International Journal of Instruction *January 2027 ● Vol.20, No.1*
e-ISSN: 1308-1470 ● www.e-iji.net *p-ISSN: 1694-609X*
pp. 249-268

Article submission code: 20260316150254
Received: 16/03/2026 Revision: 18/06/2026
Accepted: 29/06/2026 OnlineFirst: 01/10/2026

Professional Development, Self-Efficacy, and Active Pedagogy among Primary Teachers: A Comparative Study

Farzana Farhmand
Department of Science, Pirhajat Dezbad Girls' High School, Farah, Afghanistan, *farzanafarahmand08@gmail.com*

Wahidullah Enayat
Department of Physics, Education Faculty, Samangan University, Samangan, Afghanistan, *enayatwahidullah@gmail.com*

Nawida Rahimi
Department of Biology, Education Faculty, Woman Online University, Afghanistan, London, United Kingdom, *naweedarahimi2020@gmail.com*

Hayedeh Ahmadi
Department of Physics, Education Faculty, Woman Online University, London, United Kingdom, *hayadahahmadi@gmail.com*

This study examined whether participation in a professional development workshop on active teaching was associated with differences in attitudes, self-efficacy, classroom implementation, and perceived barriers among primary school teachers in Farah Province, Afghanistan. Using a comparative cross-sectional design, data were collected from 100 teachers (trained and untrained). The data were analyzed using descriptive statistics, Welch t-tests, effect size estimation, linear regression, adjusted regression (ANCOVA), and non-parametric robustness checks. The results revealed substantial and consistent differences between trained and untrained teachers across all outcome variables. Teachers who participated in the training reported significantly more positive attitudes toward active teaching ($R^2 = 0.508$), markedly higher self-efficacy ($R^2 = 0.969$), and greater classroom implementation of active teaching methods ($R^2 = 0.973$). They also reported significantly lower perceived barriers ($R^2 = 0.246$). These associations remained statistically significant after controlling for demographic and contextual factors, including gender, age, teaching experience, class size, and access to textbooks. Although the cross-sectional design and reliance on self-report measures limit causal inference, the consistent pattern of results across multiple analytical approaches suggests that context-sensitive professional development may strengthen teacher confidence, instructional practices, and perceptions of feasibility in resource-constrained educational environments.

Keywords: active teaching, teacher professional development, teacher self-efficacy, teaching behavior, perceived barriers, farah province, Afghanistan

Citation: Farhmand, F., Enayat, W., Rahimi, N., & Ahmadi, H. (2027). Professional development, self-efficacy, and active pedagogy among primary teachers: A comparative study. *International Journal of Instruction*, *20*(1), 249-268.

INTRODUCTION

Over the last two decades, educational literature has increasingly emphasized a paradigm shift from teacher-centered instruction to active, student-centered learning (Choto & Remadan, 2026; Thwala, 2026). Numerous studies have demonstrated that incorporating collaborative activities, group discussions, problem-solving, and inquiry-based learning leads to improved student attitudes toward coursework (Bhardwaj et al., 2025), active classroom engagement, and enhanced academic achievement (Armbruster et al., 2009; Gomez, 2025). Despite this evidence, the dominant pedagogical model in many educational systems, particularly in resource-constrained and crisis-affected contexts, remains characterized by one-way lectures, rote memorization, and high-stakes summative evaluations (Aaron Price & Chiu, 2018). A critical factor in navigating this transition is teacher self-efficacy; specifically, the extent to which a teacher feels capable of designing and implementing innovative activities within real-world classroom constraints (Aloe et al., 2014). Hwang (2021) found that professional development and teacher self-efficacy were positively associated with student-centered instruction, suggesting that teachers' psychological beliefs play an important role in translating professional learning into classroom practice. Similarly, Talosa et al. (2025) showed that teachers' knowledge and self-efficacy were related to teaching effectiveness, highlighting the need for continuous support and training. From the perspective of professional learning in challenging or remote contexts, Vega and Orleans (2025) reported that professional development initiatives can help teachers develop new teaching techniques and enrich their knowledge, skills, and professional capabilities. In addition, Çetinkaya (2024) emphasized that teacher education and school practice influence teachers' professional self-beliefs, indicating that practical experience and identity development should not be ignored in professional development.

International research indicates that high-quality professional development (PD) programs typically lead to significant increases in teachers' self-efficacy in teaching science, mathematics, and other subjects (Baysal & Mutlu, 2021; Liu et al., 2025). Indeed, a recent meta-analysis reported a moderate-to-strong impact of professional training on the self-efficacy of K-12 STEM teachers (Hawes et al., 2022; Liu et al., 2025; Sio & Lortie-Forgues, 2024). Furthermore, Othman and Masum (2017) suggest that when continuous professional development is context-specific and grounded in actual classroom experience, it can transform teachers' beliefs regarding their roles and increase the practical application of active learning methods. In a similar framework, Hanna (2023) and Pherali et al. (2025) emphasized the importance of context-sensitive teacher learning, while Carey et al. (2024) showed that data-driven programs, peer collaboration, and teacher agency can foster a profound pedagogical shift in low-resource educational settings.

The Afghan education system has undergone dramatic transformations over the past two decades while simultaneously facing profound, multi-layered crises. The Afghanistan Education Status Report highlights chronic resource shortages, high student-to-teacher ratios, a lack of trained educators, and severe gender inequalities (UNESCO, 2025). Recent restrictions on girls' access to education and ongoing

economic pressures have significantly affected teacher working conditions and livelihoods in Afghanistan. A 2024 Education International survey also highlights deteriorating job stability, reduced employment opportunities for female teachers, and substantial professional and psychological pressures among educators under the current regime (Education International, 2024).

