The Impact of Implementing Critical Appraisal on EFL Teachers' Quantitative Research Literacy

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Abstract

This study was an attempt to scrutinize the impact of the Critical Appraisal of Published Research (CAPR) in undergraduate teacher training programs on EFL teachers' Quantitative Research Literacy (QRL). To meet this objective, 30 male and female ELT teachers were non-randomly selected and randomly assigned to two groups. In two research classes, the experimental group received the CAPR, whereas the control group received conventional teacher-centered instruction with summative assessment. The QRL questionnaire was employed as the pretest and posttest. After ensuring the pre-treatment homogeneity of the participants in terms of QRL, analyzing the post-treatment data through running an independent-samples *t*-test indicated that there was a significant difference in post-treatment QRL scores between the participants in the experimental group and the control group. In other words, the CAPR had a significantly better impact on EFL teachers' QRL.

Keywords: Critical appraisal; Quantitative research; Research literacy; Teacher training

INTRODUCTION

Current trends in Teaching English as a Foreign Language (TEFL) are founded upon the notion that English as a Foreign Language (EFL) teachers function as transformative intellectuals and reflective practitioners who explore and investigate classroom events and outcomes (Kumaravadivelu, 2012; Lightbown & Spada, 2013). As Richards and Lockhart (1994) put it, teachers should "collect data about their teaching,

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examine their attitudes, beliefs, assumptions, and teaching practices, and use the information obtained as a basis for critical reflection about teaching" (p. 1). Consequently, taking on the role of reflective practitioners and employing the intellectual ability to reflectively cogitate on the practice of teaching, according to Farrell (2012), are now considered to be among the essential needs for language teachers which will happen through a critical and systematic analysis of the teaching and learning attitudes and practices so that teachers would function more reasonably and responsibly(Farrell, 2012; Lightbown & Spada, 2013).

The capacity to engage in the critical and systematic analysis of the teaching practice, which is mainly developed through receiving training, gaining experience, and self-discovery, can substantially influence EFL teachers' perception of the teaching techniques and practices (Borg, 2008; Freeman, 2002). Furthermore, this critical and self-involved process would make it possible for ELT practitioners to detach themselves from the limits of subjectivity and ''discover meaning [they] might otherwise miss'' (Jay & Johnson, 2002, p. 78). In actual fact, conducting systematic "Applied Research" (Best & Kahn, 2006, p. 21), which is by definition practical, problem-oriented, objective, and contextual(Creswell, 2014), can be considered one of the significant attempts to reflectively evaluate the pedagogical practice (Springer, 2010).

Research has been generally defined as a systematic inquiry which makes it possible to better understand the nature of a particular phenomenon and the way it interacts with other related variables (Blessinger, 2015). In simple terms, research is, "a process of steps used to collect and analyze information to increase our understanding of a topic or issue" (Creswell, 2010, p. 3). There exist numerous categories of research (Creswell, 2014);however, according to Best and Kahn (2006), "most educational research is applied research" (p. 21). Applied research is a category of research which "aims to find a solution to a specified practical problem under the conditions in which it appears in practice(Ary, Jacobs, Sorensen Irvine, & Walker, 2019, p. 15). Conducting applied research is basically made possible through taking two major routes, quantitative and qualitative (Best & Kahn, 2006; Creswell, 2014). Quantitative and qualitative research methods are different in terms of "the nature of the data and philosophical assumptions on which they are based that have led to different terminologies" (Ary et al., 2019, p. 442). According to (Springer, 2010),

> Philosophically, quantitative and qualitative research are grounded in somewhat different epistemological assumptions. Quantitative research tends

to reflect positivism, the assumption that reality consists of facts and causal processes that are independent of observers and thus can be revealed through scientific observation. (p. 19)

On the other hand, "qualitative research tends to reflect constructivism, the assumption that realities are constructed by individuals rather than objectively observed"(Springer, 2010, p. 20). Best and Kahn (2006), while relating quantitative research to *logical-positivism* and qualitative research to *phenomenological inquiry*, argue that qualitative research is more interpretive, subjective, and time-consuming. When it comes to the type of questions answered through qualitative and quantitative research, the former tends to answer "How" questions whereas the latter tends to answer "Yes/No" questions.

