outcomes in learning General Science particularly at Primary level. This research study deals with 5th grade students. Activity should be prepared by low cost material which can be easily available in the locality and students became avid learners through nature by easy nature related activities. Pretest and post-test Control Group Design of experimental research was selected for this research study. Experimental group was taught with the help of given activities whereas the control group was taught through ordinary method of teaching and learning. The total number of students was and these students were divided into two equal groups. The selected school was Islamabad Model School for Girls, Lakhwal. The class teacher made test of first three chapters cover in the first term serve as the data for pretest. Both the groups were taught for the period of four weeks. The achievement test (post-test) covering nine topics (two complete chapters) was used as measuring tool. The post-test was administered at the end of the treatment. The post-test scores of the experimental and control groups served as data for this study. T-test was used to analyze the data. The analysis of the data revealed that on the whole, experimental group performed significantly better than control group. The results showed that the Activity Based Approach in Learning is significantly more effective for the development of higher order skills in the students than the ordinary approach of teaching.

Introduction

Activity Based Teaching/Learning describes a variety of pedagogical strategies to teaching. Its major functions include the demand that teaching and learning should be placed upon doing hands-on trials and activities under controlled conditions for studying results. The mental picture of activity based learning is started growing in a common opinion that children are active participants instead of passive recipients of knowledge imparted. If a child is provided with the most favorable chance to explore by his/her own, the learning comes to be more pleasing than before and long-lasting. ABL is full of active and interlocked learning and it infuses into the students to obtain deeper penetration into the knowledge of the science.

Knowledge obtained by observation and experiment is a series of pedagogical strategies and if students are not interlocked in process, they are not doing science. Many science classes in elementary schools teach only the difficult words and term of science and nothing more than it. Research after research has displayed the importance of hands-on learning. Impetus students learn more and their reading skills also improve. Activity Based Learning aid students to apply the knowledge imparted to real life experiences and make arrangements for an all-around nurturing science (Patil, Budihal, Siddamal, & Mudenagudi, 2016). Activity Based Teaching/Learning is an effective pedagogical approach to teaching in which pupils thoroughly examine real life hurdles and challenges, simultaneously during working in partly small co-operative groups.

Effective science education goes hands in hands with the development of any nation's

economy. There is a great need for people who are able to make use knowledge and can create technological alterations both in order to keep in touch with scientific and technological developments and also to maintain such improvements. In our educational institutions, extra importance is paid to science education in order to meet this challenge and there is having great effort for enhancing science education qualitatively. With this Background, there is the preparation of educational programs for the most favorable methods and techniques and also the application of these programs into science education has comes to be a significant notion.

Activity Based Approach

Activity based teaching/learning has been acknowledged as an archetype and criterion for science learning and is also reproduced in the same manner in textbooks matured at the national level, it is scarcely been adapted to actual classroom routine (Noreen & Rana, 2019). Activities still have a tendency to be regarded as a passage to authenticate the plans/principles mentioned in the textbook, instead of as a passage to open-ended inquisition. There is a general notion that activity-based teaching/learning is exorbitant and consume more time as compared to the ordinary teaching/learning that could be else ways beneficially passed for text-oriented teaching and it does not equip the learner for competitive examinations. The involvement about expenditure in activities could not be discharged. Majority of schools can't manage well-equipped and sophisticated science laboratories. In spite of this, it is certainly desirable to construct low expense activities that can readily feasible in the surrounding,

thus it should not grant to become an apology for ignoring the very basic of science.

Activity Based Method is an advanced, controlled type of learning, which aims at making students produce an error-free concept. The scheme of teaching- learning practice adopted must be compatible to age and intellectual ability of learner's interpersonal criterion and feasible resources in surrounding. The style must be deficient of anxiety to learning and increasing the avidity and bliss of school routine. The early school learners are in the operational and concrete operational phase in which Cognitive and Affective domain progress is very significant. Therefore, at this phase enjoyable learning is very significant to the students. Taking this in mind, ABL is very appropriate. A well-selected, fully-planned and organized activity influences the learner's learning scope. Majority of educationists emphasized the Activity Based Approach in education like Rousseau and Dewey etc.