However, a significant gap remains between these policy objectives and the realities of overcrowded classrooms, lack of textbooks and instructional materials, and the absence of regular PD opportunities (GEM Report UNESCO, 2025; World Bank, 2023). Field research in Afghanistan and similar conflict-affected contexts indicates that while many teachers support active learning in theory, their classroom practice remains largely teacher-centered (Arooje & Burridge, 2021; Kester et al., 2022). For instance, recent assessments report that although teachers are theoretically familiar with interactive methods, challenges such as time constraints, large class sizes, and limited instructional materials hinder sustainable implementation (Save the Children, 2022). Similarly, studies in low-resource environments have found that teachers often hold positive views toward active methods, yet resource scarcity and curriculum pressure continue to act as major barriers (Amini, 2024). Furthermore, recent meta-analyses have observed that while both teachers and students find active learning principles beneficial, a knowledge-to-action gap persists at the classroom level without ongoing coaching and support (Asamoah & Amarteifio, 2025; King et al., 2022). This disconnect is further exacerbated by the current socio-economic pressures facing educators in Afghanistan (Education International, 2023).

This study aims to examine the impact of professional teacher development on attitudes toward active teaching, teacher self-efficacy, the practical implementation of active instruction, and perceived barriers among primary school teachers in Farah Province, Afghanistan. By comparing teachers who participated in an active teaching workshop with untrained teachers, this research seeks to determine the extent to which targeted PD can strengthen professional beliefs and instructional practices. Specifically, the study addresses the following questions: (1) To what extent does professional development influence teachers' attitudes and self-efficacy regarding active learning? (2) How does training status affect the practical implementation of active instruction? and (3) What is the relationship between training and perceived barriers to active pedagogy? The findings of this study are expected to contribute to the limited body of knowledge on teacher education in conflict-affected settings and provide actionable insights for enhancing educational quality in low-resource environments.

METHOD

Research Design

This study employed a cross-sectional causal–comparative design to examine differences between trained and untrained primary school teachers regarding active teaching practices. The comparison focused on four key constructs: attitudes toward active teaching, teacher self-efficacy, classroom implementation of active teaching practices, and perceived barriers. Participation in an "Active Teaching" professional development workshop served as the grouping variable. Teachers who attended the

workshop constituted the trained group, while those who had not participated formed the comparison group.

Participants and Sampling

The study population consisted of primary school teachers working in public schools in Farah Province, Afghanistan. A total of 100 teachers participated in the study. Participants were selected because they were accessible during the data collection period, met the study criteria, and voluntarily agreed to complete the questionnaire. The main inclusion criteria were being an active primary school teacher in a public school in Farah Province and either having participated in the active teaching professional development workshop or not having participated in such training.

The sample was divided equally into two comparison groups: 50 teachers who had participated in the professional development workshop on active teaching and 50 teachers who had not participated in the workshop. The decision to use equal group sizes was made to allow a balanced comparison between trained and untrained teachers and to reduce the possibility that unequal group numbers would influence the interpretation of group differences. The total sample size of 100 teachers was also considered appropriate for the comparative purpose of the study, given the accessibility of teachers in the study area and the practical limitations of data collection in Farah Province.

The sample included 50 female and 50 male teachers. Participants varied in age, teaching experience, educational level, grade level taught, and class size. Statistical comparisons of background variables indicated no significant differences between the trained and untrained groups in terms of gender, age, education level, teaching experience, grade taught, or class size. However, differences were observed in access to textbooks and supervision/feedback frequency, which are addressed in the Results and Limitations sections. Participation was voluntary, and all teachers were informed about the purpose of the study. Confidentiality and the exclusive research use of the data were assured.

Data Collection Instrument

Data were collected using a researcher-developed questionnaire informed by the literature on active teaching, teacher self-efficacy, and professional development. The questionnaire consisted of five sections. Section A (A1–A10) collected demographic and professional background information, including gender, age, educational level, teaching experience, grade level taught, class size, access to textbooks and instructional materials, prior training in modern teaching methods, and the number of supervisory visits or feedback sessions during the past three months. Sections B–E measured the main study constructs using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Section B (B1–B8) assessed teachers' attitudes toward active teaching. Section C (C1–C9) measured teacher self-efficacy in implementing active teaching strategies. Section D (D1–D10) evaluated the extent to which teachers applied active learning practices in their classrooms. Section E (E1–E8) assessed perceived barriers to implementing active teaching, including large class sizes, limited resources, and instructional constraints. Items B8, D8, and E8 were reverse-coded so that higher

scores consistently represented higher levels of the measured constructs. Composite scores for each scale were calculated as the mean of their respective items. Internal consistency reliability was evaluated using Cronbach's alpha.

Educational Intervention: Active Teaching Workshop

The trained group participated in a professional development workshop focused on active teaching approaches. The workshop addressed core principles of student-centered instruction, development of measurable learning objectives, and practical teaching strategies such as group work, inquiry-based questioning, storytelling, and role-play. Participants also practiced designing lesson plans and discussed classroom management strategies for implementing active learning in the context of primary schools in Farah Province. At the time of data collection, teachers in the comparison group had not received this workshop.

Procedure

After obtaining coordination with relevant educational authorities and school administrators, questionnaires were distributed to both groups. Teachers in the trained group completed the questionnaire after participating in the workshop, while teachers in the comparison group completed it under normal teaching conditions. Participation was voluntary, and respondents were instructed to answer the questionnaire honestly. Confidentiality of responses was ensured.

Data Analysis

Data were coded in Microsoft Excel and analyzed using Python (Version 3.12) with statistical libraries including pandas, scipy, statsmodels, and matplotlib. Descriptive statistics were computed to summarize the characteristics of the sample and the main study variables. Internal consistency reliability of the scales was assessed using Cronbach's alpha. Group differences between trained and untrained teachers were examined using independent-samples t-tests with Welch correction, along with Hedges' g effect sizes and 95% confidence intervals. Chi-square tests were used to assess group equivalence in categorical background variables. To further examine the relationship between training and the outcome variables, linear regression models were estimated. Adjusted regression (ANCOVA) models were also conducted to determine whether the effects of training remained significant after controlling for gender, age, teaching experience, class size, access to textbooks, and supervision/feedback. To verify the robustness of the results beyond parametric assumptions, Mann–Whitney U tests were performed. The significance level was set at $\alpha = 0.05$, with very small p-values reported as $p < 0.001$.

FINDINGS

Background characteristics and group comparability

To describe participants' background characteristics and assess baseline comparability, variables A1–A10 were examined, including gender, age, educational level, teaching experience, grade mostly taught, class size, students' access to textbooks, access to instructional/teaching aids, prior exposure to modern teaching methods, and the number

of supervision/feedback events during the past three months. The distribution of these variables by training status (trained vs. untrained) is presented in Table 1.