Reflecting upon the implementation of applied research in the ELT domain, both quantitative and qualitative approaches seem to have their own pros and cons; however, quantitative research seems to provide a better basis for answering pedagogical inquiries and inspecting the effectiveness of pedagogical techniques (Hadi & Closs, 2016). This special privilege is emanated from the fact that the modern approach to ELT research has been rooted in positivism through highlighting objectivity, generalizability, and being criterion-oriented (Breen & Darlaston-Jones, 2010).Consequently, quantitative research is "privileged over other forms of enquiry, and other epistemologies, methodologies, and methods remain marginalised within the discipline"(Breen & Darlaston-Jones, 2010, p. 67). This advantage also has to do with the fact that, compared to qualitative studies, quantitative studies are more objective and practical as a result of employing reliable instruments and significantly larger sample pools (Hadi & Closs, 2016; Springer, 2010).Needless to say, enjoying larger sample pools makes the findings of quantitative studies more generalizable (Springer, 2010).

According to Springer (2010), quantitative applied research refers to "a variety of approach-

es to research in which research questions are posed, hypotheses are formulated, quantitative data are gathered, and conclusions are drawn from statistical analysis" (p. 544). More specifically, the characteristics of a quantitative research, as stated by Creswell (2010, p. 13) are:

- Describing a research problem through a description of trends or a need for an explanation of the relationship among variables;
- Providing a major role for the literature through suggesting the research questions to be asked and justifying the research problem and creating a need for the direction (purpose statement and research questions or hypotheses) of the study;
- Creating purpose statements, research questions, and hypotheses that are specific, narrow, measurable, and observable;
- Collecting numeric data from a large number of people using instruments with preset questions and responses;
- Analyzing trends, comparing groups, or relating variables using statistical analysis, and interpreting results by comparing them with prior predictions and past research; and
- Writing the research report using standard, fixed structures and evaluation criteria, and taking an objective, unbiased approach.

As stated earlier, there is a general consent that undertaking a systematic, context-based, and well-designed applied ELT research, either quantitative or qualitative, can make a significant contribution to ELT practitioners' existing understanding of ELT and the development of pedagogical techniques (Farrell, 2012; Jay & Johnson, 2002). However, we have recently witnessed a surge of growth regarding the pedagogical practice, curriculum development, assessment, learner variables, and teacher education in recent years (Akbari, 2008; Bell, 2003; Ellis, 2010;

Lightbown & Spada, 2013; Mitchell, Myles, & Marsden, 2013; Nation & Macalister, 2010). Accordingly, and quite reasonably, there has been a simultaneous emergence of new concerns and techniques in carrying out applied research in ELT contexts(Birjandi & Siyyari, 2010; Mackey & Gass, 2015),and both professional researchers and TEFL students seem to require advanced research skills in order to address different pedagogical issues (Blessinger, 2015).

Coined by Birjandi (P. Birjandi, personal communication, January 1, 2016), the term Quantitative Research Literacy (QRL) is legitimately used to address researchers' (including ELT practitioners') knowledge of conducting systematic quantitative research. In fact, QRL can determine the validity of research findings and the accuracy of the path taken for achieving ELT pedagogical goals. However, as this knowledge/ability is mainly gained in academic contexts, e.g. undergraduate and graduate courses, exploring the effectiveness of different instructional procedures for developing EFL teachers' QRL seems to be quite essential and legitimate.

Considering the peculiarities and possibilities of ELT teacher training programs, more specifically Research courses, this study endeavored to scrutinize the way implementing the Critical Appraisal of Published Research (CAPR) affects EFL teachers' QRL. The term *Critical Appraisal* has been defined as "a systematic process used to identify the strengths and weaknesses of a research article in order to assess the usefulness and validity of research findings" (Young & Solomon, 2009, p. 82). In this process, it is of paramount importance to inspect the suitability of the study design, assess the methodological features, and consider the appropriateness of the statistical methods and their subsequent interpretation (Young & Solomon, 2009).Young and Solomon (2009, p. 83) touched upon a number of questions which should be addressed when inspecting a quantitative research report. These questions are:

- Is the study question relevant?
- Does the study add anything new?

