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Investigating the Effect of Collaborative Teacher Professional Development Approaches on Improving EFL Teachers' Classroom-based Assessment Literacy

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Abstract

Classroom-based assessment literacy (CBAL) as one of the constituents of formative assessment has been highlighted due to its considerable role in enhancing students' achievements. Various studies have been administered to examine the feasibility of expanding teachers' classroom-based assessment literacy. On the other hand, studies on professional development (PD) demonstrated that collaboration is one of the significant features of effective professional development programs. Hence, this study explored the impact of collaborative teacher development (CTD) approaches on improving EFL teachers' classroom-based assessment literacy. Ninety teachers participated in the study. They were divided into three experimental groups. Each group was instructed with a different CTD approach including action research (AR), narrative inquiry (NI), and teacher study groups (TSGs). The instruction consisted of ten sessions each lasting ninety minutes. CALQ was the data collection instrument. The results demonstrated that action research and narrative inquiry contributed to teachers' CBAL improvement while no evidence identified the effect teacher study groups might have on teachers' CBAL. The results could be utilized in designing instructional courses to increase pre-service and in-service teachers' CBAL in a collaborative way, which has been proven to be efficient in enhancing learners' achievements.

Keywords: CBAL, CTD Approaches, AR, NI, TSGs

1. Introduction

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Teacher professional development is a cornerstone of educational reform, with assessment literacy gaining prominence as a critical skill for enhancing student outcomes (Giraldo, 2021; Harsch et al., 2021). Classroom-based assessment literacy (CBAL), a key component of formative assessment, empowers teachers to evaluate and support learning effectively. Despite its recognized importance, recent studies reveal gaps in teachers' preparedness, particularly in EFL contexts (DeLuca & Klinger, 2010; Li et al., 2023).

Professional development programs (PDPs) have long been utilized to address these gaps. However, the effectiveness of different collaborative teacher development (CTD) approaches—such as Action Research (AR), Narrative Inquiry (NI), and Teacher Study Groups (TSGs)—remains underexplored. Most existing research focuses on individual approaches or lacks a comparative perspective, leaving a critical gap in understanding how collaborative strategies can enhance CBAL.

This study seeks to fill this gap by examining the impact of AR, NI, and TSGs on EFL teachers' CBAL. By doing so, it contributes to the broader discourse on teacher professional development, offering insights relevant to global educational contexts. Specifically, this research addresses the following questions:

1. Are there significant differences among the three approaches in improving CBAL?
2. What is the individual effectiveness of each approach?

The findings aim to inform the design of targeted PDPs, emphasizing collaborative learning as a pathway to educational excellence.

2. Literature Review

2.1. Classroom-based Assessment Literacy (CBAL)

Assessment has generally been viewed as a link between learning and teaching (Ahmadian & Hosseini, 2012; Gharani et al., 2023) that could be utilized for various purposes. In addition, DeLuca et al. (2015 cited in Saidi & Arefian, 2022) claimed that assessment literacy is the core of teachers` professional identity. Lan and Fan (2019) mentioned that classroom-based assessment includes "the abilities to design, develop, and critically evaluate tests and other assessment procedures, as well as the abilities to monitor, evaluate, grade, and score assessments based on theoretical knowledge, and the abilities to interpret and communicate assessment results (p. 115)".

Considering the importance of CBA, classroom-based assessment literacy (CBAL) has consequently been regarded as necessary. Chappuis et al. (2012 cited in Yamtim & Wongwanich, 2014) defined classroom-

based assessment literacy as the required information and skills to gather information about learners' accomplishments and operatively devote the process of assessment and results to enhance the impact of teachers' teaching and learners' learning. Tasgari (2006) asserted that the neglect of classroom-based assessment literacy training prevents teachers' creative use of assessment techniques.

2.2. Collaborative Teacher Development (CTD) Approaches

Teacher development has been claimed to influence student achievement positively and is regarded as highly important (Mora Ruano et al., 2019). Teacher development includes different approaches mostly collaborative in nature. Kelchtermans (2006, cited in de Jong et al., 2019) maintained that collaboration assists teachers in sharing knowledge, making judgments on teaching activities, attaining peer help or feedback, and collaboratively planning teaching practices. Recently, teacher collaboration has acquired expanding notice both in research and practice (Ebadijalal & Moradkhani, 2023). Burns and Richards (2009) listed CTD approaches as action research, narrative inquiry, cooperative development, exploratory practice, dialog journals, teacher study groups, team teaching, and long-distance collaboration. Estaji(2024) indicated that teachers` assessment agency could influence their professional development. The present study employs three of these teacher development approaches which are not only collaborative in nature but also reflective ones. Although teacher collaboration is a key component of professional development (De Jong et al., 2019), the relative effectiveness of AR, NI, and TSGs in enhancing CBAL remains underexplored. Recent studies suggest AR's reflective nature (Edwards & Burns, 2016) and NI's emphasis on narrative identity (Dao, 2021) may hold unique advantages over TSGs.