Overall, the gender composition was perfectly balanced across both groups (each group included 25 participants in category code 1 and 25 in category code 2), and the distributions of most demographic and professional variables appeared broadly similar. To formally test group equivalence, chi-square tests were used for categorical variables (e.g., gender, educational level, grade taught, textbook access, instructional aids, and prior training), and Welch's independent-samples t-tests were used for continuous variables (age, teaching experience, class size, and supervision/feedback). The results are summarized in Table 2.

As shown in Table 2, the trained and untrained groups did not differ significantly in gender (A1), educational level (A3), grade mostly taught (A5), age (A2), teaching experience (A4), or class size (A6) (all $p > .05$), indicating that the two groups were comparable on several key background characteristics. In contrast, statistically significant differences were observed for students' access to textbooks (A7; $\chi^2 = 7.135$, $p = .028$) and for supervision/feedback during the past three months (A10; $t = -31.93$, $p < .001$). In addition, prior exposure to modern teaching methods (A9) differed markedly between groups ($\chi^2 = 96.040$, $p < .001$). These imbalances suggest that the trained group may have had more supportive instructional conditions (especially in professional supervision/feedback) and higher prior exposure to modern methods—factors that should be considered when interpreting the main outcomes and are addressed further in the limitations. However, statistically significant differences were observed in students' access to textbooks (A7), prior exposure to modern teaching methods (A9), and supervision/feedback during the past three months (A10). These differences should be considered when interpreting the main findings.

Table 1
Distribution of background variables by group (A1–A8, A10)

Variable	Untrained (n=50)	Trained (n=50)	Total (n=100)
Female, n (%)	25 (50%)	25 (50%)	50 (50%)
Age 31–40, n (%)	45 (90%)	43 (86%)	88 (88%)
Bachelor's degree, n (%)	42 (84%)	45 (90%)	87 (87%)
≥16 years teaching experience, n (%)	24 (48%)	19 (38%)	43 (43%)
Class size 31–40 students, n (%)	32 (64%)	27 (54%)	59 (59%)
Adequate access to textbooks, n (%)	43 (86%)	32 (64%)	75 (75%)
Supervision/feedback in last 3 months	1 (2%)	48 (96%)	49 (49%)

Table 2a
Statistical comparison of background variables between groups (Chi-square tests)

Variable	Test	χ^2	df	p
A1 (Gender)	Chi-square	0.000	1	1.000
A3 (Education level)	Chi-square	3.103	3	0.376
A5 (Grade mostly taught)	Chi-square	0.601	2	0.741
A7 (Textbook access)	Chi-square	7.135	2	0.028
A8 (Instructional aids)	Chi-square	5.850	2	0.054
A9 (Prior training in modern methods)	Chi-square	96.040	1	<0.001

Table 3b
Statistical comparison of background variables between groups (Welch's independent-samples t-tests)

Variable	Test	t	p
A2 (Age)	Welch t-test	−0.576	0.566
A4 (Teaching experience)	Welch t-test	0.194	0.846
A6 (Class size)	Welch t-test	−1.234	0.220
A10 (Supervision/feedback in past 3 months)	Welch t-test	−31.930	<0.001

Robustness check using Mann–Whitney U

Because the main outcomes were measured using Likert-type scales and to reduce reliance on parametric assumptions, a non-parametric Mann–Whitney U test was also conducted as a robustness check. As shown in Table 3, the trained and untrained groups differed significantly across all four primary outcomes (all $p < .001$). Specifically, the U statistic was 212.0 for attitude toward active teaching, 0.5 for self-efficacy, 0.0 for classroom practice, and 1899.5 for perceived barriers. The consistency between Mann–Whitney U results and Welch's t-test findings supports the robustness of the observed group differences and suggests that the results are not driven solely by parametric test assumptions.

Table 4
Mann–Whitney U test results for the main outcomes

Outcome	U	p
Attitude toward active teaching (Attitude_B)	212.0	<0.001
Self-efficacy for active methods (SelfEfficacy_C)	0.5	<0.001
Classroom practice of active teaching (Practice_D)	0.0	<0.001
Perceived barriers (Barriers_E)	1899.5	<0.001

Supplementary regression controlling for gender (ready to paste)

Given the relevance of gender in educational research, a supplementary linear regression model was fitted for teacher self-efficacy. In this model, training status (trained vs. untrained) and gender (A1) were entered simultaneously as predictors. The results, presented in Table 4 (a), indicate that training status remained a strong and statistically significant predictor of self-efficacy ($\beta = 3.8067$, $p < .001$), whereas gender was small and non-significant ($\beta = 0.0156$, $p = .823$). The model explained a substantial proportion of variance in self-efficacy ($R^2 = 0.969$), suggesting that differences in self-efficacy were primarily associated with training status rather than gender (Table 4 b). Overall, these findings imply that the association between participation in the active teaching workshop and higher self-efficacy was comparable for female and male teachers.

Table 5
Linear regression predicting self-efficacy (SelfEfficacy_C) from training status and gender

a. Model summary

Metric	Value
R^2	0.969
Adjusted R^2	0.968
F (df = 2, 97)	1500.0
p (F)	<0.001
N	100

b. Regression coefficients

Predictor	β	SE	t	p
Intercept (const)	1.0722	0.115	9.303	<0.001
Training status (Group)	3.8067	0.070	54.771	<0.001
Gender (A1)	0.0156	0.070	0.224	0.823

Descriptive Statistics

To describe the status of the main study variables, descriptive statistics including means and standard deviations were calculated separately for the untrained and trained groups (see Table 5). As shown in Table 5, the mean score for attitude toward active teaching was noticeably higher among trained teachers (M = 4.88, SD = 0.32) compared to untrained teachers (M = 4.25, SD = 0.30). This pattern suggests that participation in the professional development workshop was associated with a more positive orientation toward the use of active, student-centered instructional approaches. A particularly pronounced difference emerged in teacher self-efficacy for implementing active methods. The trained group reported a mean score near the upper end of the scale (M = 4.90, SD = 0.28), whereas the untrained group reported a substantially lower mean (M = 1.10, SD = 0.40). This large descriptive gap indicates that professional training may play a crucial role in strengthening teachers' confidence in their ability to design and implement student-centered instructional strategies. A similar pattern was observed for classroom practice of active teaching. Teachers who had participated in the workshop reported a very high level of practical implementation (M = 4.94, SD = 0.21), compared to the untrained group (M = 1.67, SD = 0.33). This finding suggests that professional development was not only associated with changes in attitudes and beliefs but also with substantial differences in reported classroom behavior. In contrast, perceived barriers to implementing active teaching were higher among untrained teachers (M = 4.29, SD = 0.80) than among trained teachers (M = 2.98, SD = 1.44). This indicates that teachers who received professional training tended to report fewer obstacles when applying active teaching strategies in their classrooms.

