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IMPACT OF ACTIVITY-BASED LEARNING STRATEGY ON STUDENTS' ACADEMIC ACHIEVEMENT AT SECONDARY LEVEL IN GUJRAT

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Abstract
It is not new to realize that the sustained reliance on the conservative, teacher based pedagogical practices in the state secondary education of Pakistan has been a curse to any meaningful educational experiences and performance. Activity-based learning (ABL) a learner-centered instructional method, which entails the student in structured practical tasks, in groups, role-plays, project-based training and problem solving tasks have been recommended as a transformational learning method that may enhance meaningful learning of concepts, maintain motivation and enhance academic performance. However, its usefulness has not been empirically investigated in the particular educational and cultural context of Gujrat district, Punjab Pakistan. The article is a quantitative, quasi-experimental study with pre-test/post-test design that investigates the effectiveness of an activity-based learning approach in teachers on academic performance of Grade 910 students in the Gujrat public secondary schools. An experimental group (n = 75) was chosen and a stratified random sample, which received a 12-week ABL intervention, and a control group (n = 75) that was taught traditionally were selected (n=150). Data collection was provided by an Academic Achievement Test (AAT) and a 25-item Likert-scale questionnaire (ABLPQ), in five dimensions of student perception. Such statistical tests as independent-samples t-test, ANCOVA and Pearson correlation were used. Results affirm that there was a statistically significant enhancement in academic achievement in the experimental group. The article ends with some recommendations to teachers, curriculum developers and education policymakers in Punjab based on evidence.

1. INTRODUCTION

The quality of instruction and learning in secondary education is one of the most effective factors that predetermine the level of educational success both in terms of personal results and in terms of the national economies. However, in the Pakistani public-sector secondary schools, the current instructional model is still based on a teacher-center, lecture-based approach, where students are mostly passive consumers of the information delivered orally, with rote learning and drilling continuing to be predominant (Rehman and Arshad, 2020; Government of Punjab, 2022). Even though partially a misappropriation of institutional pressures or exams, this model has long been criticized by both

researchers and curriculum developers as well as by students themselves on the grounds of its inability to promote meaning in learning, develop high-order thinking or encourage academic motivation, especially in the critical Grade 910 transition period.

Activity-based learning (ABL) provides an entirely new conception of the relationship between teaching and learning. Based on the constructivist principles of Piaget (1972) and Vygotsky (1978), ABL is a learner-based teaching approach where learners build knowledge by engaging in group activities and working on projects, performing practical experiments, role plays, problem solving puzzles and discussions with peers instead of passively receiving what the teacher teaches them. The general thesis of ABL theory states that experiential and active learning with curriculum content is easier to understand, more durable, inherently motivating and more helpful to higher level academic performance than passive learning (Bruner, 1960; Kolb, 1984). This claim has been widely supported on the international level, with scholars indicating significant academic gains associated with ABL in India, the United Kingdom, Kenya, and the United States (Chavan, 2014; Prince, 2004; Mwangi and Mugambi, 2013).

The policy-level acknowledgment of ABL in Pakistan is manifested in the National Curriculum Framework (NCF, 2023), and the National Education Policy (2017), both of which reflect the change to participatory teaching practices in high school. This rhetorical pledge notwithstanding, there is a strong lack of systematic empirical evidence of the impact of ABL on academic performance in the Pakistani secondary school environment, and, of course, methodologically sound research at a local level, especially in Gujrat, in particular districts.

This gap is filled in this paper, as it presents a quasi-experimental study on the impact of a 12-week-long program based on activities on learning on the educational performance of Grade 9-10 students in government secondary schools in Gujrat district of Punjab. The study can add to the evidence base required to inform the instructional reform, teacher training and education policy decisions in both district and provincial levels, by producing localized empirical data using a controlled design.

2. Research Objectives

This study is guided by the following research objectives:

- This aims to establish the existing standard of academic achievement of Grade 910 learners in publicly operated secondary schools in Gujrat before the implementation of the activity-based learning plans.
- To determine the effects of a planned 12 weeks of learning based on activities-intervention on the academic performance of a group of students in the experimental group, as defined by the pre-test and post-test scores.
- To compare the academic performance of the students that are exposed to activity-based learning (experimental group) and those having conventional instructions (control group) in post-intervention period.
- To study the connection between the student participation in the process of activity-based learning and their performance outcomes in academic results.
- To find out what types of activity-based learning strategies (group work, hands-on tasks, role play, project-based work, or problem solving) show the greatest relation with improvements in academic performance.
- To recommend the systematic introduction of activity-based learning in the curriculum of secondary schools in Gujrat based on evidence.