2.2.1. Action Research (AR)

In educational settings, the gap between the researcher and the teacher needs to be filled. Action research could be regarded as an instrument to remove the gap between the two. AR allows teachers to research while participating in the teaching process. Action research provides teachers with a medium to deal with not only theoretical considerations but also practical issues observed in the classroom context. Johnston (2009 cited in Burns & Richards, 2009) defined AR as teachers involved in small-range, organized, generally recounted research in their classrooms and contexts, attempting to transform or perceive those classrooms and contexts. Recent studies (e.g., Burns & Khalifa, 2017) emphasized the

dual nature of AR as both reflective and practical. While AR's iterative process has been shown to enhance teacher reflection and practice (Saeb et al., 2021), its scalability and generalizability in large-scale PD programs remain questionable.

2.2.2. Narrative Inquiry (NI)

Narrative inquiry is a qualitative research approach that utilizes stories as data. According to Johnston (2009 cited in Burns & Richards, 2009), it regards stories teachers narrate about their teaching experience as the primary source for professional growth. It highlights that it is not solely storytelling demanding intensive reflection and analysis of teaching stories. In the NI approach, it is highly recommended that researchers go beyond the narratives and relate them to the literature of the field to support the research (Heigham, 2009). Recent studies (e.g., Babaii & Asadnia, 2019; Dao, 2021) have identified the NI`s potential to build teachers' assessment identities and its application in cross-cultural and multilingual settings. However, its heavy reliance on subjective narratives poses challenges for consistent evaluation of its impact on CBAL (Dao, 2021).

2.2.3. Teacher Study Groups (TSGs)

Recently the interest in TSGs has increased since they could organize different directions in CTD approaches, follow course materials, form peer groups, and provide continuous relevant activities (Gresten et al., 2009). Gersten et al. (2010) defined TSGs as containing small groups of teachers collectively attempting towards a determined goal. Recent literature (e.g., Methlagl, 2022) investigated the theoretical basis of TSGs in peer learning and collaboration. Despite their potential to foster collaborative learning (Methlagl, 2022), TSGs are often criticized for their variability in effectiveness, which heavily depends on group composition and facilitator expertise. A review of the literature highlights the limited empirical evidence on TSGs' impact on CBAL specifically.

3. Method

The purpose of the study is to explore the effect of Collaborative Teacher Development (CTD) approaches (AR, NI, and TSGs) on improving teachers' CBAL. The present study is based on an experimental design including three experimental groups. Each group is instructed with a different CTD approach. In the end, it is investigated to identify whether the approaches have had any impact on improving teachers' CBAL.

3.1. Participants

The participants in the study consisted of 90 EFL teachers who were selected through non-probability convenience sampling. They were divided into three different groups and exposed to three different approaches of CTD in teaching CBAL. The subsequent table demonstrates the demographic information of participants:

Table 1. *The Demographic Information of Participant*s

Group	Male	Female	< 5 yrs	5-10 yrs	> 10 yrs	Diploma	BA	MA	Ph.D.	English Major	Non-English Major
Action Research Group	12	18	17	8	5	6	11	10	3	20	10
Narrative Inquiry Group	11	19	14	9	7	3	13	11	3	19	11
Teacher Study Group	14	16	13	12	5	6	10	9	5	22	8

3.2. Instrumentation

3.2.1. CALQ

The present study employed CALQ (Banisaeed et al., 2024) as the data collection instrument to investigate the effect of CTD approaches on improving EFL teachers' CBAL. CALQ was developed based on an inclusive review of the literature which was accomplished by retrieving major themes and components of CBAL, and then a series of interviews were conducted with five assessment experts and 13 experienced EFL teachers in accordance with Pill and Harding's (2013) Model of LAL, Hill and McNamara's (2012) scope and dimensions of CBA in addition to teachers' assessment literacy beliefs. Accordingly, a questionnaire (CALQ) including 41 items was developed. To inquire about the reliability and validity of the CALQ, 318 EFL teachers were selected through non-probability convenience sampling and asked to answer the questionnaire. The outcomes of the Cronbach's alpha demonstrated a

proper reliability index (.876), and factor analysis products clarified that items loaded on six factors named illiteracy (6 items); nominal literacy (11 items); functional literacy (6 items); procedural and conceptual literacy (6 items); multidimensional literacy (6 items); and assessment literacy beliefs (6 items). Besides, CALQ is considered advantageous in assessing teachers' CBAL and facilitating materials preparation to design instructional courses and develop EFL teachers' CBAL, based on the conclusions of structural equation modeling (SEM), which proved that the Model enjoyed good psychometric features. Since CALQ classifies EFL teachers based on their level of CBAL, it seemed to be appropriate to be used as the data collection instrument in the present study. It includes 41 statements and respondents were asked to indicate their degree of agreement with those statements.