Table 6
Descriptive statistics of the main variables by training status

Variable	Untrained (n = 50) M ± SD	Trained (n = 50) M ± SD
Attitude toward active teaching	4.25 ± 0.30	4.88 ± 0.32
Self-efficacy for active methods	1.10 ± 0.40	4.90 ± 0.28
Classroom practice of active teaching	1.67 ± 0.33	4.94 ± 0.21
Perceived barriers	4.29 ± 0.80	2.98 ± 1.44

Reliability of the Instrument

To examine the internal consistency of the measurement scales, Cronbach's alpha coefficients were calculated for each construct (Table 6). The reliability coefficient for

the Attitude scale was α = 0.686, indicating an acceptable level of internal consistency for exploratory educational research. The Self-efficacy scale demonstrated an extremely high internal consistency (α = 0.999), suggesting a very strong correlation among the items. Similarly, the Classroom Practice scale (α = 0.975) and the Perceived Barriers scale (α = 0.950) showed very high reliability coefficients, indicating strong internal coherence and measurement stability across items.

Table 7
Cronbach's alpha coefficients for study scales

Scale	Number of Items	Cronbach's α
Attitude toward active teaching	8	0.686
Self-efficacy for active methods	9	0.999
Classroom practice of active teaching	10	0.975
Perceived barriers	8	0.950

Inferential Results

To examine whether the observed differences between trained and untrained teachers were statistically significant, Welch's independent-samples t-tests were conducted (Table 7). The results indicated a statistically significant difference in attitude toward active teaching, $t = -10.07$, $p < .001$. This suggests that participation in the professional development workshop was associated with a significantly more positive attitude toward active teaching approaches. An even stronger difference was observed for teacher self-efficacy, $t = -55.04$, $p < .001$, indicating that trained teachers reported substantially higher confidence in their ability to implement active instructional strategies. Similarly, classroom practice of active teaching differed markedly between the two groups, $t = -59.10$, $p < .001$, suggesting that trained teachers reported significantly greater practical implementation of student-centered methods. In contrast, perceived barriers showed a significant difference in the opposite direction, $t = 5.66$, $p < .001$. Given the direction of the means, this indicates that trained teachers reported significantly fewer barriers to implementing active teaching compared to their untrained counterparts.

Table 8
Welch's t-test results comparing trained and untrained teachers

Variable	t	p
Attitude toward active teaching	−10.07	< .001
Self-efficacy for active methods	−55.04	< .001
Classroom practice of active teaching	−59.10	< .001
Perceived barriers	5.66	< .001

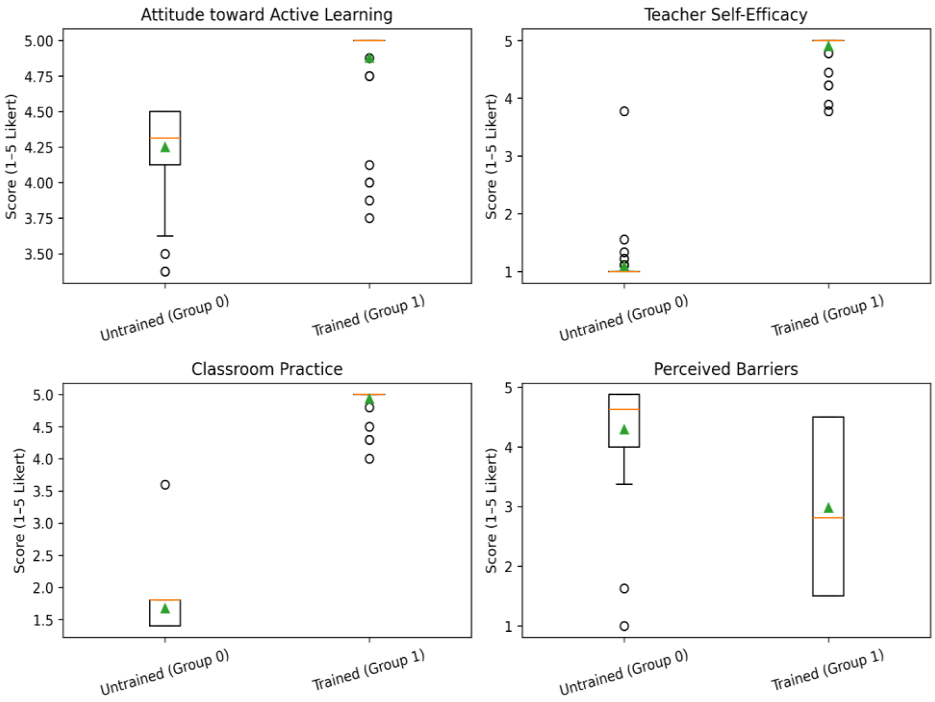

Figure 1
Presents the distribution of scores for the four main study variables by training status

As shown in Figure 1, score distributions differed noticeably between trained and untrained teachers across all variables. The distinction was particularly clear for self-efficacy and classroom practice of active teaching, where both the separation of central tendencies and the range of score variability were markedly different between the two groups. This visual pattern aligns with the descriptive statistics reported in Table 5 and the inferential comparisons reported in Table 7.

