



## INFLUENCE OF ACTIVITY BASED LEARNING ON ACADEMIC PERFORMANCE AT SECONDARY LEVEL IN DISTRICT MARDAN

AZMAT ALI SHAH<sup>1</sup>, ABDUL GHAFFAR<sup>2</sup>, AISHA MUNTAZIR<sup>3</sup>, SAQIB SHAHZAD<sup>4</sup>, FAHEEM AFSHAN<sup>5</sup>,  
SYED MUHAMMAD ABOUZAR<sup>6</sup> & DR. SUMERA IMRAN<sup>7</sup>

<sup>1</sup>Lecturer, Department of Education, Abdul Wali Khan University, Mardan

<sup>2</sup>Associate Professor, Department of Education, Abdul Wali Khan University, Mardan.

<sup>3</sup>PhD Scholar, Department of Education, Abdul Wali Khan University, Mardan.

<sup>4</sup>Associate Professor, Department of Education, Abdul Wali Khan University, Mardan

<sup>5</sup>PhD Scholar, Department of Education, Abdul Wali Khan University, Mardan.

<sup>6</sup>Chairman Sameem Orphan-Care Foundation, Khyber Pakhtunkhwa

<sup>7</sup> Assistant Professor, Department of Education, Women Campus, University of Malakand

### **Abstract**

*The study was basically experimental that examined the impact of activity-based learning on the academic achievement of physics student. Research questions of the study were to explore the effectiveness of activity-based learning? To analyze the effectiveness of activity based learning for teaching physics at secondary level? The study design was experimental and the population of the study was constituted of secondary schools in district Mardan whereas Government Boys Higher Secondary School Chamtar, Mardan was selected as a sample school for data collection and class 9<sup>th</sup> students were part of the sample. The sample was equally distributed in controlled and experimental group. The scholar developed pre-test and pot-test for the students. The tool was validated from experts and their suggestions were incorporated. Students test score were compared and mean standard deviation and t-test were applied. It was found that those students, who were taught via activity-based learning method, improved their academic performance. Therefore, it was recommended that science teachers have to be trained and motivated to use activity-based learning approach for teaching. Moreover, the school heads may help and support science teachers in teaching through activity-based learning.*

**Key Words:** Activity based learning, academic achievement,

### **INTRODUCTION**

Action-based learning or Activity based learning (ABL) is a method of education that involves students in the learning process (Prince, 2004). ABL is the process of instructing children of various ages in the same location at their own speed with the assistance of a teacher. Action-Based Learning (ABL) is a strategy that enables learners to consent to teachers' motivaton and encourage a child to study on his or her own terms based on skills and abilities. A wonderful example of how to teach children in a way that retains their attention and makes them feel comfortable is the Action-Based Learning approach. A discourse-based technique is a spoken review that informs students or prods them to consider a particular subject. The whole session is run by the school or college educators or teachers. In an Activity-based learning exhibiting approach, "understudies effectively take an interest in the gaining material as opposed to sit as detached audience members," (emphasis added) claim Harfield, Davies, Hede, Panko, and Kenley (2007). They cited an essay by Prince (2004) who made the case that an active learning system varies from a more conventional approach to teaching in two crucial respects. The first is full engagement from both shifts, and the second is a concentrated effort by students enrolled in undergraduate programs. Activity-Based Learning bases the whole process of learning on real-world problems and investigations, may assist students in converting abstract information into knowledge that has value. Suydam, Marilyn, and Higgins (2021) defined ABL as the learning experience in which the understudy is effectively connected with just doing or observing something being done. According to Harfield, Davies, Hede, Panko Kenley's (2007) argued that activity-based learning is an effective teaching strategy. Moreover, it was extended about ABL that manipulative materials are employed as frequently as feasible.

Activity-Based Learning occurs when children of various ages live together and learn at their own speed with the assistance of teacher-led activities (Bosworth, 2018). An approach called movement-based learning encourages self-learning and lets a toddler choose and choose what to study depending on his or her aptitudes and talents. Young people may improve at what they do through action-based learning, and they are welcomed into a mentoring framework. An address-based strategy is a spoken blueprint that is intended to demonstrate facts or a series of events on a certain subject. Teachers from a university or a school oversee the session.

According to Linton et al. (2014), middle school and high school students employ the Activity-Based Learning technique to learn. We became aware that replacements are still a dynamic component of this system when we discussed active learning within the classroom. A successful classroom education system benefits students' learning and aids in their development as learners. This approach is equally effective at demonstrating to new employees how to study and practice various inspections and exercises. In the history of scientific education, activity-based learning (ABL) has shown to be one of the most effective methods of instruction.

Academic learning is the method by which an individual arrives at his or her own findings and develops new concepts that are thoroughly grounded in historical knowledge. If the whole learning process in Activity-Built Learning is based on truthful meeting and discoveries, students will find it simpler to adapt the knowledge and report it their own way. Later, students can apply what they've learned in a variety of tasks and settings by themselves (Mayer, 2015).