3.2.2. Collaborative Teacher Development Approaches

In addition, the study required three experimental groups. Each group was instructed with a different CTD approach including AR, NI, and TSGs. According to Sprinthall et al., (1996 cited in Martin, 2019), teacher professional development could be categorized into three different models (craft, expert, interactive), and the professional development program employed in the present study is considered interactive, which regards that teacher' understanding increases when linked to external sources of information such as exchanging knowledge with colleagues in collaborative courses.

3.2.2.1. Action Research

According to Mertler (2017), in theory, AR includes four stages: "the planning stage", "the acting stage", "the developing stage", and "the reflecting stage". Every stage contains different steps to be undertaken. As Table 2 demonstrates, the first step in AR is problem identification. After a short discussion about each topic, participants are supposed to identify their problems individually. The next step is called preliminary investigation. Participants are supposed to adopt a method of data collection to formulate possible solutions. It leads to the next step named formulation of potential solutions. The last step is labeled evaluation, in which the final discussion examines the formulated solutions and reflects on the proposed solutions.

Table 2. *Action Research Steps in Theory and Practice*

Action Research Steps in Theory	Action Research Steps in Practice
1 Planning Stage: *Pinpointing and confining the topic* *Collecting information* *Reconsidering related literature* *Elaborating a research plan*	For each topic, following a short discussion, the participants are supposed to find the answer to their problem. Problem Identification
2 Acting Stage: *Collecting data* *Analyzing data*	The participants are supposed to adopt a method of data collection to investigate the problem including questionnaires, diaries, interviews, observation, and review of the related literature. Preliminary Investigation
3 Developing Stage: *Developing an action plan*	The problem was investigated, and the solution was formulated. Formulation of Possible Solutions
4 Reflecting Stage: *Exchanging and transferring outcomes* *Considering the process*	The final discussion examines the formulated solutions and reflects on the proposed solutions. Evaluation

3.2.2.2. Narrative Inquiry

According to Kim (2015), NI in theory contains three steps including interview, reflection, and analysis. The following table elaborates on these steps in practice:

Table 3. *Narrative Inquiry Steps in Theory and Practice*

Narrative Inquiry Steps in Theory	Narrative Inquiry Steps in Practice
Interview	For each topic, the participants are required to talk about their experiences through open-ended questions and answer some follow-up questions to elicit as many details as possible.
Reflection	The participants are required to reflect more deeply upon their narrated experiences and record them.
Analysis	Through the final discussion, the participants discuss their reflections to find common themes and wrap up the theoretical considerations.

The participants are required to talk about each topic while asking general and detailed questions. Then they are required to reflect on the narratives. Consequently, the final discussion wraps up the points and theoretical considerations.

3.2.2.3. Teacher Study Groups

Gersten et al. (2010) mentioned that in theory, TSGs include four steps. The steps are categorized as thinking and choosing a topic, limiting the topic and distinguishing questions, consulting and investigating problems, and eventually considering process and content; the following table presents these steps in practice.

Table 4. *Teacher Study Groups in Theory and Practice*

Teacher Study Groups in Theory	Teacher Study Groups in Practice
Brainstorming and Selecting a Topic	The participants get familiar with the topic through a brief discussion.
Narrowing the Topic and Identifying Questions	The participants were required to narrow down the topic by proposing some related detailed questions.
Dialoguing and Exploring Issues	After a preparation time, the participants share their ideas and explore the issues.
Reflecting on Process and Content	Through a final discussion, the participants reflect on the discussed content and wrap up the materials.

First, a brief discussion familiarizes teachers with the topic. Then, they are asked to narrow down the topic by proposing some related questions and giving some time for preparation. Then, they share their ideas and explore the issues. Eventually, through a final discussion, teachers reflect on the matters discussed and wrap up the materials.

3.3. Course Content

The topics covered in the course included methods, types, and concepts of assessment; theories, rubrics, and cut-off scores; and practical issues related to test development and validation. They concluded with concepts beyond ordinary issues like philosophical, historical, and social dimensions of assessment.

3.4. Data Collection Procedure

The study sought to investigate the effect of CTD approaches (AR, NI, TSGs) on the CBAL of EFL teachers. Ninety experienced EFL teachers were selected through non-probability convenience sampling. They were divided into three groups, each exposed to an instructional program by the researcher according to one of the CTD approaches mentioned earlier. To

compare the effect of three different approaches, each group was planned to have a 10-session course of instruction two sessions a week. Every session continued for 90 minutes, and the classes were conducted in both English and Persian. The first session of the training program was devoted to an introduction to CTD approaches and participants were provided with explanations regarding each approach. The detailed procedure regarding the implementation of each CTD approach is explained in Table 2, Table 3, and Table 4. Based on a pre-planned syllabus including the main topics and themes of CALQ, the three groups were instructed in a consistent way and the researcher had the role of coordinator and facilitator.