- What type of research question is being asked?
- Was the study design appropriate for the research question?
- Did the study methods address the most important potential sources of bias?
- Was the study performed according to the original protocol?
- Does the study test a stated hypothesis?
- Were the statistical analyses performed correctly?
- Do the data justify the conclusions?
- Are there any conflicts of interest?

Carrying out the multidimensional CAPR seems highly prone to bias and subjectivity without employing a framework or criterion. In fact "a structured approach to critical appraisal could potentially improve the quality of this process" (Young & Solomon, 2009, p. 83). Among the instruments and guidelines for implementing the CAPR, the guideline provided by Best and Kahn (2006) seems to be one of the highly practical and concise frameworks for guiding the CAPR. This CAPR guideline is presented in Table 1.

Table 1

Guideline for Implementing the Critical Appraisal of Published Research

Element of Articles	Expected Features of the Element
Title	▪ clear and concise
Problem and Hypotheses	▪ clearly stated ▪ significance of problem ▪ specific question raised ▪ clear statement of hypothesis or ▪ research question ▪ testable hypothesis ▪ assumptions stated ▪ important terms defined
Review of Literature	▪ adequate coverage ▪ well organized ▪ important findings noted ▪ studies critically examined ▪ related to problem and hypothesis
Procedures	▪ subjects and methodology described in detail ▪ adequate sample ▪ appropriate design ▪ variables controlled ▪ appropriate data gathering instruments
Data Analysis/Results	▪ effective use of tables ▪ effective use of figures ▪ concise but complete report of findings ▪ appropriate statistical or other treatment of data ▪ logical analysis
Discussion/Conclusions	▪ problem restated or addressed ▪ hypotheses restated or addressed ▪ clear and concise ▪ conclusions based on results ▪ statement of practical or theoretical implications ▪ appropriate generalizations
Overall Form and Style of Paper	▪ clear and concise ▪ appropriate degree of objectivity ▪ all parts of the paper are properly related to each other ▪ Referencing according to appropriate style

Note. Adapted from *Research in Education* (p. 490), by J. W. Best and J. V. Kahn, 2006, Boston: Pearson. Copyright 2006 by Pearson Education Inc.

In order to meet the objective of this study, the following research question was formulated:

> *RQ: Is there any statistically significant difference between the impact of the critical appraisal of published research and traditional teacher-centered instruction on EFL teachers' quantitative research literacy?*

Based on the abovementioned research question, the following null hypothesis was formulated:

> H_0:*There is not any statistically significant difference between the impact of the critical appraisal of published research and traditional teacher-centered instruction on EFL teachers' quantitative research literacy,*

METHOD

Participants

The participants of this study were initially chosen from a sample pool of 52 senior undergraduate students who majored in ELT at Islamic Azad University, South Tehran Branch, on the basis of having experience in ELT. The selected EFL teachers ($n = 30$; 21 or 70% females; 9 or 30% males) were within the age range of 21 to 33 ($M_{age} = 25$), and their teaching experience ranged from 6 months to 7 years ($M_{experience} = 17$ months).The non-participating senior undergraduate students ($n = 22$) also attended the classes and were exposed to the treatments; however, the data they provided were not used in answering the research question. Therefore, the participants of the study were selected through implementing the convenience and purposive sampling strategies as only intact groups were initially available ($n = 52$) from which only EFL teachers were purposefully selected ($n = 30$).These intact groups were randomly assigned to two groups of experimental and control. Implementing the principles of ethics in research, they were given the freedom to withdraw from the study at any point in time(Ary et al., 2019); due to this, the sample pool shrank to 23 individuals (17 or 74% females; 6 or 26% males) at the post-treatment phase.

Instrumentation

In order to fulfill the objectives of this study, the QRL scale along with the pertinent instructional materials were employed whose details and characteristics are explained in what follows.