Effect size results

To evaluate the magnitude of differences between the two groups, effect sizes were calculated using Hedges' g (Table 8). As reported in Table 8, the effect size for attitude toward active teaching was very large (g = 1.998, 95% CI [1.517, 2.480]), indicating a substantial difference between trained and untrained teachers. For self-efficacy in implementing active methods, the effect size was extremely large (g = 10.923, 95% CI [9.345, 12.502]) (Table 8), reflecting a striking gap between the two groups in teachers'

perceived instructional capability. Likewise, the effect size for classroom practice of active teaching was extremely large (g = 11.728, 95% CI [10.040, 13.417]) (Table 8), suggesting a fundamental difference in the extent to which teachers reported applying student-centered strategies in their classrooms. In contrast, the effect size for perceived barriers was large and negative (g = −1.123, 95% CI [−1.546, −0.701]) (Table 8). Considering the direction of group means reported in Table 5, this indicates that trained teachers reported fewer barriers to implementing active teaching than untrained teachers.

Table 9
Effect sizes (Hedges' g) comparing trained and untrained teachers

Variable	Hedges' g	95% CI
Attitude toward active teaching	1.998	[1.517, 2.480]
Self-efficacy for active methods	10.923	[9.345, 12.502]
Classroom practice of active teaching	11.728	[10.040, 13.417]
Perceived barriers	−1.123	[−1.546, −0.701]

Regression findings

To examine the predictive contribution of training status (trained vs. untrained), simple linear regression models were conducted for each dependent variable (Table 9). The results showed that training status significantly predicted attitude toward active teaching ($\beta = 0.627$, $p < .001$), explaining approximately 50.8% of the variance in attitude ($R^2 = 0.508$) (Table 9). This finding suggests that participation in the workshop was strongly associated with a more positive attitude toward active teaching. For self-efficacy, training status was a very strong and statistically significant predictor ($\beta = 3.807$, $p < .001$), accounting for 96.9% of the variance ($R^2 = 0.969$) (Table 9). This result indicates a highly pronounced association between professional training and teachers' confidence in implementing active teaching strategies. Similarly, training status significantly predicted classroom practice of active teaching ($\beta = 3.264$, $p < .001$) and explained 97.3% of the variance ($R^2 = 0.973$) (Table 9), suggesting a very strong relationship between training and reported implementation of student-centered practices in the classroom. In contrast, training status was a significant negative predictor of perceived barriers ($\beta = -1.315$, $p < .001$), explaining 24.6% of the variance ($R^2 = 0.246$) (Table 9). The negative coefficient indicates that professional training was associated with a reduction in teachers' perceived obstacles to implementing active teaching.

Table 10
Regression results predicting outcomes from training status

Dependent variable	β (Group)	t	p	R^2
Attitude toward active teaching	0.627	10.07	<0.001	0.508
Self-efficacy for active methods	3.807	55.04	<0.001	0.969
Classroom practice of active teaching	3.264	59.10	<0.001	0.973
Perceived barriers	−1.315	−5.66	<0.001	0.246

Adjusted regression analysis (ANCOVA)

To determine whether these associations remained after accounting for contextual and demographic factors, adjusted regression (ANCOVA) models were estimated. In these

models, training status was entered alongside gender (A1), age (A2), teaching experience (A4), class size (A6), and access to textbooks (A7). Preliminary diagnostics indicated substantial multicollinearity between training status and supervision/feedback (A10). To ensure model stability and clearer interpretation of effects, A10 was excluded from the final adjusted models. As presented in Table 10, training status remained a strong and statistically significant predictor of attitudes ($\beta = 0.689$, $p < .001$), self-efficacy ($\beta = 3.860$, $p < .001$), and classroom practice ($\beta = 3.295$, $p < .001$) after controlling for background variables. The models explained 70.7% of the variance in attitudes, 97.4% in self-efficacy, and 97.7% in classroom practice. For perceived barriers, training status was also a significant negative predictor ($\beta = -1.382$, $p < .001$), with the model explaining 41.4% of the variance. This indicates that participation in professional development is associated with lower perceived implementation barriers even after adjustment.

Table 11
Summary of adjusted regression models

Dependent Variable	R^2	β (Group)	p
Attitude_B	0.707	0.689	< .001
SelfEfficacy_C	0.974	3.860	< .001
Practice_D	0.977	3.295	< .001
Barriers_E	0.414	−1.382	< .001

Mann–Whitney U test (robustness)

To assess the robustness of the findings and ensure that results were not dependent on normality assumptions, the non-parametric Mann–Whitney U test was also conducted. The results indicated statistically significant differences between trained and untrained teachers across all variables (all $p < .001$) (Table 11). The consistency between the Mann–Whitney U results in Table 10 and the Welch t-test results reported in Table 7 strengthens confidence in the stability and robustness of the study findings.

Table 12
Mann–Whitney U test results comparing trained and untrained teachers

Variable	U	p
Attitude toward active teaching	212.0	<0.001
Self-efficacy	0.5	<0.001
Classroom practice	0.0	<0.001
Perceived barriers	1899.5	<0.001

Discussion and interpretation of findings

This study examined whether participation in a professional development workshop on active teaching was associated with differences in teachers' attitudes, self-efficacy, classroom implementation, and perceived barriers among primary school teachers in Farah Province, Afghanistan. These four outcomes were directly related to the main objectives of the study, which aimed to compare trained and untrained teachers in terms of their professional beliefs, confidence, reported classroom practices, and perceived obstacles to active pedagogy. Overall, the findings showed a clear and consistent pattern across descriptive statistics, Welch's t-tests, effect size estimates, regression models,

adjusted regression models, and non-parametric robustness checks. Teachers who participated in the workshop reported more favorable outcomes than untrained teachers across all main variables.

Regarding attitudes toward active teaching, trained teachers reported a higher mean score than untrained teachers (M = 4.88, SD = 0.32 vs. M = 4.25, SD = 0.30). This difference was statistically significant, $t = -10.07$, $p < .001$, with a very large effect size, Hedges' $g = 1.998$, 95% CI [1.517, 2.480]. The simple regression model also showed that training status significantly predicted attitudes toward active teaching, $\beta = 0.627$, $p < .001$, explaining 50.8% of the variance. This suggests that teachers who participated in the professional development workshop were more likely to view active, student-centered teaching as useful, feasible, and relevant to their classroom work. In a context such as Farah Province, where many teachers work under difficult instructional conditions, such a positive attitude is important because it can provide the starting point for changes in classroom practice.