3.5. Data Analysis

The current study is an endeavor to explore the effect of AR, NI, and TSGs on improving EFL teachers' CBAL within and between groups. That is to say, the three groups' means on the CBAL posttest are compared. Moreover, each group's mean enhancement from the pretest to the posttest is investigated. These objectives are achieved using Repeated Measures ANOVA plus Simple Effect Analysis.

4. Results

4.1. Overview

The two research questions proposed in this study aimed at achieving two main objectives. The first research question probed any meaningful differences between the three groups' means on the posttest of CBAL, while the second aimed at investigating each group's mean enhancement from the pretest to the posttest. These objectives cannot be achieved through an Analysis of Covariance, which compares the groups' means on the posttest after controlling for the effect of the pretest. Analysis of Covariance does not allow the researchers to compare each group's mean enhancement from pretest to posttest that was why Repeated Measures ANOVA in addition to Simple Effect Analysis were employed to analyze the present data. Repeated Measures ANOVA has four assumptions; i.e., normality of data, homogeneity of variances of groups, homogeneity of covariance matrices, and sphericity. The results are discussed below.

First, Repeated Measures ANOVA assumes the normality of the pretest and posttest of CBAL. Table 5 shows the skewness and kurtosis indices of normality. The skewness indices examine the symmetry of the data, while the kurtosis indices probe their relative height. In an ideally normal distribution, the skewness and kurtosis indices are equal to zero. As demonstrated in Table 5, the skewness and kurtosis indices were all

within the ranges of ±2. Thus, it was concluded that the present data did not show any significant deviation from normality.

It should be noted that the criteria of ±2 were proposed by George & Mallery (2019). It should also be noted that Zhu et al. (2019) suggested the criteria of ±3. However, Watkins (2021) suggested different criteria for skewness and kurtosis. He believed that skewness values should be less than ±2; while kurtosis indices should be evaluated against the criteria of ±7.

Table 5. *Skewness and Kurtosis Indices of Normality*

		N	Skewness		Kurtosis	
Group		Statistic	Statistic	Std. Error	Statistic	Std. Error
AR	Pretest	30	.117	.427	-1.566	.833
	Posttest	30	-.477	.427	-.977	.833
NI	Pretest	30	.136	.427	-1.054	.833
	Posttest	30	-.410	.427	-1.277	.833
TSG	Pretest	30	.793	.427	-.522	.833
	Posttest	30	.567	.427	-.611	.833

Second, Repeated Measures ANOVA demands that groups should enjoy homogenous variances on the pretest and posttest of CBAL. The presumption of homogeneity of variances was checked through Levene's Test. Table 6 shows the outcomes of Levene's test of homogeneity of variances. The outcomes presented that the presumption of homogeneity of variances was retained for the pretest ($F (2, 87) = 1.84$, $p > .05$), and posttest ($F (2, 87) = .215$, $p > .05$) of CBAL.

Table 6. Levene's Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Pretest	Based on Mean	2.785	2	87	.067
	Based on Median	1.843	2	87	.164
	Based on Median and with adjusted df	1.843	2	70.264	.166
	Based on trimmed mean	2.673	2	87	.075
Posttest	Based on Mean	.288	2	87	.750
	Based on Median	.215	2	87	.807
	Based on Median and with adjusted df	.215	2	86.713	.807
	Based on trimmed mean	.267	2	87	.766

Third, Repeated Measures ANOVA requires that the correlations between pretest and posttest of CBAL be roughly equal across the two groups; i.e., homogeneity of covariance matrices. This assumption is examined by the Box's Test.

As depicted in Table 7, the non-meaningful outcomes of the Box's test (Box's M = 6.35, p > .001) revealed that the presumption of homogeneity of covariance matrices was preserved. It is worth mentioning that Field (2013), believes that the outcomes of the Box's test should be stated at .001 levels.

Table 7. *Test of Equality of Covariance Matrices*

Box's M	6.350
F	1.023
df1	6
df2	188642.769
Sig.	.408

And finally, Repeated Measures ANOVA requires sphericity of the data; as examined through Mauchly's test. As noted by Field (2013), at least three conditions (tests) are needed to compute Mauchly's test. Since this study included two tests, i.e., the pretest and posttest of CBAL; therefore, Mauchly's test could not calculate its probability (Table 8). The column "Sig." has a dot, instead of probability values.

Table 8. *Mauchly's Test of Sphericity*

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
CBAL	1.000	.000	0	.	1.000	1.000	1.000

4.2. Cronbach's Alpha Reliability Indices

Table 9 shows the Cronbach's Alpha reliability indices for the pretest and posttest of CBAL. The two tests possessed reliability indices of .923, and .915. These reliability indices can be identified appropriately; as stated by Fryer et al. (2018) and Harrison et al. (2020), who believed that a Cronbach's alpha value of .70 is the satisfactory reliability index for an instrument. However, George and Mallery (2019, p. 244) assume that "there is no set interpretation as to what is an acceptable alpha value. A rule of thumb that applies to most situations is; >.9 excellent, >.8 good, > .7 acceptable, >.6 questionable, >.5 poor, and < .5 unacceptable". According to these criteria, it can be inferred that pretest and posttest of CBAL enjoyed "excellent"; i.e., >= .90 reliability indices.