I) The Quantitative Research Literacy Scale

The English version of the QRL scale, specifically estimating the dependent variable of this study, developed and validated byZaker, Nosratinia, Birjandi, and Yazdanimoghaddam (2019) is a 50-item Likert-type questionnaire which estimates QRL through addressing four factors and nine sub-factors; these factors, or main areas of QRL, are Developing Research Topic Knowledge (9 items), Research Design Knowledge (19 items), Procedural Knowledge (13 items), and finally Data Analysis Knowledge (9 items).

The participants are expected to respond on the basis of a six-point Likert scale, ranging from "*strongly disagree*" (1) to "*strongly agree*" (6), and the allocated time for providing the responses is 25 minutes. The total obtained scores could range from 50 to 300. In the validation study,Zaker et al. (2019) report numerous measures taken for supporting the reliability and validity of this instrument; some of these measures are model development, expert review, initial piloting, revision, administering the instrument, conducting Exploratory Factor Analysis, and finally conducting Confirmatory Factor Analysis, using the MPlus software. The calculated reliability/internal consistency index for the QRL scale in this study was estimated to be 0.93 using the Cronbach's alpha coefficient.

II) The Instructional Materials

The main employed textbook in both of the groups during the instruction was Research Methods in Applied Linguistics 1 & 2 by Farhady (2009), published by PNU University. This book covers almost all of the areas of QRL, including the four factors addressed in the QRL scale. More specifically chapters 1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, and 15 were used in the instructional process. As a reference, Research in Education

by Best and Kahn (2006), published by Pearson was introduced to the participants. Besides, Publication Manual of the American Psychological Association (6th ed.), APA, by American Psychological Association (2010) was used as a supplementary material to the main textbook; however, chapter 1 of this book which generally deals with research types, ethical standards, and crediting sources was used as a standard source of the instructed Research courses.

Procedure

To conduct this study and fulfill its pertinent objectives, a number of steps were taken which are explained in this section. To begin with, a formal approval from the officials of the Islamic Azad University, South Tehran Branch, was obtained in order to carry out this study. The experiment began with introducing the researchers, research goals, and main characteristics of the study to the participants who had enrolled in the Research course and were chosen based on convenience sampling strategy. The participants were informed that their participation in this study would be purely voluntary, and they were given the right to withdraw from participation at any point in time, for any reason, and without penalty. Moreover, they were informed that the information supplied by them will be treated as confidential. The two intact groups were randomly assigned to two groups of experimental ($n = 15$) and control ($n =15$).

Prior to commencing the instruction and delivering the treatments, the QRL scale was administered to the participants in the two groups. The participants were provided with thorough explanation about the instrument and the answering procedure; they were also informed that the answers they provide would not exert any effect on their course scores and how they would be treated. They were given 25 minutes to provide the answers while the researchers were present at the time of administration in order to resolve the problems. The scores participants obtained at this point were used as the pretest scores and enabled the researchers to inspect the pre-treatment homogeneity of the participants through conducting

pertinent analyses (see Results). The treatment phase lasted for 15 sessions of 90 minutes during 15 weeks, and both of the groups received the same method of instruction in Research Methodology; moreover, the same instructional material was employed for both of the groups. At the sixteenth/last session, the QRL scale was re-administered to the participants as posttest. The same procedure as the pretest administration (stated above) was followed for the posttest administration. However, the two classes differed over what happened in the last twenty minutes of the class. This difference was based on the type of treatment in each group which functioned as the independent variable in this study. The instructional procedures in the two groups are explained in the following sections.

I) The Experimental Group

The main objective of the researchers in the experimental group was to engage the participants in the CAPR which would enable them to put what they had just learned in the class into test. After taking the pretest, the instructor (one of the researchers) continued the first session with working on the textbook of the course which lasted for 45 minutes ($25 + 45 = 70$). Thence, during the remaining 20 minutes of the first session, the participants were introduced to CAPR, its definition, and main purpose. Following this, the participants were provided with the guideline for implementing the CAPR by Best and Kahn (2006) for implementing the CAPR (see Table 1). In addition, the instructor supplied each participant with two quantitative research papers, one descriptive/correlational and one experimental research. The participants were asked to bring the guideline and papers each session for the CAPR practice.