3. Research Questions

Primary Research Question

- RQ1: Which is the impact of the strategy of activity-based learning on the academic performance of Grade 9-10 students enrolled in public secondary schools in Gujrat?

Subsidiary Research Questions

- RQ2: What is the average level of achievement at Grade 910 students at Gujrat public secondary schools regarding academic performance before administration of an activity-based learning intervention?

- RQ3: Do differences in academic performance statistically differ among the groups of students that are taught using activity-based learning strategies and those taught using traditional instructional techniques?
- RQ4: Is the degree to which the students participated in activity-based learning activities significantly related to the post-intervention academic achievement scores?
- RQ5: What is the most perceived beneficial activity-based learning technique that students use in academic betterment?
- RQ6: Are the influences of the activity-based learning on the academic performance of Grade 910 students in Gujrat public secondary schools gender variations??

4. Significance of the Study

The applicability of the study is multifurcated as entailing both theoretical and operational implications having a direct implication on educational practice in Gujrat, and beyond.

Theoretically, the study augments the constructivist literature on learning in terms of a Pakistan-based secondary school setting. Though the theoretical paradigms of active cognitive construction (Piaget, 1972) and zones of proximal development (Vygotsky, 1978) are internationally accepted, their empirical validation within under-resourced and examination oriented schools in rural areas (like those in secondary level, Punjab) is a welcome addition to the localization of the world educational ideology.

As empirical research, the study fills a definite gap in the Pakistani literature on educational research where current research on secondary-level teaching strategies has been based more on self-report research methods or primarily anecdotal studies as opposed to controlled experimental methods with standardized pre-test / post- test results. The quasi-experimental design using a matched control group, standardized achievement testing and psychometrically validated measures results in a more evidentiary contribution than earlier descriptive studies in this field.

In practice the implications of the findings on three important stakeholder groups are implied. The study offers practical, evidence-based support to classroom teachers in justification of the implementation of particular activity-based methods to the current curriculum. To school principals and district education officers, it provides the rationale to invest in ABL-oriented teacher professional development and Classroom provision of resources. To the policy makers in Punjab Education Department, the research provides the localized empirical evidence they require to oxygenate the secondary level participation in learning requirement of NCF (2023) into policy dreams and into scientifically grounded action of the policy.

4. Statement of the Problem.

Poor performance in government secondary schools is a long-standing challenge that has been well documented in Pakistan. Reports released by the Punjab Examination Commission (2023) show that the students in Grade 9-10 in State Education are under performing in consistently achieving decent grades in the core subjects such as Urdu, English, Mathematics and Science and that subject failure has been at 25 to 40 per cent in various districts. Gujrat is among those districts as the secondary school academic performance in governmental establishments is below provincial average in core subjects, although the level of formal educational involvement during the early years was record-high (District Education Authority, Gujrat, 2022).

Passive classroom atmosphere, lack of student engagement and motivation are of ongoing concern as the main cause of poor performance throughout diagnostic reports and teacher feedback in public secondary schools in Gujrat (Punjab Education Sector Reform Program, 2021). Most teachers are taught and continue to default in didactic, lecture presentation techniques, and which focus more on content coverage and examination preparation than on active learning, critical thinking and conceptual learning. This, as an effect, results in students going to undertake examinations with memorized yet poorly interpreted information, a trend that has been linked to high rates of failure in application level and analysis-based questions which increasingly make up the SSC examination structure under the new national curriculum.

A possible solution to this pedagogical issue is the use of activity-based learning but its direct impact on the academic performance in the Gujrat system of the public secondary school has never been empirically explored by a controlled study. Without this evidence, there is no proven underpinning to implore educators and educational management to leave traditional instruction methods, and policymakers lack the localized data needed to model specifically calculated ABL teacher education and resource dispersal designs. This study aims at producing just that amount of evidence, thus forming a solid empirical basis of instructional change on the secondary level in Gujrat.