According to Shah and Rahat (2014), when teachers lead their pupils in the appropriate direction, the pupils create and exchange fresh ideas with their various peers, aiding the pupils in keeping up with current events. Focuses have also demonstrated to us that research center questions provide students with significant open-ended inquiries that will link ideas and hypotheses that are being discussed in class and on written work. A materials research student's thought is erratic at any stage of their training without test work. The accuracy and testing of the materials research topic were strengthened by each action and examination in the lab. The teaching method known as "activity-based learning" (ABL) concentrates on the most crucial aspects of learning. Predictable learning is a type of instruction, and we connected students and instructors in the lab and classroom using the ABL principle.

### **Research Questions**

Following research questions to be followed in my research:

1. To explore the effectiveness of activity-based learning?
2. To analyze the effectiveness of activity based learning for teaching physics at secondary level?

### **Objectives of the Study**

I was interested in to examine the effects of activity-based learning in the ninth-grade physics course. The major goal of the study was to determine how activity-based learning affects students studying physics at the secondary school level at Government Higher Secondary School Chamtar, Mardan.

## **LITERATURE REVIEW**

Activity-based learning is becoming more popular in science schools. Observational evidence backs up the excess of movement-based learning and as a result educators gradually moved their attention to Activity Based Learning (ABL) methodologies (Brophy, 2011). According to the National Research Chamber, providing a hypothesis entails asking the questions, maintaining an eye on things, and regulating information in 1996. It necessitates figuring out how to apply and summarise what you've learnt rationally. For this to function, students must participate in several exercises. It is obvious that students participate passively in traditional teaching techniques, whereas they take on a working role in Activity-Based Learning (ABL). According to Chickering and Gamson (2016), these specific principles about learning and training are paralleled in the seven recommendations for excellent promoting practise in undergrad education.

Learning is the acquisition of new information, knowledge, skills, habits, characteristics, preferences, or understanding. It also integrates subjective, natural experience and affects to assist

individuals in learning, improving their abilities, and seeing things from a fresh perspective (Illeris & Kund, 2000). This requires that the pupil understand what they have to know. Students must perform lab work to confirm their hypotheses and learn more in order to fully grasp science, in addition to reading or listening about it (Ewers, 2001).

One of the new initiatives being utilised to make institutions more "student-focused" or "having to learn" is movement-based learning (Weimer, 2002). The instruction reading is replaced in this action learning technique with cards that are arranged according to the text book modules. Cards feature several lessons where the primary topic is covered, the theme is mastered in its entirety, and the subject is put to the test via examinations. Each of these cards information is placed in groups of successes, and these successes are divided into four categories. A symbol is used to indicate each stage inside the achievement, and each component of the achievement is coloured.

The constructivist objectives of action-based learning include teaching students how to collaborate and providing them with access to resources that are data-rich. The organisation of the activities is viewed as the foundation of the way the course is delivered, allowing students the opportunity to "learn through doing" (Macdonald & Twining, 2002). Studies have demonstrated that the usual lecture-based setting, when students sit quietly and the instructor makes a speech to them to teach them science. According to Akhtar and Saeed (2017), the objective is to increase students' connections to both the subject matter and one another.

### RESEARCH METHODOLOGY

The study's research design was experimental. A "pre-test, post-test" method with two groups—the experimental and the control group—was employed for this investigation. In this approach, tests were administered before and after treatment to randomly selected groups (experimental and control). The pre-test and post-test were administered to both groups. It's an excellent technique to design an experiment since it ensured that there weren't any internal faults thanks to randomly assigning, a pre-test, and the existence of a control group.


All the science students of secondary schools Mardan studying Physics at 9th grade constituted the population. Government Higher Secondary School Chamtar, Mardan was chosen as the sample school, and 60 science students were chosen at random to be part of the study. From the sample, groups of 30 students were chosen at random to be the control group and the experimental group). It was experimental research, and the subjects completed pre- and post-tests. An MCQ-style writing test was created to collect data. The pre-test was created using Bloom's taxonomy and the first 4 chapters of ninth-grade physics. The 50 questions contained ten questions from each sub-level of Bloom's taxonomy. For the previous four post-tests, the same procedure had been utilized. The test sets were fixed in stone following item analysis.

### RESULTS

The students within the group that participated in activity based learning classes had higher mean interest levels, as can be shown in Table 1 by comparing the mean interest scores of the two groups before and after the exam. The two groups' mean post-test results also differ, with both the hands-on activity-based group performing better. This suggests that students were more interested in learning about physics through hands-on exercises than through discussion groups.