Rationale of the study

It is usually observed that researchers take keen interest on the objectives of cognitive domain but the objectives of Affective domain often remained neglected. In fact, objectives of Affective domain are also of such a great concern and it should not be ignored. The objective of cognitive domain is interlinked with Affective domain. The first level of affective domain is receiving which involves the willingness to listen that is only for motivated students along with teachers who provide up to date knowledge relative to the concerned topics. By taking a glance at the current synopsis, activity-based learning has been proved as superb pedagogical strategy for science education because in ABL learners

lively participate and engage in the series of learning cycle. Any learning cycle will not be conducive for the learners unless a wise teacher devised a useful scheme of teaching.

There are numerous indoor and outdoor activities in which learners lively perform themselves, which are encompassed by the multiplex directions that can have a force on science performance. Auxiliary scholastic activities are interconnected with revised educational level, enhanced interpersonal aptitude, higher aspirations along with exceptional consideration level which are the major component of Affective domain of learning. It affects positively on child's cognitive, affective and also psycho-motor domains of learning.

Objectives of the study

The research was attempted bearing the successive objectives:

1. To explore/investigate the effectiveness of activity- based learning in General Science at primary level.

Literature Reviewed

ABL is acknowledged as an outstanding pedagogical model in the domain of science, and it has recently launched for modern studies. At its foundation, this type of pedagogic provides an approach to a blended learning inside the student's prior information and by exposition to a series of activities providing an aid to the students to learn. Due to abundance interplay in ABL, vital mentor skills include simplifying, motivating, authorizing and honing instead of artlessly demonstrating details and numbers didactically. Applying an innovative pedagogic is helpful only when a particular

Farkhunda et al; (2021): Effectiveness of Activity Based Learning in General Science at Elementary Level

infra structure along with a certain students setting is designed. In this way a diversified pedagogic scheme must be cautiously instructed. In 2009 Simonson and Maushak have concluded after studying several research findings and suggest six guiding principles for useful scheme of attitude guidance. These guidelines can be summarized as follows:

1. Create the instructions sensibly; appropriate and functionally motivating and convincing.
2. Confer unheard information ever.
3. Communicate influential information in the most plausible way.
4. Derive meaningful sentimental involvement with learners.
5. Engage the students in preparation, construction or transformation of knowledge.
6. Arrange post-instruction consultation and editorial chances.

Research on teaching strategies for science education

Since 40 years science education is acknowledged everywhere in the world as an autonomous domain of research. The concern of this research is different from the concern of other sciences along with those of common education. The procedures and techniques which are used in most researches were at first adopted from different sciences. Teaching-learning process is a complicated, context dependent and demands at first hand to explain this complexity for understanding it before aspiring to dominating it eventually. Investigation in science is usually triggered by any theory or any hypothesis; learners either observe or pursue instructions and learners also advised to focus on specific observation to

target on and the conclusion is also communicated to them. Let us suppose an example. Illuminate a candle and after few minutes it is capped with glass. Here a question ponders, what does this action represent? The usual answer is, this action or experiment describes that air includes oxygen undoubtedly as a conclusion. It is one answer that is usually acknowledged in classrooms.

Activities enhancing affective domain components

The components of affective domain are motivation, mental outlook, perceptions and attitude. Affective domain consists of learning objectives that assert a sensitive tone, sentiments or degree of approval and disapproval. The range of objectives of Affective domain varies from simple consideration for particular phenomena to complicated phenomena having internally constant characteristic traits and moral sense. Here are some learning outcomes related to affective domain (attitudes, behavior and values).

- Receiving is willing to listen and to differentiate.
- Responding is to aid, to pursue, to participate, to commend and to consume time.
- Valuing is to debate and to be involved.
- Organizing is to discuss, to examine and to advocate.
- Characterizing is to resolve and change one's behavior and lifestyle.

The major concern of Affective domain is with motivation, eagerness to participate, behavior and valuation of what is learning consists of and lastly combining the standards of any discipline to regular life. The authors of the"

Farkhunda et al; (2021): Effectiveness of Activity Based Learning in General Science at Elementary Level

Dimensions of learning teacher's manual" (Marzano et al. p.5) summarize:

"Learning occurs in a sea of attitudes and perceptions that the effective Teacher continually manages often so skillfully that students are not aware of the Efforts they made. Subtle through this behavior may be, it is a conscious instructional act that involves overtly cultivating specific attitudes and perceptions"(p.5) . Any student will not become successful unless he/she develops a positive attitudes and mental model about the self, his/her fellows, the teacher and the standards of the chore that compose the topic which is being learned.