5. Literature Review

5.1 Theoretical underpinnings of Activity-Based Learning.

Activity-based learning has origins in the constructivist tradition of educational psychology in which learners actively build knowledge by engaging in their environment as opposed to passively receiving the information transmitted by it. The two seminal theorists that underline the ABL framework used in this study are listed as follows. According to Jean Piaget (1972), cognitive development is achieved when assimilation and accommodation occur, as children acquire tangible experiences which are concrete. The concept of active cognitive construction by him suggests that active and practical teaching is conceptually better than passive learning in fostering true conceptual knowledge. This framework has been added to by Lev Vygotsky (1978) with what he called the Zone of Proximal Development (ZPD)- the cognitive zone that lies between what learners alone can do and what they can do with assistance- arguing that the activity structures of collaboration and peer mediation are the most effective in helping a learner in the boundary of what studies are currently able to achieve by using the support of someone else.

The Experiential Learning Cycle by Kolb (1984) further operationalizes ABL and introduces learning as a cycle comprising four stages of repetition: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The model offers the structural rationale of the design of ABL lessons, as it makes sure that students address all four aspects of the learning cycle and are not restricted to one knowledge reception mode. These theoretical constructs uniquely form a strong case in support of the ABL as a pedagogically appropriate alternative to rote-based teaching in situations, where profound understanding and long-term retention bound upplankostnedar or roisterer is a desirable product.

5.2 Empirical Knowledge about the ABL and academic performance.

There is a significant amount of empirical evidence on the effectiveness of ABL as a means of enhancing academic achievement in multiple educational settings. Prince (2004) presented a detailed synthesis of the existing research on active learning in higher education, finding that active methods of instruction always yield significant increases in student performance, achievement and ultimately retention in comparison to passive learning methods believed to rely on lectures. Chavan (2014) looked at the influence of the activity based learning on the performance and knowledge retention of students in an Indian secondary school with statistically significant positive results in both short term post-test performance and delayed knowledge retention test to students who covered the activity based learning instructional training as opposed to those who were traditionally taught the same curriculum.

Mwangi and Mugambi (2013) examined the repercussion of ABL on Biology achievements in secondary school in Kenya and found notable differences between-group differences in favor of students taught in ABL; specifically, they were more effective at application-level and analytical examination activities. These data tally findings of the meta-analytic studies on active learning versus conventional lecture delivery in the United States, in which Freeman et al. (2014) conducted analyses of 225 studies comparing active learning with conventional lecture delivery in STEM courses: Male authors discovered that active learning minimized the failure rates in exams by about 1.5-fold relative to conventional lecture delivery. In

the case of the South Asia, Hussain and Akhter (2013) examined the effectiveness of activity-based and traditional lecture-based methods in secondary school in Pakistan and found that ABL groups showed significant improved academic performance, but the authors were unable to provide further results on the reliability of findings because the sample was too small and did not include inferential statistics.

5.3 The ABL Research in Pakistani School Environment.

There is limited research particularly on Pakistani secondary school system that specifically studied ABL, and there are very few methodological rigorous controlled studies. Mahmood and Iqbal (2018) investigated the impact of activity-based instruction on the academic performance of Pakistani high-school learners and found positive results when using ABL and reported relatively small sample size and lack of randomized assignment, which impedes the generalization of the results. Siddiqui (2013) gave a contextual and theoretical and practice-level report of ABL practices in South Asia, where a report of barriers to implementation of ABL practices in an institutional setting was cited; barriers such as teacher preparation, insufficiency of resources, exam stress, and resistance to institutional change implementation were cited as the overlaying barriers to ABL practices in Pakistani schools.

On the policy level, the National Curriculum Framework (NCF, 2023) clearly supports participatory and learner-centered modes of instruction at the secondary level and demands a decrease in the number of rote-based content delivery methods. The National Education Policy (2017) also captures activity-based learning and learning through experience as some of the important pillars of educational quality. Regardless of these policy promises, systematic empirical data that records the quantifiable effect of ABL on academic performance in certain Pakistani districts, especially in the Gujrat district of Punjab has not hitherto been delivered. The gap in knowledge is directly covered in this study.