**Table 1.** Physics result in Public and Private Schools in controlled and experimental group.

S.NO	Private School Result		S.NO	Public School Result	
	Traditional Method	Activity Based Method		Traditional Method	Activity Based Method
01	30	39	01	22	18
02	31	37	02	31	24
03	40	38	03	23	35
04	20	19	04	33	37



05	40	39	05	20	32
06	42	38	06	30	28
07	31	40	07	24	32
08	20	30	08	42	31
09	42	52	09	35	27
10	29	35	10	21	19
11	20	30	11	31	28
12	40	38	12	32	28
13	33	29	13	22	20
14	20	18	14	26	15
15	25	33	15	31	27
16	39	31	16	29	31
17	46	37	17	23	37
18	32	30	18	42	33
19	26	31	19	37	30
20	29	38	20	31	31
21	35	22	21	40	29
22	36	40	22	41	41
23	46	27	23	47	32
24	26	32	24	30	28
25	30	40	25	27	35
26	28	39	26	41	28
27	43	31	27	38	40
28	40	38	28	26	33
29	26	25	29	29	29
30	39	39	30	34	36

**Table 2:** Comparison of activity-based learning in physics facilities in public and private schools

Factors	School Type	N	Mean	Std. Deviation	T	Sig. (2-Tailed)	Effect Size
Activity Based Learning	Public	30	34.25	5.24	4.06	.000	.976
	Private	30	35.67	5.73			

The results of the ANCOVA tests in Table 2 demonstrate a significant difference in people's levels of interest in discussion-based instruction and hands-on activity-based instruction, favoring the former. The study investigated how physics interest among high-school physics students is impacted by practical experiences. A hands-on learning approach to teaching was the independent variable. The hands-on exercisers and the conversation approach group had average interest scores that were 13.06 apart. This indicated that the group doing hands-on activities shown greater interest than the group using the discussion technique. The outcome of hypothesis one revealed a substantial difference between students who learned physics through talks and those who learned it through hands-on activities in terms of their average interest scores. This distinction favored the practical exercises.

**Table 3:** Students taught physics using Activity-Based Method and Traditional Method.

Factors	N	Mean	Standard Deviation	T	Sig. (2-tailed)	Effect size
Activity Based Method	30	35.42	5.17	4.739	.000	1.040
Traditional Method	30	34.97	4.98			

The table illustrates that the total number of the participants were thirty in the study whereas the mean score for activity based method was higher than traditional method. The table explains that even the figure of standard deviation for activity based learning is higher than traditional method that shows that activity based method has a significant impact on students' results as compared to traditional method of teaching.

### DISCUSSION

In many aspects, activity-based learning (ABL) is more effective than traditional teaching methods. Students' capacity to think is enhanced by this kind of instruction. These facts were put together by many scholars. But it's crucial to keep in mind that without labs, instructors cannot instruct all of their pupils on physics. As a result, "activity-based learning" is a technique used by educators and students in classrooms. Students apply what they have learnt in the classroom by engaging in activities and experiments in the labs. Students can participate in activities and experiments since this technique centers on the student. A learner uses both his and her intellect and body to study in this manner. Learning by doing is a business where students gain knowledge by performing experiments and other tasks associated with their study.

According to Omosewo (2016), instructional approaches like the lecture style do not yield the same benefits as active learning that involves students in hands-on activities. Activity-based learning is a fantastic technique to pique students' interest in physics and also aids in making physics' abstract concepts more tangible. This keeps pupils engaged and helps them remember what they have learned. The fact that male students were somewhat more fascinated by physics than the female counterparts was one of the study's most significant findings. This variation was statistically noteworthy. No of their gender, physicists are interested in physics. This indicates that physics has always piqued the curiosity of girls more than of boys. This contradicts what Adewale (2013) discovered. This goes against what Adewale (2013) found, which was that girls were more interested in physics than boys. In Pakistan, the private sector emerged as a significant provider of educational services as during 1990s and 2000s, both independently and in comparison, to the state sector. By providing students and instructors with a better learning environment, private schools not only help eliminate illiteracy but also help students and teachers achieve higher levels. The private sector made significant contributions to eliminating illiteracy in advanced economies. Private schools can improve Pakistan's educational standards if they are well-managed.

Most people consider education, particularly basic education, to be a public service that must be offered to everyone, regardless of capacity to pay, and that is primarily the responsibility of the government. This was the rationale behind the government's takeover of all schools in 1972, which harmed the function of the private sector, particularly after the elementary stage. However, like with other services, governance, quality, and efficacy have made it difficult for the government to offer decent education. Perhaps it would be preferable for the government to invest its funds in improving the existing schools rather than creating new ones. Building new schools to improve children's education opportunities must be left to the private sector. The government should instead concentrate on enhancing the facilities and faculty of the existing institutions. By doing this, the bar for private schools will likewise climb, making education more accessible and superior.