Activities based learning incorporates with hands-on learning

Hands-on learning is a pathway of variety of distinct things to many individuals. To use different stuff (activities) in classroom has become an expression for hands-on learning. Hands-on learning and activities based learning is not only manipulating things but it is a teaching-learning process that engages the learners in the depth of investigation of object, material or any phenomena or any idea in different experiments. The last step was squeezing the meanings and standards to rearrange the experiences gained from these experiments. Activities based learning has close resemblance with discovery learning, inquiry learning and hands-on learning. Activities based learning stresses on hands-on activities (usually) and minds-on activities (always) by manipulating most effective methods which give quick response by arguments with classmates and the teacher (Amuthavalli & Sivakumar, 2014). Ates and Erylmaz, (2011) quoted Rillero,

(1994, p.1), that a child best learns science when he/she is doing science. Without carrying out experiments in science we have no experience and it takes towards rote learning which kills learner's genius and gives unwanted stress on grades. Activities based learning support learners to join the learning to real life and appreciate them to initiate. It is only natural genius which brings crumbling inventories and creations throughout the world. Activities oriented learning plays vital role in the attainment of better and most appropriate education. Science initiates for learner when they recognize that they are now became able to acquire information about the surrounding world through constructing their own analysis of happenings by means of their own behavior and experience. Hands-on learning is similar to activities oriented learning by manipulating different stuff. The basic feature of hands-on learning and activities based learning comprises of comprehending events and happenings during accomplishment and experimenting (Amuthavalli & Sivakumar, 2014). This implies to the highest degree of understanding. This highest degree of understanding can be achieved by organizing easy classroom activities which can be performed through toys on primary stages for scientific convention that should have close resemblances with real life situations providing wide scope for innovations and newness making science learning an enjoyable (Chu, Saenz, Quek, & Angello, 2016), (Roistika, 2017) and pleasing activity.

Advantages of activities-based learning

In activities-based learning students got memorize the content, enjoy success after accomplishment of given task and became capable on transferring that knowledge in the easiest way to various real life situations.

Knowledge has the most favorable chance of fruitful retrieval if learning is acquired through the blended pedagogical methods like activities-based learning. Learning by purposeful activities and experiments in a well-structured pedagogic is a characteristic of didactic approach;

- 1) Motivate learners to depend on evidence (Anwer, 2019).
- 2) Encourage cause and effect thinking (Celik, 2018).
- 3) Supply the learners with an analogous series of experiments; so that every student becomes an active participant in any level of discussions disregarding social position (Ergul, et al., 2011), (Thayniath, 2015).
- 4) It triggers learners to response according to the results of the observed happening instead of simple remembrance of the conventional responses (Amuthavalli & Sivakumar, 2014).
- 5) It promotes inquiry of observed happenings and the emerging data. When the learners go through individual experiments, they became more intimate with the happenings and the complicated variables and thus, there was an improvement in the quality of teaching/learning (Akhtar & Saeed, 2017), (Kuyate, 2019).

Patil, Budihal, Siddamal, & Mudenagudi, (2016) concluded that Activity Based Teaching and Learning was found effective not only in enhancing the academic achievement level but also helpful in bridging the gap among the theoretical concepts and real time situations.

Sample of the study

Islamabad Model School for girls Lakhwal, Bani gala was selected as sample school. 28 students of 5th class were selected randomly as sample of the study. Two groups were formed from this sample. One group is named as Control group and the other is named as experimental group. Equal number of students was randomly distributed to each group that means 14 students in each group.

Table 1: Distribution of sample

Gender	Experimental Group	Control Group	No. of Sample
Boys	8	8	16
Girls	6	12	
Total	14	14	28

Sampling technique

For this study, 28 students were randomly selected. The sample of students was divided into two groups through tickets. Out of the two groups one group of 14 students was randomly allotted to experimental group and the other group of 14 students was allotted to control group.

Research instruments

For the present study, I have used two contrasting tools to gather information about the performance of students. These tools are both the measuring tools and instructional tools were employed as dominant instruments for the research. Measuring tools comprised of pretest and post-test structured whereas instructional tools comprised of guided indoor and outdoor activities, ungraded quizzes, arguments and discussion, story-telling and stereotyping and others.

Farkhunda et al; (2021): Effectiveness of Activity Based Learning in General Science at Elementary Level

For treatment purpose 9 lesson plans were prepared for experimental group as it was taught through activities based treatment. These lessons were conveyed through storytelling, demonstration, IQ quiz, experimentation, field trip, puzzles and some sort of word games. For the control group 9 lesson plans were prepared and this group was taught by ordinary teaching method. Control group and experimental group were administered for the period of one month. Scores of the students on post-test was served as data for study.