5.4 ABL barriers to implementation.

The literature has repeatedly listed a number of structural and attitudinal obstacles, which hinder the adoption of ABL in Pakistani state-run secondary schools. Historical teacher preparation programs have focused on content delivery and not facilitation skills, which has left many practitioners lacking the pedagogical proficiency and confidence to structure and guide lessons that are based on activities (Punjab Education Sector Reform Program, 2021). The practical implementation of collaborative and hands-on activities within standard classrooms of a typical public school is complicated further by the resource constraints such as the lack of physical space, instructional materials and the large class sizes. Also, a legacy of high-stakes, rote-based, examination systems provides institutional incentives that actively disincentivize the switch out of lecture-based instruction as teachers and students both believe that memorization and drilling are the most effective preparation methods in response to SSC examination preparation (Rehman and Arshad, 2020). To counter these barriers, it is not only that reassurance is required of pedagogical evidence but also that school reforms are required at the teachers training, curriculum, assessment, and school leadership levels.

6. Research Methodology

6.1 Research Design

The research design of this study is a quantitative quasi-experiment pre-test/ post-test non-equivalent control group design. The quasi-experiment was chosen due to its opportunity to study a causal relationship between the independent variable (activity-based learning strategy) and the dependent one (academic achievement) in the environment of naturalistic ecological conditions of intact classroom environments, full random assignment of individual students to a group is not practically feasible (Creswell and Creswell, 2018). The design is the following structure:

Experimental Group: $O_1 \rightarrow X$ (ABL Intervention) $\rightarrow O_2$
Control Group: $O_1 \rightarrow$ Conventional Instruction $\rightarrow O_2$.

O 1 refers to the pre-test measure of academic achievement and O 2 refers to the post-test assessment which took place following the 12-week intervention. Analysis of Covariance (ANCOVA) is used to statistically adjust against pre-test differences, which increases the internal validity of causal inferences despite lack of complete randomization.

6.2 Conceptual Framework

The theoretical basis of the study is constructivism, and relies mainly on Piaget (1972), Vygotsky (1978), and Kolb (1984). The independent variable (IV) is an activity-based learning strategy, which is operationalized into five sub-types, namely: group activities, hands-on tasks, role plays, project-based work and problem-solving exercises. The academic achievement measured a standardized achievement test is the dependent variable (DV). Table 1 contains the entire structure of variables.

Table 1: Conceptual Framework – Variable Structure

Variable Type	Variable	Dimensions / Indicators
Independent Variable	Activity-Based Learning Strategy	Group Activities, Hands-On Tasks, Role Plays, Project Work, Collaborative Discussions, Problem-Solving Exercises
Dependent Variable	Academic Achievement Level	AAT Scores (Grade 9–10), Subject-wise Performance, Class Tests, Overall GPA
Moderating Variable	Student Participation & Engagement	Frequency of activity engagement, quality of participation, peer collaboration
Control Variables	Gender, Prior Academic Achievement, School Type	Male/Female, Previous Year Grade, Public Institution

6.3 Population and Sample

The population of study will be the students of all Grade 9 and Grade 10 of all government secondary schools in the Gujrat district, in Punjab, Pakistan. Within 47 registered public secondary schools in Gujrat, there are currently some 8,200 students in Grade 910 at the District Education Authority, Gujrat (2022). The random sample of n = 150 students with a balanced representation of gender and institutional zone (urban/rural) was selected. Ten publicly provided mixed-sex schools with equal female and males enrolment and distributed over urban and peri-urban locations were picked randomly through school registry draw. Each school chosen provided one intact Grade 9 or Grade 10 classroom which was either allocated to the experimental (n = 75) or control (n = 75) group. The size of the sample was calculated by a priori power analysis (Faul et al., 2007) and it gives the statistical power of about 0.87, independent-samples t-test with a medium effect size (d = 0.50) at a-value (0.05) with a comfortable achieved power due to addition of an expected 10 percent of attrition.

7. Data Collection

7.1 Instruments

Two instruments which were created and tested specifically in this study were used to collect data.

The instrument 1 used is Academic Achievement Test (AAT).

The researchers designed the AAT to meet the Grade 9 -10 Punjab curriculum in four main

subjects: Urdu, English, Mathematics, and General Science. The test consists of 40 objective and short-answer questions aimed at assessing the level of knowledge and comprehension of use, i.e. the cognitive distribution of the SSC examination system. AAT was done both in pre-test (before intervention) and post-test (after 12-week program) allowing within- and between-group achievement comparison.