The order of instruction topics in the experimental group agreed with the order of topics presented in the CAPR guideline (Best & Kahn, 2006), similar to the control group. From this point onward, the last twenty minutes of each session was dedicated to CAPR after a 5-minute break. Following the break, in each CAPR session the participants were asked to categorize the topic of

that specific class session into one of the seven main areas presented in the CAPR guideline. Thence, they were asked to find the location of this topic in both of the articles. Finally, the participants were asked to critically evaluate each paper regarding the specific topic of each class session and highlight the strengths and weaknesses. Considering these strengths and weaknesses, the participants were expected to grade each paper regarding that session's specific point on a scale from 0 to 20. As the term project, the participants were asked to provide two evaluation reports for two new articles, one descriptive and one experimental, and discuss the strengths and weaknesses of each paper in seven categories (stated in the CAPR guideline).

II) The Control Group

As stated in the introductory paragraphs of the Procedure section, both of the groups shared the instructional procedure, instructional materials, and instruction length in each session of the class. However, it was explained that the two groups differed in what happened in the last 20 minutes of the class. In the control group, after administering the pretest (the QRL scale), the first session of the class continued with working on the textbook of the course, lasting for 45 minutes. At this point, the participants took a five-minute break which was followed by reviewing the instructed points in the first session. The instructor asked a number of questions pertinent to the instructed points, and volunteer students were given the chance to answer the questions. As stated earlier, the order of instruction topics in both of the groups agreed with the order of topics presented in the CAPR guideline (Best & Kahn, 2006). However, in the control group, the participants were not provided with the

CAPR guideline. This, in fact, had to do with the notion that the absence of the CAPR was the intended treatment in this group.

Similar to what took place at the end of the first class session, in all of the remaining fourteen sessions the last twenty minutes of the class was dedicated to answering the questions asked by the instructor and reviewing the points covered in each session. As the term project, the EFL teachers in the control group were asked to come up with a research topic and prepare a research proposal based on the topic.

RESULTS

In this quasi-experimental quantitative study with a pretest-posttest control group design, QRL was considered the dependent variable whereas the independent variable was the treatment type with two levels (the CAPR and the absence of the CAPR). In simple terms, the impacts of these treatments were to be checked on participants' QRL. Further, participants' age and gender were considered the intervening variables. In order for the researchers to answer the research question, a series of pertinent calculations and statistical routines were conducted whose results are presented in this section.

Pre-Treatment Homogeneity of the Participants

In order to ensure the pre-treatment homogeneity of the participants in terms of QRL, it was essential to inspect the pretest scores performing pertinent statistical routines. To do so, an independent-samples *t*-test was conducted. However, as a major prerequisite for running this parametric test, it was essential to ensure the normality of the data. For this purpose, the Kolmogorov-Smirnov test was run, results of which are presented in Table 2.

Table 2
Kolmogorov-Smirnov Test of Normality on the Pre-Treatment Data

	Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
RL1	Experimental	.148	12	**.200**[*]	.951	12	.658
	Control	.172	11	**.200**[*]	.943	11	.551

Note. Sig. values for the Kolmogorov-Smirnov test in bold indicating the existence of normality. RL1 = pre-treatment quantitative research literacy.
[a]Lilliefors Significance Correction. *This is a lower bound of the true significance.

As presented in Table 2, the Sig. values of the Kolmogorov-Smirnov test for the scores were above the critical value (.05), indicating the existence of normality of distribution (Tabachnick & Fidell, 2013). Table 3 reports the descriptive statistics on the estimated construct. Moreover, the obtained results of the *t*-test are presented in Table 4.

Table 3.
Descriptive Statistics of Pre-Treatment Scores in the Two Groups

	Group	N	Mean	Std. Deviation	Std. Error Mean
RL1	Experimental	12	169.08	19.97	5.77
	Control	11	176.45	18.15	5.47

Note. RL1 = pre-treatment quantitative research literacy.