Data analysis techniques

I used suitable data analysis techniques. For all that, the scores for the post-test were interpreted to examine the effectiveness of activity based teaching/learning approach in science through multiple choice questions (MCQ) and completion type and some diagram labeling. For interpretations of result, both descriptive and inferential techniques were adopted. T-value test was adopted to compare the mean score values, and standard deviation (SD) used.

Table 2

Analysis of data regarding the achievement in general Science for pre-test scores of 5th class

Group name	N	Mean	SD	SED	DF	t _{cal}	tab	P
Control group	14	19.21	4.81	4.99				
					26	1.28	1.71	0.106
Experimental group	14	21.28	3.71	3.85				

The calculated t-value i.e. 1.28 on one tailed test is less than the critical table values i.e. at 0.05 is 1.71 and at 0.01 is 2.48 on one tailed test. It is clear from the results shown above in the table 2 that there is no significant difference

between the mean scores of experimental group

	Control gr	Experimental group				
Mean scoi	19.21	21.28				

and control group for pre-test.

Fig. 1

Graph of mean scores of control group and experimental group in pre-test.

Hence, it is concluded from table 2 and fig. 1 that both the experimental and control groups were the same before the treatment. Therefore, we accept the hypothesis that there would be better achievement if the experimental group was taught through activities based teaching/learning method. This is evident from the graph given above:

Table 3

Analysis of the achievement scores in general science for post-test

Group name	N	Mean	SD	SED	DF	t _{cal}	tab	P
Control group	14	21.21	3.02	3.14				
					26	2.81	1.71	0.004
Experimental group	14	24	2.20	2.29				

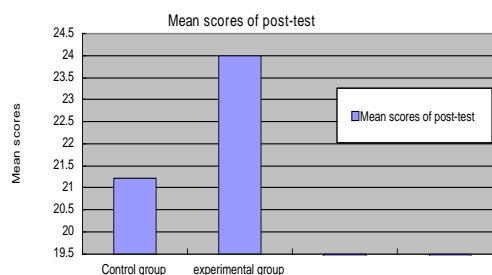


Fig. 2: Mean scores of post-test

Farkhunda et al; (2021): Effectiveness of Activity Based Learning in General Science at Elementary Level

This means the treatment produce an effect in positive direction. Thus we may say that 95 times out of 100 the gain is significant and activity based approach may be taken as a significant enhanced for science achievement of students. From the mean scores, it can be concluded that activity based approach enhanced the achievement of science than the ordinary method of teaching/learning process.

Discussion

The data was obtained from the scores of students on pretest and post-test. Experimental group shows better performance in science than that of control group whereas the experimental group receives the treatment which is teaching through activity based approach and control group does not received any treatment and is taught through ordinary method of teaching.

The scores of experimental group are better in all the stages of affective domain than that of control group. However, there is a marked difference of scores for receiving, organizing and characterizing based items of both groups than that of responding and valuing based items. Achievement in general science at primary level depends upon pedagogical techniques.

The mean scores of experimental group for post-test in the learning stages of receiving, responding, and valuing which was 27.86, 25.4 and 25.7 respectively and the respective t-values for these stages are 6.8, 4.2, and 6.6 which was quite greater than the critical table value of 't' and the mean scores of experimental group in organizing and characterizing stages which was 23.5 and 20.5 respectively and the respective t-values for these stages are 3.9 and 3.6 with $p < 0.05$ and $p < 0.01$ and p-values are 0.0003 and 0.0006 for both the stages. The

calculated 't' values for these stages is also greater than the critical table value of 't' but less than the other stages which was mentioned above. The findings show that there exists a marked difference between the mean achievement scores of experimental group which receives treatment of teaching through activity based learning and the mean achievement scores of the control group after teaching through ordinary method.

Activities are a significant feature of school-science in many countries. Science activities are essential in order to create a learning situation that encourages and challenges students to develop experimentally-based inquiry skills. Activities involve thinking, feeling and doing, and the science laboratory is a hub of interactions between these aspects. A high proportion of lesson time is given to activities, usually carried out by pupils working together in small groups (Hussain, Anwar, & Majoka, 2011).