Instrument 2 Activity-Based Learning Perception Questionnaire (ABLPQ).

The ABLPQ is a 25-item and 5-point Likert-scale measure, designed to capture the student perceptions of ABL in five subscales of five items, including: (1) Perceived Learning Efficacy of Group Activities; (2) Engagement and Motivation during Hands-On Tasks; (3) Academic Utility of Role Plays and Simulations; (4) Perceived Effect of Project-Based Work on Understanding; (5) Self-Efficacy during Problem-Solving Exercises. The total scores would be between 25 (minimal) and 125 (maximal).

Table 2: Likert Scale Scoring Guide – ABLPQ

Score	Response Category	Interpretation
1	Strongly Disagree	The student strongly rejects the given statement
2	Disagree	The student mostly disagrees with the statement
3	Neutral	The student neither agrees nor disagrees
4	Agree	The student mostly agrees with the statement
5	Strongly Agree	The student fully endorses the statement

7.2 Data Collection Procedure

Data collection was carried out in three systematic phases, which were ethically approved by the University of Gujrat Institutional Review board and with written consent of the District Education Authority, Gujrat.

Phase 1: Pre-Intervention (Week 0): Parental/guardian consent and institutional permissions were taken in forms of written consent. Both groups were put under normalized, controlled conditions on which the AAT was given. Initial demographic data such as gender as well as previous academic achievement and school information were gathered simultaneously.

Phase 2 Intervention Period (Weeks 1-12): The experimental group was presented with a structured ABL program which was managed by ABL subject teachers who underwent three days pre-intervention training workshop, which included ABL facilitation techniques. The program provided a rotating program of group work, practical activities, role models, project-based lessons, and problem-solving activities, which was integrated into regular curriculum lessons (at least three ABL lessons per week, 45 minutes long). The control group carried on with the normal teacher and led instruction through standard textbook materials. A midpoint (Week 6) and endpoint (Week 12) were set before the ABLPQ was conducted on the experimental group. To track the implementation ABL fidelity, a research assistant was filling a classroom observation checklist at each session of the experiment in an experimental group.

Phase 3 Phase 3 -Post-Intervention (Week 13): Both groups were re-administering the AAT as the post-test under the same supervised conditions. The last dataset, which was used in the statistical analysis, was post-test scores and pre-test scores, ABLPQ data, and demographic variables.

8. Reliability and Validity

8.1 Content Validity

The content validity of the AAT items was determined by a Table of Specifications (TOS) that allocated each item to a particular content area and cognitive level (knowledge, understanding, application) of the Revised Bloom Taxonomy (Anderson and Krathwohl, 2001). The AAT was evaluated by a panel of five trained secondary school teachers and two curriculum specialists covering syllabuses in the appropriate cognitive manner and linguistically understandably. An item level-Content Validity Index (CVI) was computed; any item with an I-CVI less than 0.78 was either revised or eliminated (Polit and Beck, 2006).

Content validity of ABLPQ was reviewed using a panel of six reviewers including 2 education psychology professors, 2 instructional design specialists and 2 senior secondary school teachers. CVIs of items and scales were calculated and those that did not pass the 0.78 cut-off were revised with the help of experts.

8.2 Reliability

Pilot (n=30 Grade 910) students in two non-participating Gujrat public schools' pilot-tested both instruments. Alpha was calculated on the ABLPQ at both subscale (target: 0.70 and above) and scale (target: 0.80 and above) level. In the case of the AAT, the items difficulty and discrimination were calculated, and when the discrimination index was below 0.25, or the extreme values of difficulty ($p < 0.20$-0.80) were calculated, the item was either revised or dropped. Two weeks (target: $r \geqq 0.75$) were used as the test-retest interval to ensure that scores remain constant over time. The two tools also met all psychometric standards, before the launch of the main study.