Table 4
Independent Samples T-Test for Pre-Treatment Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
RL1	Equal variances assumed	.021	.885	-.923	21	.366	-7.371	7.985	-23.97	9.234
	Equal variances not assumed			-.927	21	.364	-7.371	7.950	-23.90	9.162

Note. RL1 = pre-treatment quantitative research literacy.

The obtained results indicated that there was no significant difference in QRL scores for the participants in the experimental group (*M* = 169.08, *SD* = 19.97) and the control group (*M* = 176.45, *SD* = 18.15), as reported (*t* (21) = -.923, *p* = .366, two-tailed). The magnitude of the differences in the means (mean difference = 7.37, 95% *CI*: -23.97 to 9.234) was very small (*eta squared* = .039, indicating a small-to-medium effect size). The obtained results indicated that the pre-treatment states of the participants in terms of QRL were internally homogeneous. This made it possible to attribute any observed difference in the post-treatment behavior of the participants to the treatments they received. The post-treatment scores are explored and compared in the following sections.

Answering the Research Question
As stated earlier, the participants of the study were exposed to two different treatments in the research courses, and the research question concerned the comparison of the participants in the experimental and control groups in terms of QRL. In order to answer this question, the data were to be analyzed through running an independent-samples *t*-test. However, as a major prerequisite for running this parametric test, it was essential to ensure the normality of the data. For this purpose, the Kolmogorov-Smirnov test was run, results of which are presented in Table 5.

Table 5

Kolmogorov-Smirnov Test of Normality on the Post-Treatment Quantitative Research Literacy Scores

	Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
RL2	Experimental	.150	12	**.200**[*]	.961	12	.805
	Control	.176	11	**.200**[*]	.938	11	.494

Note. Sig. values for the Kolmogorov-Smirnov test in bold indicating the existence of normality. RL2 = post-treatment quantitative research literacy.

[a]Lilliefors Significance Correction. *This is a lower bound of the true significance.

As presented in Table 5, the Sig. values of the Kolmogorov-Smirnov test for the scores were above the critical value (.05), indicating the existence of normality of distribution. Table 6 reports the descriptive statistics of the scores in the two groups. Moreover, the obtained results of the *t*-test are presented in Table 7.

Table 6

Descriptive Statistics of Post-Treatment Quantitative Research Literacy Scores

	Group	N	Mean	Std. Deviation	Std. Error Mean
RL2	Experimental	12	214.25	29.653	8.560
	Control	11	187.73	18.890	5.695

Note. RL2 = post-treatment quantitative research literacy.

Table 7

Independent Samples T-Test for Post-Treatment Quantitative Research Literacy Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
RL2	Equal variances assumed	1.825	.191	2.530	21	.019	26.523	10.481	4.73	48.32
	Equal variances not assumed			2.580	18.835	.018	26.523	10.282	4.99	48.05

Note. RL2 = post-treatment quantitative research literacy.

The obtained results indicated that there was a significant difference in post-treatment quantitative research literacy scores for the participants in the experimental group ($M = 214.25$, $SD = 29.65$) and the control group ($M = 187.73$, $SD = 18.89$), as reported ($t(21) = 2.53$, $p = .019$, two-tailed).