The basic purpose of activities is to help learner develop links between domain of real objects/observable things and domain of ideas. In activities, the emphasis is more strongly on the domain of real objects and observable. The aim of the activities is to help learners to observe a phenomenon and to look at in more detail than theoretical knowledge and to remember it. Activities helps learner to learn a new concept and use of terms unrefined manner (Arnold and Millar). The main purpose of science activities in science education is to provide students with conceptual and theoretical knowledge to help them learn scientific concepts and through scientific methods, to understand the nature of science. Science activities also give the students the opportunity to experience science by using

Farkhunda et al; (2021): Effectiveness of Activity Based Learning in General Science at Elementary Level

scientific research procedures. Moreover, science activities should encourage the development of analytic and critical thinking skills and encourage interest in science.

Conclusion

There is a significant difference between activities based teaching/learning and ordinary teaching. The result of the study also indicates that there is significant difference between the mean scores of post-test on receiving, responding and valuing stage. The result of the study also indicates that there was significant difference between the mean scores of post-test of receiving stage, responding stage and valuing stage. This shows that activity based teaching enhances the higher order skills.

Recommendations

Following recommendations are suggested after the analysis of data obtained from this study which can be described as follows:

1. Activity should be suitable to the ability of children coming from different background.
2. Teacher should directly or indirectly guide the student to ensure enough freedom to do different activities.
3. Most of the activities of our life are based on sciences. Therefore, activity-based Incorporation of real life situation in classroom was found to be an effective way to inculcate problem solving ability in students.
4. The role of ABL is well acknowledged in the literature to develop Affective domain thinking skills. As this study is consistent with past findings, it is therefore, recommended that ABL should be adopted at all levels to teach

sciences in Pakistan.

5. The study should be replicated in all science disciplines.
6. Teacher must be equipped with the knowledge and skills of implementing activity-based approach in the school through pre-service and in-service program.

References

- Akhtar, M., & Saeed, M. (2017). Applying Activity Based Learning (ABL) in Improving Quality of Teaching at Secondary School Level. *Pakistan Journal of Educational* , 02(02), 37-47. Retrieved from http://pu.edu.pk/images/journal/PJERE/PDF-FILES/3-V2_no2_17.pdf
- Amuthavalli, & Sivakumar. (2014). Impact of Activity Based Learning on Learning Science at Primary Level. *Shanlax International Journal of Education*, 02(02), 60-69. Retrieved from http://www.shanlaxjournals.in/pdf/EDN/V2N2/EDN_V2_N2_009.pdf
- Anwer, F. (2019). The effect of Activity-Based teaching techniques on student motivation and academic achievement. *Journal of Education and Educational Development*, 06(01), 154-170.
- Celik, H. C. (2018). The Effects of Activity Based Learning on Sixth Grade Students' Achievement and Attitudes towards Mathematics Activities. *EURASIA Journal of Mathematics, Science and Technology Education*, 1963-1977.

Farkhunda et al; (2021): Effectiveness of Activity Based Learning in General Science at Elementary Level

- doi:<https://doi.org/10.29333/ejmste/85807>
- Ergul, R., Simsekli, Y., Calis, S., Ozdilek, Z., Gocmencelebi, S., & Sanli, M. (2011). The effects of inquiry-based science teaching on elementary school students' science process skills and science attitudes. *Bulgarian Journal of Science and Education Policy*, 04, 48-68.
- Hussain, S., Anwar, S., & Majoka, M. (2011). Effect of Peer Group Activity-Based Learning on Students' Academic Achievement in Physics at Secondary Level. *International Journal of Academic Research*, 03 (01), 940-944.
- Kuyate, P. (2019). A Study of Effectiveness of Activity-Based Teaching Method in the English Subject of Standard IV. *Educational Resurgence Journal*, 01(01), 46-52.
doi:<https://dx.doi.org/10.2139/ssrn.3512758>
- Noreen, R., & Rana, A. M. (2019). Activity-Based Teaching versus Traditional Method of Teaching in Mathematics at Elementary Level. *Bulletin of Education and Research*, 41(02), 145-159. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1229426.pdf>
- Patil, U., Budihal, S. V., Siddamal, S. V., & Mudenagudi, U. K. (2016). Activity Based Teaching Learning: An Experience. *Journal of Engineering Education Transformations*(Special Issue).
doi:10.16920/jeet/2016/v0i0/85433
- Thayniath, S. (2015). Activity Based Language learning in the classroom— An Effective Learning Method. *International Journal of English Language, Literature and Humanities*, 03(05), 33-40. Retrieved from <http://ijellh.com/papers/2015/July/03-33-40-July-2015.pdf>