The strongest differences were observed in teacher self-efficacy and classroom implementation. Trained teachers reported very high self-efficacy scores (M = 4.90, SD = 0.28), while untrained teachers reported a much lower mean score (M = 1.10, SD = 0.40). This difference was statistically significant, $t = -55.04$, $p < .001$, with an extremely large effect size, Hedges' $g = 10.923$, 95% CI [9.345, 12.502]. The regression analysis further showed that training status explained 96.9% of the variance in self-efficacy, $\beta = 3.807$, $p < .001$. A similar pattern was found for classroom practice. Trained teachers reported much higher classroom implementation of active teaching methods (M = 4.94, SD = 0.21) than untrained teachers (M = 1.67, SD = 0.33). This difference was also statistically significant, $t = -59.10$, $p < .001$, with an extremely large effect size, Hedges' $g = 11.728$, 95% CI [10.040, 13.417]. Training status explained 97.3% of the variance in classroom practice, $\beta = 3.264$, $p < .001$. These results indicate that the workshop was associated not only with more positive attitudes, but also with teachers' confidence and their reported use of active teaching methods in the classroom.

These findings are consistent with previous studies showing that professional development can strengthen teachers' self-efficacy, instructional confidence, and classroom practice. Baysal and Mutlu (2021) reported that professional development programs can improve teachers' self-efficacy beliefs, and Liu et al. (2025) similarly emphasized the positive role of professional development in improving in-service teachers' self-efficacy. The present study supports this broader body of evidence, but it also adds contextual evidence from Farah Province. The particularly strong difference between trained and untrained teachers may be partly explained by the limited availability of regular professional development opportunities in low-resource educational settings. In such contexts, even a focused and practice-oriented workshop can become an important source of professional support when it provides teachers with strategies that are directly connected to their classroom needs.

The findings are also in line with recent studies published in the International Journal of Instruction and the Anatolian Journal of Education. Hwang (2021) found that professional development and teacher self-efficacy were positively related to student-

centered instruction, which is consistent with the present finding that trained teachers reported higher self-efficacy and greater classroom implementation of active teaching. Similarly, Talosa et al. (2025) showed that teachers' knowledge and self-efficacy were linked to teaching effectiveness, supporting the idea that confidence and practical knowledge are important for effective instruction. In remote and resource-limited contexts, Vega and Orleans (2025) found that professional development programs helped teachers acquire new teaching techniques and improve their knowledge, skills, and capabilities. This is closely related to the present study, where teachers in Farah Province who participated in the workshop reported greater use of active teaching methods and fewer perceived barriers. In addition, Çetinkaya (2024) emphasized that teacher education and school practice influence teachers' professional self-beliefs, which supports the view that practice-oriented professional development may strengthen teachers' confidence and professional identity.

The findings also support the argument that professional development is more meaningful when it is connected to teachers' real teaching conditions. Othman and Masum (2017) suggested that context-specific professional development grounded in classroom experience can influence teachers' beliefs and practices. The present study is consistent with this view because trained teachers reported much greater use of active teaching methods than untrained teachers. This suggests that the workshop may have helped teachers move beyond general awareness of active pedagogy toward practical classroom application. In other words, professional development appears to be most useful when it does not remain theoretical, but gives teachers concrete strategies that they can adapt to their own classrooms.

The contextual importance of active teaching in low-resource schools is also supported by previous work conducted in disadvantaged educational settings. Enayat et al. (2025) found that active mathematics teaching methods were associated with students' positive learning experiences, motivation, conceptual understanding, social cooperation, and learning outcomes in a disadvantaged school context. Similarly, Fahrunnisah et al. (2025) emphasized that simple and familiar learning media, such as traditional game-based activities, can make classroom learning more varied, enthusiastic, and active for elementary students. These studies support the interpretation that active pedagogy can be meaningful even in resource-constrained classrooms when teachers are provided with practical strategies that are adaptable to local conditions.

Perceived barriers showed the expected reverse pattern. Untrained teachers reported higher perceived barriers ($M = 4.29$, $SD = 0.80$) than trained teachers ($M = 2.98$, $SD = 1.44$). This difference was statistically significant, $t = 5.66$, $p < .001$, with a large negative effect size, Hedges' $g = -1.123$, 95% CI $[-1.546, -0.701]$. The simple regression model also showed that training status negatively predicted perceived barriers, $\beta = -1.315$, $p < .001$, explaining 24.6% of the variance. This means that teachers who participated in the workshop tended to perceive fewer obstacles to implementing active teaching. In practical terms, the workshop may have helped teachers interpret common classroom challenges, such as large class size, limited materials, and instructional constraints, as difficulties that can be managed through practical strategies rather than as fixed barriers.

This result is consistent with studies conducted in Afghanistan and other low-resource educational contexts. Previous research has shown that large classes, limited teaching materials, lack of textbooks, curriculum pressure, and weak professional support can make the implementation of active teaching difficult (Amini, 2024; Arooje & Burridge, 2021; Save the Children, 2022). The present study confirms that such barriers remain relevant in Farah Province. However, the lower barrier scores among trained teachers suggest that professional development may change how teachers perceive and respond to these constraints. It may not remove structural problems from schools, but it can provide teachers with practical techniques, confidence, and a stronger sense of possibility for using active teaching despite difficult conditions.

A key finding of this study is that the association between training status and all four outcomes remained statistically significant after controlling for important demographic and contextual variables. In the adjusted regression models, gender, age, teaching experience, class size, and access to textbooks were included as control variables. Even after these controls, training status remained a significant predictor of attitudes toward active teaching, $\beta = 0.689$, $p < .001$, with the model explaining 70.7% of the variance. Training status also remained a significant predictor of self-efficacy, $\beta = 3.860$, $p < .001$, $R^2 = 0.974$, and classroom practice, $\beta = 3.295$, $p < .001$, $R^2 = 0.977$. For perceived barriers, training status remained a significant negative predictor, $\beta = -1.382$, $p < .001$, $R^2 = 0.414$. These findings show that the differences between trained and untrained teachers were not explained only by gender, age, teaching experience, class size, or textbook access. Rather, training status continued to have a strong independent association with the main study outcomes. Supervision/feedback was not retained in the final adjusted models because preliminary diagnostics indicated substantial multicollinearity with training status, and excluding it improved model stability and interpretability.