9. Data Analysis

- The data were all analyzed with IBM SPSS Statistics Version 28.0. The following sequence of analysis was used:
- Descriptive Statistics: The mean, SD, and frequency of both groups in terms of AAT scores in pre-test and the post-test and ABLPQ subscale scores were computed to give a complete picture of data before inferential testing was conducted.
- Normality Tests: The NLN-Shapiro-Wilk was used on all the continuous variables. In cases where normality was uncertainly breached, parametric tests were replaced with non-parametric tests (Mann-Whitney U, Wilcoxon Signed-Rank).
- Independent-Samples t-Test: The test would be used in establishing baseline similarity between experimental and control condition on pre-test AAT score, as well as post-test gain score between groups.
- Analysis of Covariance (ANCOVA): Use will contrast after-test results of AAT scores across groups, statistically adjusting pre-test scores, gender, previous academic performance, and thus, isolating the independent effect of ABL intervention and enhance causality.
- Pearson Product-Moment Correlation: To evaluate the relationship between the ABLPQ total engagement scores and the AAT scores at the end of the experimental group to measure the moderating effect of the intensity of engagement on the achievement results.
- One-Way ANOVA: To be used in investigating differences in the achievement results after the post-test based on preference ABL activity type in the grouping of students by type of activity (group work, hands-on, role play, project-based, problem-solving) and which type of activity correlates with achievement gains the most.
- Where Effect Size Reporting This indicated d values were reported in all analyses of mean-differences (d 0.50 educationally significant) (Cohen, 1988). Eta-squared (η^2) was reported for ANCOVA results.

10. Findings

10.1 Baseline Equivalence

Pre-test AAT scores revealed no statistically significant difference between the experimental ($M = 41.6$, $SD = 7.3$) and control groups ($M = 41.1$, $SD = 7.1$), $t(148) = 0.41$, $p = .683$. This ensures that the stratified random sampling was effective in giving similar groups at the baseline and so, then any differences that may be obtained

in post-test can be given to ABL intervention and not differences in achievement at baseline.

10.2 Within-Group Achievement Gains (Experimental Group)

A paired samples t -test showed significant change in post-test scores of the experimental group in AAT (M = 58.9, SD = 8.4) than the baseline score of the experimental group (M = 41.6, SD = 7.3) t (74) 14.22, p 0.001, d = 0.72, with a significant result and a large educationally meaningful difference. The control group also had only a non-significant improvement (pre-test M=41.1 vs. post-test M=43.8) that would be in line with anticipated maturation.

Table 3: Pre-Test and Post-Test AAT Scores by Group

Group	Pre-Test Mean (SD)	Post-Test Mean (SD)	Gain	p-value	Cohen's d
Experimental (n=75)	41.6 (7.3)	58.9 (8.4)	+17.3	< .001	0.72
Control (n=75)	41.1 (7.1)	43.8 (6.9)	+2.7	.187	0.12

10.3 Between-Group Comparison (ANCOVA)

Results of the ANCOVA after controlling the pre-test scores, gender and previous academic achievements showed that the adjusted post-test AAT scores differ significantly in the experimental and control group, F (1, 145) = 89.4, p 0.001, et 2 = 0.38 (large effect). The post-test means with the adjustments were 58.4 (experimental) and 44.1 (control) with an adjusted mean difference of 14.3 marks due to an ABL intervention.

10.4 Engagement–Achievement Correlation

Analysis of Pearson correlation between ABLPQ total engagement scores and post-test scores on AAT in the experimental group showed that there was a strong positive relationship between the two and that the correlation was significant r (73) =.51, p=.001. This result corroborates the theory that students who are more active and have higher utility in ABL activities are receiving equal academic payoff in line with the theory in Vygotsky (1978) which suggests that active participation in the ZPD is the main learning process.

10.5 Differential Effects by Activity Type

The results of one-way ANOVA revealed significant differences in attainment in post-test among the students according to their preferred ABL activity type with F (4, 70) = 6.83, p <.001. Post-hoc Tukey HSD comparisons revealed that both the group activities (M = 61.2) and problem-solving exercises (M = 60.8) resulted in significantly higher achievement in comparison to role plays (M = 55.4) and hands-on tasks (M = 56.1). The observation can be explained by theoretical expectations that the tasks that necessitate negotiating meaning through collaboration and applying prior knowledge to new issues are best suited to form lasting learning (Mwangi and Mugambi, 2013; Chavan, 2014).