Table 9. *Cronbach's Alpha Reliability Statistics*

	Cronbach's Alpha	N of Items
Pretest	.923	41
Posttest	.915	41

4.3. Exploring Null-Hypotheses

As mentioned earlier, the two null hypotheses presented in this study, corresponding to the two research questions, were analyzed through Repeated Measures ANOVA plus Simple Effect Analysis. The present Repeated Measures ANOVA included two dependent variables, pretest and posttest of CBAL, and one independent variable, treatment, with three levels, i.e., action research (AR), narrative inquiry (NI), and teacher study groups (TSGs). Repeated Measures ANOVA produces three F-values for the effect of the type of treatment (Table 11), two CBAL tests (Table 12), and their interaction (Table 12).

The Simple Effect Analysis investigated the effect of levels of treatment within levels of dependent variables. That is to say, it enabled the researchers to compare the three groups' means on pretest, and posttest. Moreover, Simple Effect Analysis investigated each group's mean enhancement from the pretest to the posttest. After this brief introduction, the main results are discussed below.

First, Table 10 shows the three groups' descriptive statistics on the pretest and posttest of CBAL. The AR (M = 92.10), NI (M = 95.73), and TSGs (M = 95.06) groups had roughly equal means on pretests of CBAL. However, the AR group (M = 155.16) had the highest mean on the posttest of CBAL. This was followed by NI (M = 129.26), and TSGs (M = 104.83) groups.

Table 10. *Descriptive Statistics for Pretest and Posttest of Classroom-Based Assessment Literacy by Group*

Group	CBAL	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
AR	Pretest	92.100	6.191	79.795	104.405
	Posttest	155.167	7.778	139.707	170.627
NI	Pretest	95.733	6.191	83.428	108.038
	Posttest	129.267	7.778	113.807	144.727
TSG	Pretest	95.067	6.191	82.762	107.372
	Posttest	104.833	7.778	89.373	120.293

Table 11 shows the results of the Between-Subjects Effect. The results ($F = 2, 87) = 4.11$, $p < .05$, partial eta squared = .086 portraying an average effect size, demonstrated that there were meaningful differences between the three groups' overall means on the pretest and post-test of CBAL. Thus, the first null hypothesis "there were not any differences among Action Research (AR), Narrative Inquiry (NI), and Teacher Study Groups (TSGs) on improving EFL teachers' classroom-based assessment literacy (CBAL)" was rejected.

Table 11. *Tests of Between-Subjects Effects for Overall Pretest and Posttest of Classroom-Based Assessment Literacy by Group*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2259040.139	1	2259040.139	1102.420	.000	.927
Group	16847.078	2	8423.539	4.111	.020	.086
Error	178277.283	87	2049.164			

Table 12 shows the results of Within-Subject Effects. The results indicated a meaningful difference between the overall means on the pretest and posttest of CBAL regardless of group membership ($F = 1, 87) = 61.78$, $p < .05$, partial eta squared = .419 demonstrating a large effect size. That is to say, if the total samples' means on the pretest and posttest of CBAL are compared, there will be a meaningful difference between the two means.

Table 12. Tests of Within-Subjects Effects for Overall Pretest and Posttest of Classroom-Based Assessment Literacy by Group

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
CBAL	Sphericity Assumed	56569.339	1	56569.339	61.784	.000	.415
	Greenhouse-Geisser	56569.339	1	56569.339	61.784	.000	.415
	Huynh-Feldt	56569.339	1	56569.339	61.784	.000	.415
	Lower-bound	56569.339	1	56569.339	61.784	.000	.415
CBAL * Group	Sphericity Assumed	21389.811	2	10694.906	11.681	.000	.212
	Greenhouse-Geisser	21389.811	2	10694.906	11.681	.000	.212
	Huynh-Feldt	21389.811	2	10694.906	11.681	.000	.212
	Lower-bound	21389.811	2	10694.906	11.681	.000	.212
Error (CBAL)	Sphericity Assumed	79657.350	87	915.602			
	Greenhouse-Geisser	79657.350	87	915.602			
	Huynh-Feldt	79657.350	87	915.602			
	Lower-bound	79657.350	87	915.602			

The results shown in Table 12 also suggested a meaningful relation between groups and tests ($F = 1, 87) = 11.68$, $p < .05$, partial eta squared = .212 portraying a significant effect size). As shown in Table 10, although the AR group had the highest mean on the posttest of CBAL, their mean on the pretest was the lowest, despite the fact that the differences in means were negligible as will be discussed in Table 13.