The robustness of these findings was further supported by the Mann–Whitney U tests, which were conducted because the main variables were measured using Likert-type scales. The results confirmed statistically significant group differences across all four outcomes: attitude toward active teaching, $U = 212.0$, $p < .001$; self-efficacy, $U = 0.5$, $p < .001$; classroom practice, $U = 0.0$, $p < .001$; and perceived barriers, $U = 1899.5$, $p < .001$. The agreement between the Mann–Whitney U tests and the Welch t-test results indicates that the findings were not dependent only on parametric assumptions. Therefore, the overall pattern of results can be considered statistically consistent across several analytical approaches.

Taken together, the findings indicate that participation in the active teaching workshop was strongly associated with more positive attitudes, higher self-efficacy, greater reported classroom implementation, and lower perceived barriers among primary school teachers in Farah Province. These findings are consistent with previous studies on the role of professional development in strengthening teacher confidence and practice, while also reflecting the specific realities of a resource-constrained and conflict-affected educational context. In Farah Province, where teachers may face large classes, limited instructional materials, and restricted access to sustained professional development, a practice-oriented workshop can be an important source of pedagogical support.

However, because the study used a cross-sectional design and relied on self-reported questionnaire data, the results should be interpreted as strong associations rather than causal effects. Future studies should use classroom observation, delayed follow-up, and longitudinal or quasi-experimental designs to examine whether these reported differences are sustained over time and reflected in actual classroom practice.

LIMITATIONS

Despite these strengths, several limitations should be considered when interpreting the results. **First**, the cross-sectional, convenience-sampled design limits causal inference; the analyses support strong associations and clear group differences but cannot establish that the workshop alone caused the observed outcomes. **Second**, baseline differences between groups in factors such as prior exposure to modern teaching methods, access to textbooks, and supervision/feedback may partially contribute to the observed contrasts. Although adjusted models address measured covariates (Table 10), unmeasured influences such as school leadership, peer norms, or school culture may still play a role. **Third**, the extremely high internal consistency and unusually large effect sizes—especially for self-efficacy and practice—raise the possibility of item redundancy, ceiling effects, and social desirability bias. Because outcomes were collected via self-report shortly after training, future work should incorporate classroom observations, delayed follow-up, and more comprehensive psychometric evaluation of the instrument. Finally, generalizability is limited to similar settings, and replication across other Afghan provinces and with stronger quasi-experimental or longitudinal designs would strengthen external validity.

CONCLUSION

The findings of this study indicate that participation in a structured professional development workshop on active teaching was strongly associated with more positive attitudes, higher teacher self-efficacy, greater reported classroom implementation of student-centered practices, and lower perceived barriers among primary school teachers in Farah Province, Afghanistan. These relationships remained statistically significant after controlling for key demographic and contextual variables, including gender, age, teaching experience, class size, and access to textbooks. The consistency of the results across descriptive statistics, Welch's t-tests, effect size estimates, regression analyses, adjusted regression models, and Mann–Whitney U tests strengthens confidence in the stability of the findings. After comparing the findings with previous studies, the results suggest that professional development can play an important role in strengthening teachers' confidence and classroom practice, especially when training is practical, context-sensitive, and connected to real classroom challenges. The findings are consistent with earlier research showing that professional development can improve teacher self-efficacy and support the implementation of active teaching methods. However, the present study adds contextual evidence from Farah Province, where teachers often work in low-resource and challenging educational conditions. In such contexts, professional development may be especially valuable because it can help teachers view active teaching as more feasible and reduce the perception that classroom constraints make student-centered instruction impossible. At the same time, the findings should be interpreted with caution. Because the study used a comparative cross-

sectional design and relied on self-reported questionnaire data, the results show strong associations rather than direct causal effects. Baseline differences between trained and untrained teachers may also have influenced some outcomes. Therefore, future research should include classroom observations, follow-up measurements, and longitudinal or quasi-experimental designs to examine whether the reported changes are sustained over time and reflected in actual teaching behavior. Overall, the study suggests that sustained, practice-oriented, and locally relevant professional development can be an important strategy for improving active pedagogy and supporting primary teachers in low-resource educational settings.

REFERENCES

Aaron Price, C., & Chiu, A. (2018). An experimental study of a museum-based, science PD programme's impact on teachers and their students. *International Journal of Science Education, 40*(9), 941–960. https://doi.org/10.1080/09500693.2018.1457816

Aloe, A. M., Amo, L. C., & Shanahan, M. E. (2014). Classroom management self-efficacy and burnout: A multivariate meta-analysis. *Educational Psychology Review, 26*(1), 101–126. https://doi.org/10.1007/s10648-013-9244-0

Amini, M. H. (2024). *Teacher's quality in public schools in Afghanistan: Exploring the perceptions of public schools' stakeholders* [Master's thesis, BRAC University]. BRAC University Institutional Repository. http://hdl.handle.net/10361/24397

Armbruster, P., Patel, M., Johnson, E., & Weiss, M. (2009). Active learning and student-centered pedagogy improve student attitudes and performance in introductory biology. *CBE—Life Sciences Education, 8*(3), 203–213. https://doi.org/10.1187/cbe.09-03-0025

Arooje, R., & Burridge, N. (2021). School education in Afghanistan: Overcoming the challenges of a fragile state. In P. M. Sarangapani and R. Pappu (Eds.), *Handbook of education systems in South Asia* (pp. 411–441). Springer. https://doi.org/10.1007/978-981-15-0032-9_10

Asamoah, M. K., & Amarteifio, J. (2025). Overcoming barriers and ethical challenges in implementing intelligent tutoring systems in Ghanaian higher education. *Discover Education, 4*(1), Article 179. https://doi.org/10.1007/s44217-025-00593-5

Baysal, Y. E., & Mutlu, F. (2021). The effect of professional development programs on teachers' self-efficacy beliefs in science teaching: A meta-analysis study. *International Journal of Contemporary Educational Research, 8*(4), 1–15. https://doi.org/10.33200/ijcer.828528

Bhardwaj, V., Zhang, S., Tan, Y. Q., & Pandey, V. (2025). Redefining learning: Student-centered strategies for academic and personal growth. *Frontiers in Education, 10*, Article 1518602. https://doi.org/10.3389/feduc.2025.1518602

Carey, T., Tyrosvoutis, G., Win, N. N., & Kyan, N. P. K. (2024). Cracking the egg carton profession: Sensemaking of the teacher leader role on the Thai-Myanmar border. *International Education Journal: Comparative Perspectives, 23*(1), 43–57.