The magnitude of the differences in the means (mean difference = 26.523, 95% *CI*: 4.73 to 48.32) was large (*eta squared* = .234, indicating a large effect size). In simple terms, this meant that the CAPR had a significantly better impact on EFL teachers' quantitative research literacy. Figure 1 presents the comparative charts in order to make an overall visual comparison of the pre-treatment and post-treatment scores in the two groups of the experiment.
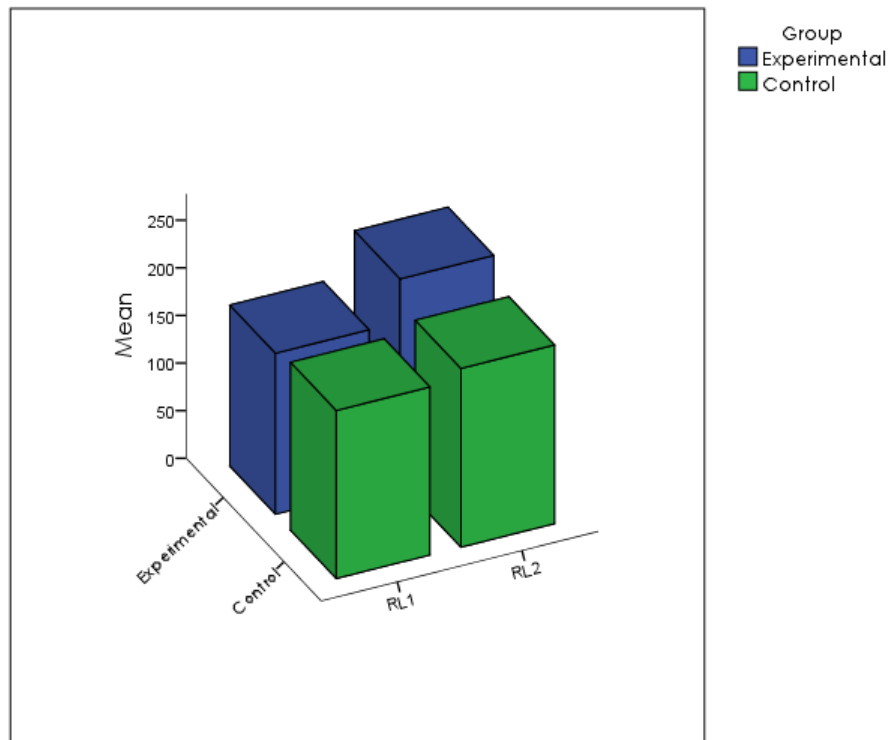
Figure 1. Comparative three-dimensional chart of pre-treatment and post-treatment
quantitative research literacy scores categorized based on the received treatment
*Note.*RL1 = pre-treatment quantitative research literacy; RL2 = post-treatment quantitative research literacy.

DISCUSSION

Training the ELT practitioners in employing reflection and critical inspection of the pedagogical events could be justified on the grounds of the constructivist paradigm which highlights the significance of self-discovery and personal reasoning when acquiring knowledge in a specific domain (Creswell, 2014). Rooted in this premise, the present study, carried out in a teacher training context, attempted to inspect the impact of implementing CAPR as a reflective and criterion-guided process on EFL teachers' QRL.

In this quasi-experimental study, QRL was considered the dependent variable whereas the independent variable was the treatment type with two levels (the CAPR and the absence of the CAPR). Prior to answering the research question, the pre-treatment homogeneity of the participants in terms of QRL was checked and confirmed. Consequently, the observed difference in the post-treatment QRL could be sensibly attributed to the type of treatment the participants received. Subsequent to meeting the assumptions of parametric tests (see Results), the obtained results of running an independent-samples t-test(t (21) = 2.53, p = .019, two-tailed) indicated that implementing CAPR yielded significantly higher levels of QRL among EFL teachers.

This finding brings about a systematic support and confirmation for the notion that ELT practitioners' critical and systematic inspection of pedagogical issues, either when engaged in teaching or when learning how to teach, can considerably develop their capacities (Akbari, 2008; Lightbown & Spada, 2013; Nosratinia & Zaker, 2017). Moreover, the obtained results make it more sensible to state that if teacher training programs do not focus on actively involving the prospective teachers in the learning process, the outcome will not be favorable (Farrell, 2012). Basically, this finding is also pertinent to the notion that consciously reflecting on a practice or topic can lead to prevention of burnout, maintain-

ing the internal motiving force, and expecting better outcomes (Dewey, 1933).

The desirability of the results notwithstanding, as it is the case with all studies, this research encountered a number of limitations which impose inevitable constraints on the interpretation and generalization of the findings (Mackey & Gass, 2015). The first point to mention in this regard is that the findings could not be directly compared to those of other similar studies as no other studies had previously addressed the objectives of this study. Moreover, there were not equal numbers of male and female participants in the sample, making gender a potential confounder. Also, the sample selection was carried out employing the convenience sampling strategy. The last point to make is that participants' internal factors, which are highly diverse and influential, along with other features of the context can influence the findings of studies in the ELT domain (Best & Kahn, 2006; Fahim & Zaker, 2014; Tabachnick & Fidell, 2013). Therefore, considering the abovementioned points, the obtained results should be interpreted with caution (Creswell, 2014).