Table 13 shows the outcomes of the first Simple Effect Analysis, which compared the three groups' means on pretests of CBAL. These results should be interpreted with reference to two mean scores shown in Table 10. The results demonstrated that,

A: There was not any meaningful difference between NI (M = 95.73) and AR (M = 92.10) on the pretest of CBAL (MD = 3.63, p > .05). Therefore, it can be stated that NI and AR groups were homogenous regarding their classroom-based assessment literacy before the administration of the treatments.

Table 13. *Simple Effect Analysis for Comparing Groups' Means on Pretest*

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
NI	AR	3.633	8.755	.679	-13.768	21.035
	TSG	.667	8.755	.939	-16.735	18.068
TSGs	AR	2.967	8.755	.736	-14.435	20.368

B: There was not any meaningful difference between NI (M = 95.73) and TSGs (M = 95.06) on the pretest of CBAL (MD = .667, p > .05). Thus, it can be stated that NI and TSGs groups were homogenous regarding their classroom-based assessment literacy before the administration of the treatments.

C: And finally, there was not any meaningful difference between TSGs (M = 95.06) and AR (M = 92.10) on the pretest of CBAL (MD = 2.96, p > .05). Thus, it can be concluded that TSGs and AR groups were homogenous regarding their classroom-based assessment literacy before the administration of the treatments. Figure 1 shows the three groups' means on the pretest of CBAL.

Figure 1. *Mean Scores on Pretest of Classroom-Based Assessment Literacy by Groups*

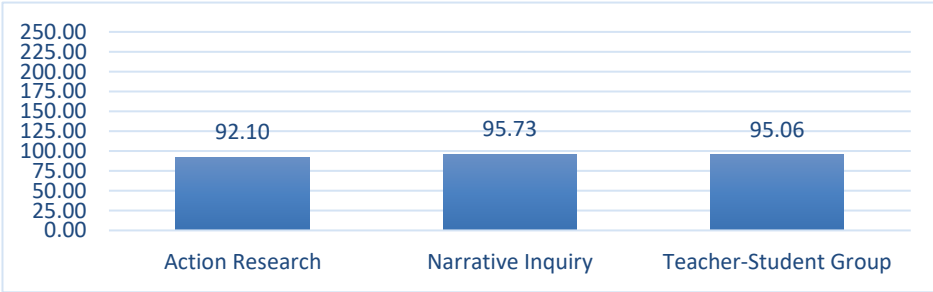


Table 14 shows the outcomes of the second Simple Effect Analysis which compared the three groups' means on posttests of CBAL. These results should be interpreted with reference to the two mean scores shown in Table 10. The results indicated that,

A: The AR group (M = 155.16) had a meaningfully larger mean than the NI group (M = 129.26) (MD = 25.90, p < .05).

B: The AR group (M = 155.16) had a meaningfully larger mean than the TSG group (M = 104.83) (MD = 50.23, p < .05).

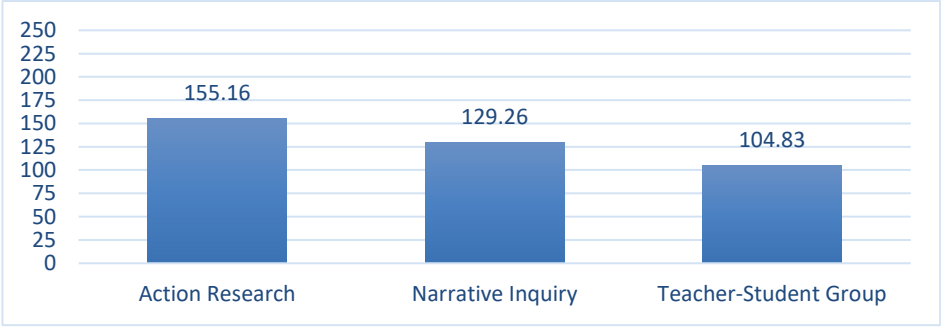
Table 14. *Simple Effect Analysis for Comparing Groups' Means on Posttest*

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
AR	NI	25.900*	11.000	.021*	4.036	47.764
	TSG	50.333*	11.000	.000*	28.470	72.197
NI	TSG	24.433*	11.000	.029*	2.570	46.297

*. The mean difference is significant at the .05 level.

C: And finally, the NI group (M = 129.26) had a meaningfully larger mean than the TSGs group (M = 104.83) (MD = 24.73, p < .05). Figure 2 shows the three groups' means on the posttest of CBAL.

Figure 2. *Mean Scores on Posttest of Classroom-Based Assessment Literacy by Groups*



Finally, Table 15 shows the results of the last Simple Effect Analysis, which can be employed to probe the second, third, and fourth null hypotheses. These results should be interpreted with reference to the two mean scores presented in Table 10. The outcomes demonstrated that,

A: The Action Research (AR) group had a meaningful enhancement in their mean from the pretest (M = 92.10) to the posttest (M = 155.16) (MD = 63.06, p < .05). Thus, the second null hypothesis as "the Action

Research (AR) approach did not have any significant effect on EFL teachers' classroom-based assessment literacy" was rejected.