### CONCLUSION

Based on the findings presented above, it was determined that activity-based instruction aided in the cognitive development of secondary level physics students. The ABL teaching approach is more effective in fostering the growth of higher-order thinking abilities in children. There is a substantial difference between the mean knowledge and understanding scores of the Experimental Group and the Control Group, despite the fact that the Experiment Group's mean scores are higher. As a result, ABL is more effective in developing higher-order thinking abilities (such as application, synthesis, and analysis) than lower-order thinking abilities (knowledge and comprehension).



## RECOMMENDATIONS

The recommendations are made on the basis of the results obtained from the analysis of the data. It was found that an activity-based learning strategy engages more students, makes instruction more enjoyable, and facilitates understanding and application therefore teachers are suggested to apply activity based learning strategy in their classes. Moreover, science teachers have to be trained and motivated to use activity-based learning approach for teaching. The significant positive change in the results suggests that the teachers maybe encouraged and supported by the administrators to apply ABL in their respective classes. Numerous studies have demonstrated that activity-based learning enhances higher-order cognitive abilities. It is advised that ABT be used to teach physics at the secondary level in Pakistan because this study supports previous findings. It is suggested that the study may be replicated for other subjects as well.

## REFERENCES

- [1] Adewale (2013), *A theoretical and experimental study of the Broyden-Fletcher-Goldfarb-Shano*
- [2] (BFGS) update Vol.6(1), 2016
- [3] Akhtar, M. & Saeed, M. (2017). *Applying Activity Based Learning (ABL) in Improving*
- [4] *Quality of Teaching at Secondary School Level. Pakistan Journal of Educational Research and Evaluation*, 2(2), 37-47.
- [5] Bosworth, K. (2018). *Developing collaborative skills in college students. New Directions for*
- [6] *Teaching and Learning*, 1994(59), 25-31. doi: 10.1002/tl.37219945905
- [7] Brophy, S. P. (2011). *Computer partner in the classroom: Fostering small group problem*
- [8] *solving. Proceedings from the Computer Support for Collaborative Learning 1995 Conference.*
- [9] Chickering, A. W., & Gamson, Z. F. (2016). *Development and adaptations of the seven*
- [10] *principles for good practice in undergraduate education. New Directions for Higher Education*, (80), 75-81.
- [11] Edward, N.S. (2001). *Evaluation of a constructivist approach to student induction in relation to*
- [12] *students' learning style. European Journal of Engineering Education*, Vol. 26(4) 429-440.
- [13] Ewers, T. G. (2001). *Teacher-directed versus learning cycles methods: effects on science*
- [14] *processs kills mastery and teacher efficacy among elementary education students. Dissertation Abstracts International*, 62(07), 2387A (UMI No. AAT3022333).
- [15] Harfield, T., Davies, K., Hede, J., Panko, M. and R. Kenley, R. (2007) *Activity-Based Teaching for*
- [16] *Unitec New Zealand Construction Students, Emirates Journal for Engineering Research*, 12 (1), 57-63 (2007)
- [17] Illeris, Knud (2000). "Learning Theory and Adult Education," *Adult Education Research*
- [18] *Conference.*
- [19] Linton, D.L., Pangle, W.M., Wyatt, K.H., Powell, K.N., & Sherwood, R.E. (2014),
- [20] *Identifying key features of effective active learning: The effects of writing and peer discussion. Cell*
- Physics Education*, 13(3), 469-477. doi: 10.1187/cbe.13-12-0242
- [21] Macdonald, J., & Twining, P. (2002). *Assessing activity-based learning for a networked course.*
- [22] *British Journal of Educational Technology*, 33(5), 102-107.
- [23] Mayer, R. E. (2015), "Cognitive, Metacognitive, and Motivational Aspects of Problem
- [24] *Solving." Instructional Science*, 26, 49-63
- [25] Omosewo (2016) *Effects of Instructional Materials on Secondary Schools Students' Academic*
- [26] *Achievement in Social Studies in Ekiti State, Nigeria Vol. 6, No. 1; 2016*
- [27] Prince, M. (2004). *Does active learning work? a review of the Research* . 03 Jan, 2012.
- [28] Shah, I., & Rahat, T. (2014). *Effect of Activity Based Teaching Method in Science.*
- [29] *International Journal of Humanities and Management Sciences*, 2320-4044.
- [30] Suydam, M. N, & Higgins, J. L. (2021). *Activity based learning in elementary school*
- [31] *mathematics: Recommendations from Research. ERIC Information Analysis Center for Science,*
- Mathematics, and Environmental Education, Columbus, Ohio.*
- [32] Weimer, M. (2002). *The Impact of a Teacher Training Program on Mathematics Teaching*
- [33] *Methodologies: Using Student-centered Learning vol. 4, No. 14, 2016, pp 992-998. doi:*
- 10.12691/education-4-14-2*