CONCLUSION

Contemporaneous with the growing endorsement of the constructivist theory of cognitive and mental development (Ashton-Hay, 2006; Zaker, 2016), the ELT domain seems to spotlight ELT practitioners' critical mental engagement in pedagogical events(Farrell, 2012; Kumaravadivelu, 2012). Consequently, critically and systematically reflecting on the practice of teaching is now a key factor in teacher education (Akbari, 2008). Implementing CAPR seems to be the offspring of this emerging trend which deals with one specific area of teacher education, i.e. QRL. However, favoring the implementation of CAPR on its own is the reflection of an ambition to boost EFL practitioners' capability in conducting research in language teaching contexts. According to Farrell (2012) and Jay and Johnson (2002), conducting research can make a significant contribution to ELT practitioners' existing understanding of ELT and the development of pedagogical techniques.

The focus of the present study was limited only to quantitative research. In spite of the fact that research in human science is a multidimensional domain (Best & Kahn, 2006), quantitative research has qualified as an absolutely indispensable area of research (Hadi & Closs, 2016). This phenomenon has to do with the fact that ELT research is rooted in positivism through highlighting objectivity, generalizability, and being criterion-oriented (Breen & Darlaston-Jones, 2010; Springer, 2010). It is, however, essential to mention that although qualitative and quantitative studies are theoretically different, there are rules and principles which apply to both of these approaches (e.g. ethical principles; Best & Kahn, 2006); consequently, assessing mastery of quantitative research might partially indicate one's general research literacy, including qualitative research literacy.

Owing to the emergence of new concerns in the ELT domain (Ellis, 2010; Lightbown & Spada, 2013; Mitchell et al., 2013; Nosratinia & Zaker, 2014), there has been a simultaneous emergence of new concerns and techniques in carrying out quantitative research in ELT contexts (Birjandi & Siyyari, 2010; Mackey & Gass, 2015). As a result, both professional researchers and TEFL students seem to require advanced research skills in order to address different pedagogical issues (Blessinger, 2015).Conducted in an undergraduate teacher training program, the obtained results of this quasi-experimental study indicated that the implementation of CAPR yielded significantly higher levels of QRL among EFL teachers. More specifically, employing CAPR in a research course would result in significantly higher levels of developing research topic knowledge, research design knowledge, procedural knowledge, and data analysis knowledge(Zaker et al., 2019) . In the wake of this finding, it seems accurate and statistically-supported to argue that teacher training programs should endeavor to involve the students in a mentally engaging process where the content of the course is put into practice by the students. The obtained results provided further support for the

premise that actively involving the prospective teachers in the learning process will result in substantial growth in developing their skills (Farrell, 2012).

The implementation of CAPR seems to be a step toward intensifying TEFL practitioners' autonomous practice which, is defined by Little (1991) as "[a] capacity – for detachment, critical reflection, decision-making, and independent action" (p. 4). An autonomous ELT practitioner is not dependant on others for the direction and control of their pedagogical decision making (Nosratinia & Zaker, 2017), and CAPR seems to be an invaluable tool for materializing this autonomy.Based on the findings of the present study, EFL teacher trainers in both academic and non-academic contexts are recommended to implement CAPR as a standard part in the training process. Needless to say, this implementation cannot and should not be limited to Research courses. Moreover, it is suggested to consider CAPR tasks and activities as one of the key factors in the assessment process. Considering the focus, design, and limitations of this study, other researchers are recommended to:

- Replicate this study in graduate levels to inspect whether the same results would be obtained;
- Replicate this study with an equal number of male and female participants, so that gender might not limit the generalizability of the findings;
- Employ pure/simple random sampling while replicating this study in order to enhance the validity of the findings;
- Replicate this study employing some qualitative instruments and employing triangulation in order to increase the validity and reliability of the results and interpretations;
- Apply CAPR to other courses in teacher training programs and explore the outcomes; and
- Estimate and inspect the cognitive and mental capacities of the participants simultaneous with estimating their QRL levels.

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