Çetinkaya, S. (2024). Development of pre-service teachers' teacher identity: A time capsule case study. *Anatolian Journal of Education, 9*(2), 139–158. https://doi.org/10.29333/aje.2024.9212a

Choto, H. M., & Remadan, N. M. (2026). A transformative practice-based pedagogical model for architectural design education: Bridging practice, teaching, and research. *Journal of Engineering and Applied Science, 73*, Article 28. https://doi.org/10.1186/s44147-026-00892-0

Education International. (2023). *Afghanistan: One year on—The struggle for education continues*. Education International Research.

Education International. (2024, March 25). *Afghanistan: Survey provides meaningful insights into the experiences of teachers and students under the Taliban regime*. https://www.ei-ie.org/en/item/28464%3Aafghanistan-survey-provides-meaningful-insights-into-the-experiences-of-teachers-and-students-under-the-taliban-regime

Enayat, W., Noorzia, A., Rahimi, N., & Qarloq, R. (2025). English improving math learning and motivation in disadvantaged schools: A case study of Chahi-Zanda Girls' High School. *Samangan Academic & Research Journal, 3*(02). https://doi.org/10.64226/sarj.v3i02.137

Fahrunnisah, F., Enayat, W., & Fazil, A. W. (2025). Application of the traditional snakes and ladders game as an Indonesian language learning media to train students' language skills in elementary schools. *MANDALIKA: Journal of Social Science, 3*(1), 1–7. https://doi.org/10.56566/mandalika.v3i1.177

GEM Report UNESCO. (2025). *Global education monitoring report, 2023: Technology in education: A tool on whose terms?* [Chinese]. https://doi.org/10.54676/BIUM3029

Gomez, M. J. (2025). The impact of inquiry-based learning in science education: A systematic review of student engagement and achievement. *Journal of Education, Learning and Management, 2*(2), 353–363.

Hanna, H. (2023). A critical review of international research into pre-service teachers' beliefs and practices when teaching migrant learners. *London Review of Education, 21*(1), Article 21. https://doi.org/10.14324/LRE.21.1.21

Hawes, Z. C. K., Gilligan-Lee, K. A., & Mix, K. S. (2022). Effects of spatial training on mathematics performance: A meta-analysis. *Developmental Psychology, 58*(1), 112–137. https://doi.org/10.1037/dev0001281

Hwang, S. (2021). The mediating effects of self-efficacy and classroom stress on professional development and student-centered instruction. *International Journal of Instruction, 14*(1), 1–16. https://doi.org/10.29333/iji.2021.1411a

Kester, K., Abura, M., Sohn, C., & Rho, E. (2022). Higher education peacebuilding in conflict-affected societies: Beyond the good/bad binary. *International Journal of Comparative Education and Development, 24*(3/4), 160–176. https://doi.org/10.1108/IJCED-04-2022-0027

King, O., West, E., Lee, S., Glenister, K., Quilliam, C., Wong Shee, A., & Beks, H. (2022). Research education and training for nurses and allied health professionals: A systematic scoping review. *BMC Medical Education, 22*(1), Article 385. https://doi.org/10.1186/s12909-022-03406-7

Liu, J., Wang, K., & Pan, Z. (2025). The effectiveness of professional development in the self-efficacy of in-service teachers in STEM education: A meta-analysis. *Behavioral Sciences, 15*(10), Article 1364. https://doi.org/10.3390/bs15101364

Othman, A., & Masum, A. (2017). Professional development and teacher self-efficacy: Learning from Indonesian modern Islamic boarding schools. *Educational Process: International Journal, 6*(2), 7–19. https://doi.org/10.22521/edupij.2017.62.1

Pherali, T., Chan, M. L., Charoensukaran, W., Chase, E., Kennedy, E., Tyrosvoutis, G., Witthaus, G., & Laurillard, D. (2025). Pedagogical approaches to teacher professional development in contexts of mass displacement: An agenda for research and practice. *Journal of Interactive Media in Education, 2025*(1), Article 7. https://doi.org/10.5334/jime.885

Save the Children. (2022). *Stolen childhoods: The impact of crisis on education in Afghanistan*. Save the Children Fund. https://resourcecentre.savethechildren.net/pdf/Breaking-Point-Childrens-lives-one-year-under-Taliban-rule_Aug-2022.pdf

Sio, U. N., & Lortie-Forgues, H. (2024). The impact of creativity training on creative performance: A meta-analytic review and critical evaluation of 5 decades of creativity training studies. *Psychological Bulletin, 150*(5), 554–585. https://doi.org/10.1037/bul0000432

Talosa, A. D., Acidera, R. A., Tamanu, M. J. M., & Sumer, J. J. M. (2025). Knowledge, self-efficacy and effectiveness in leveraging blended delivery system: A study of higher education teachers. *International Journal of Instruction, 18*(2), 709–726. https://doi.org/10.29333/iji.2025.18238a

Thwala, S. K. (2026). From policy to practice: Eswatini perspective on the implementation of inclusive education policy. *International Journal of Inclusive Education*, 1–14.

UNESCO. (2025). *New report warns Afghans' education crisis threatens future of entire generation*. United Nations Educational, Scientific and Cultural Organization. https://www.unesco.org/en/articles/new-report-warns-afghanistans-education-crisis-threatens-future-entire-generation

Vega, M. G. A., & Orleans, A. V. (2025). Science teachers' perceived impact on the implementation of Learning Action Cell (LAC) in remote Philippine region. *Anatolian Journal of Education, 10*(2), 143–152. https://doi.org/10.29333/aje.2025.10211a

World Bank. (2023). *Afghanistan development update: Resilience amidst crisis*. World Bank Group. https://thedocs.worldbank.org/en/doc/210d5f24dc33a3460beff3447fceadcf-0310012023/afghanistan-development-update-october-2023