Table 15. *Simple Effect Analysis for Investigating Mean Enhancement of the Three Groups from Pretest to Posttest*

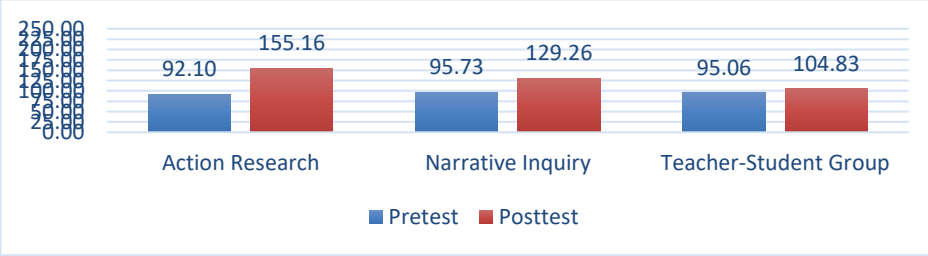
Group	(I) CBAL	(J) CBAL	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
AR	Posttest	Pretest	63.067*	7.813	.000*	47.538	78.595
NI	Posttest	Pretest	33.533*	7.813	.000*	18.005	49.062
TSGs	Posttest	Pretest	9.767	7.813	.215	-5.762	25.295

*. The mean difference is significant at the .05 level.

B: The NI group had a meaningful enhancement in their mean from the pretest (M = 95.73) to the posttest (M = 129.26) (MD = 33.53, $p < .05$). Thus, the third null hypothesis as "the Narrative Inquiry (NI) approach did not have any significant effect on EFL teachers' classroom-based assessment literacy" was rejected.

C: However, the Teacher Study Groups did not have any meaningful enhancement in their mean from the pretest (M = 95.06) to the posttest (M = 104.83) (MD = 9.76, $p > .05$). Thus, the third null hypothesis as "the Teacher Study Groups (TSGs) approach did not have any significant effect on EFL teachers' classroom-based assessment literacy" was supported. Figure 3 shows the three groups' mean enhancement from the pretest to the posttest of CBAL.

Figure 3. *Mean Enhancement from Pretest to Posttest by Groups*



5. Discussion

One of the salient responsibilities defined by teachers in any educational system is transferring knowledge and skills to the students. Not surprisingly, the predetermined objectives might not be achieved. The mentioned reason highlights the importance of assessment. Assessment has been regarded as a tool to evaluate not only students' learning process

but also teachers' teaching practices. Therefore, improving teachers' assessment literacy (AL) could be viewed as an essential factor that leads to teachers' professional development. Although teachers have gained some assessment knowledge through teaching experience, participating in instructional assessment courses seems necessary to be well-prepared to employ various assessment methods and make sound decisions.

Recent studies have focused on the effect professional development programs might have on improving teachers' AL. Koh (2011) in a longitudinal study working with Singaporean teachers which lasted for two years indicated that efficient professional programs will improve teachers' AL and result in enhancing students' learning. In fact, according to Khodashenas et al. (2022) who conducted an empirical study, it was indicated that "teachers' expectations of continuing professional development programs" could be regarded as one of the components of EFL teachers' assessment literacy needs (TALNs). Li et al. (2023) claimed that professional development programs lead to efficient utilization of formative assessment and improve teachers' formative assessment literacy.

Since the positive impact of professional development programs on improving teachers' AL is important, Juanjuan and Yusoff (2023) examined the typical characteristics of efficient professional development programs that enhance teachers' AL. They investigated 17 experimental studies considering teachers' AL enhancement, figured out the underlying features, and divided them into three categories: what or the content, that highlights the importance of contextualization and needs analysis, how or method which supports collaborative learning, working engagement, and continuous professional development possibility, and why or orientation which attempts to promote reflection and build teachers' identity as assessors.

Regarding the first feature of effective PD programs, which is the content, Giraldo (2021) reviewed 14 PD programs conducted to improve teachers' language assessment literacy (LAL). The core content for most of the studies derived from Davies (2008), who asserted that teachers should possess knowledge of language proficiency in terms of theories and models, skills for designing professional assessment tools in education, and principles of ethics regarding the effects of assessment on learners. The reviewed studies mainly focused on practical and theoretical considerations of language assessment. Therefore, it has attempted to familiarize the participating teachers with how to design assessment tasks in classrooms.

Giraldo (2021) observed that considering knowledge, the studies consisted of concepts such as the meaning of language assessment (4 studies, e.g., Boyd & Donnarumma, 2018), purposes in language assessment (8 studies, e.g., Bolívar, 2020), and qualities of language assessment including validity, reliability, practicality (11 studies, e.g., Giraldo & Murica, 2018). Also, some studies contained content; related to skills, for instance, language assessment methods: critiques and/ or design (14 studies, e.g., Levi & Inbar-Lourie, 2020), and assessing language skills (10 studies, e.g., Koh et al., 2018), ethics, fairness, impact, etc. (6 studies, e.g., Montee et al., 2013). Furthermore, Koh (2011) conducted a professional development program that presented a summary of authentic assessment in addition to explanations about task design and rubric development to the participants.