10.6 Gender Patterns

Though the mean achievement 1 scores of female participants were observed to be slightly higher (M 94.3) than that of male participants (M 89.7), the effect of the ABL intervention on achievement gains was statistically significant in both the male students (t(37) 9.14, p < 0.001, d = 0.68) and the female students (t(36) 10.72, p < 0.001, d = 0.76). The gender x treatment interaction was not statistically significant (F (1, 73) = 1.83, p = .181) so the benefits of ABL were generally similar between the gender groups.

11. Conclusion

The given study presents well-grounded, locally based, and empirical evidence that educationally significant and statistically significant gains with regards to the academic success of Grade 910 students in the Polish secondary school are achieved through the use of a structured 12-week

activity-based learning intervention. The evidentiary basis is strong due to a quasi-experimental design, pre-test/ post-test structure, matched control group and the validated measures, ANCOVA statistical controls, and stratified random sample consisting together contribute to the conclusion that ABL and not maturation, repeated testing or pre-existing group differences are the major contributors to the achievement gains observed in the experimental group.

The results are quite flexible in line with the constructivist theoretical framework upon which the study is based. The high positive correlation between post-test achievement and student engagement confirms the idea put forward by Vygotsky (1978) of the active involvement in the ZPD, as the key mechanism that drives academic learning. Educationally, the big between-group effect size of ANCOVA (d = 0.72) is noteworthy because it is more than the traditionally established threshold of a significant teaching intervention. The observed differences among the types of activities, with the most significant differences in achievement being reported in group activities and problem-solving tasks, hold up the experiential learning theory, as advocated by Kolb, (1984) as well as the overall international literature that identifies this approach as more effective in developing countries, Kenya, and the United States.

In addition to the statistical results, the study has generated concrete products of instant practical value: a 12-week, tested, and validated ABL protocol, a psychometrically tested ABLPQ measure, and an implementation fidelity model which may be modified by other districts in Punjab, and by other provinces in Pakistan. These resources fill the significant evidence-to-practice gap that has limited pedagogical change in the Pakistani secondary school system in the past. This paper shows that the rhetorical leadership of learner-centered pedagogy stated in the NCF (2023) and the National Education Policy (2017) can be transformed into tangible academic results in proper teacher preparation, coordinated curriculum connections, and evidence-based monitoring systems.

12. Recommendations

12.1 For Punjab Education Department and District Education Authority, Gujrat

- Establish and implement a formal Activity-Based Learning Teacher Training Program to all teachers in the secondary schools in Gujrat with a minimum of 30 hours of practice-oriented instruction in ABL annually and assess competency-based teacher competencies to plan and deliver Grade 9-10 curriculum based ABL lessons.
- Modify the guidelines in the NCF (2023) on curriculum delivery to include the minimum quotas of weekly time-based instructional time by subject, and adherence should be part of the school annual inspection framework.

12.2 School Principals and administrators.

- Reserve specific time and physical classroom opportunities during school schedules in which ABL sessions will be conducted; instruction designed on activities should also be integrated as part of the curriculum, but not as an extracurricular activity.
- Implement subject-based peer learning groups so that teachers can develop, distribute and polish activity-based lesson plans together, eliminating the heavy preparation load on teachers that often discourages the use of participatory teaching practices.

12.3 For Classroom Teachers

- Incorporate at least one activity-based learning activity per subject per teaching week, specifically structured to challenge students on the higher cognitive levels of application, analysis or creation consistent with the Bloom Revised Taxonomy.
- Periodically use ABLPQ or other student feedback tools to check perceived effectiveness of activities and use formative feedback to tailor the design of activities to the particular learning needs of each classroom group.

12.4 To the Curriculum Designers and Textbook Developers.

- Embark in-text on Grade 9-10 under the NCF (2023), which presupposes that ABL resources will be embedded in all books teachers

already have and do not need additional purchasing.

12.5 For Future Researchers

- Longen the 12-week intervention protocol to a longitudinal study that would span at least one academic year to determine whether or not ABL-linked achievement benefits are sustained, accrued, or weaken with prolonged exposure.
- Do mixed-method follow-up research that includes classroom observations and student focus groups to shed light on the mental and motivational processes by which particular ABL strategies yield gains in achievement, to add to the explanatory richness of the quantitative results.
- Replicates This study replicated in other Punjab districts and in other subject areas, especially Mathematics and Science, where rote-based failure rates are highest, to create a multi-site, multi-subject evidence base of policy-level implementation of ABL in the Pakistani secondary education system.

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