The present study in addition to presenting all the above-mentioned main concepts of LAL in the previous studies, provided the participants with issues related to significant steps in test construction, validation, and some points regarding extra knowledge beyond ordinary concepts such as philosophical, social, and historical dimensions of assessment.

The second significant characteristic of effective LAL professional development programs is reflection. Ashraf and Zolfaghari (2018) identified a relationship between teachers' AL and their reflective teaching. Subsequent studies emphasized that teachers should possess practical and theoretical knowledge of reflection in assessment. Later, the empirical studies focused on making teachers competent in practical consideration of reflection in assessment (e.g., Boyd & Donnarumma, 2018). Chan and Luo (2020) maintained that teachers could not apply reflection in assessment. Recent studies went beyond and observed reflection on assessment theories and concepts to support EFL teachers' autonomy and professional identity (e.g., Babaii & Asadnia, 2019). Since the present study involves a reflection stage in practice, it addresses the second feature of effective PD programs.

As clarified, collaboration is regarded as the third important feature of effective PD programs. Different studies reported that collaborative learning facilitates LAL in primary, secondary, and tertiary education (e.g., Estaji, 2024; Latif, 2021; Meijer et al., 2020; Methlagl, 2022). Also, Harsch et al., (2021) concluded that EFL teachers regarded collaborative and responsive CTD programs as helpful and efficient, which resulted in favorable alterations in assessing teaching and learning. Meanwhile, PD programs have shifted from brief workshops to teacher groups working toward professional practice (Martin, 2019). Among CTD approaches,

action research (AR), narrative inquiry (NI), and teacher study groups (TSGs) were chosen to be investigated by the present study.

According to Lofunglo et al., (2021), AR is considered advantageous compared with traditional research since it identifies the problems to deal with in the milieu of teaching and learning, and due to this capability, it has turned into the most favorable approach in educational research. Several studies have been carried out to examine the effect of AR on assessment. Drost (2012) indicated that AR improved authentic formative assessment for teachers and learners. On the other hand, Burns and Khalifa (2017) reported different projects carried out in the ELICOS Program to explore the impact AR might have on assessment. The mentioned studies demonstrated that AR positively influences teachers' and learners' ability for self-assessment (Wallace, 2020), formative assessment (Edwards & Burns, 2016), and summative assessment (saRa KaBLaOui, 2012). Also, Saeb et al., (2021) demonstrated that AR supplies a framework for EFL teachers to evaluate and improve their classroom-based assessment in a systematic way. The present study found that AR improves teachers' CBAL.

Narrative Inquiry (NI), which is a qualitative and reflective research approach has also been demonstrated to influence assessment. Dao (2021) who worked with Vietnamese university EFL teachers, illustrated that NI could contribute to constructing teachers' identities as assessors. In another study, Poursaduqi et al., (2019) explored the effect of NI on learners' ability to evaluate their language learning process. They underscored the relationship between NI and learners' productivity in language learning through constant self-assessment. On the other hand, Khojaste Mehr et al., (2024) found that the inquiry-based approach to language assessment literacy instruction compared with the expository one, has no statistically significant difference in forming assessment conceptions among EFL teachers. On the contrary, the present study indicated that NI could enhance teachers' CBAL.

TSGs are considered a facilitative CTD approach that assists teachers in forming learning communities and sharing knowledge and experience. Martin (2019) mentioned that TSGs could lead to school improvements and collaboration in solving educational problems. Gersten et al. (2010) reported that evidence was found regarding the influence TSGs have on the shift in teachers' ideas in practicing curriculum. Although TSGs are among CTD approaches, a review of the literature indicated that there is no straight proof in the previous studies about the impact they might have on assessment. The present study also could discover no substantial TSGs effect on improving teachers' CBAL.

6. Conclusion and Implications

This study extends collaborative learning theory by demonstrating that reflective practices like AR and NI have a greater impact on CBAL than less structured approaches like TSGs. These results highlight the importance of guided reflection and iterative problem-solving in teacher development. Educational policymakers should prioritize AR-based PD programs to enhance teachers' CBAL. Incorporating reflective exercises and problem-solving activities into teacher training curricula can foster better assessment practices and improve student outcomes. The study's reliance on non-probability convenience sampling limits the generalizability of the findings. Additionally, the short intervention duration may not fully capture the long-term impacts of CTD approaches on CBAL. Future research should explore the long-term impact of AR and NI on CBAL through longitudinal studies. Investigating these approaches in diverse cultural and linguistic settings could enhance the generalizability of the findings. Moreover, studies comparing CTD approaches with digital or hybrid professional development models may provide valuable insights.

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