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Research Paper

Effects of Explicit Teaching of Critical Thinking Strategies on EFL Learners' Reading Comprehension

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Abstract
Although Critical Thinking is a competency required to make students go beyond rote learning and to enhance their academic achievement, it is an under-researched construct in ELT contexts. Therefore, this study investigated whether explicit teaching of critical thinking through amalgamation of Critical Discourse Analysis and Critical Linguistics (group 1), Asking 11 Right Questions (group 2), and amalgamation of Critical Discourse Analysis and Critical Linguistics accompanied by Peer-evaluation (group 3) can improve Reading Comprehension abilities of university students in an EFL context. In so doing, the study utilized a mixed methods design including quasi-experimental and narrative feedback; with 16 participants in groups 1 and 2 each, 15 participants in group 3 as experimental groups, and 15 participants in group 4 as control group. Reading comprehension and critical thinking pretests were employed to homogenize groups at the beginning of the study; then every session 3 provocative texts were applied for critical analysis based on the treatments students received within five sessions. The reading comprehension post-test results indicated that explicit teaching of critical thinking through Asking 11

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Right Questions had the highest and most significant influence on reading comprehension ability followed by two other experimental groups with control group representing no significant gain. The findings imply that reflecting critically on learning materials can illuminate hidden cultural and ideological aspects of the texts which consequently helps learners to better understand the text, and to defend against cultural invasion.

Keywords: Critical Thinking, Questions, Critical Discourse Analysis, Peer Review, Reading Comprehension

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1. Introduction

Educational systems should consider learners not as blank vessels which should be filled with teachers' knowledge but rather as active agents who should engage in decision making, reflect critically on their learning styles and, in information era, screen out warranted from unwarranted information. The base of decision making is to have access to skills which can help judge objectively without being manipulated by agents including networks, mass or social media (Paul, 1987). Critical Thinking (CT) as a higher order thinking skill is considered to have a crucial role in logical thinking, decision making, problem solving, and defense against torrent of biased information; and it helps students to have critical reflection on their learning strategies (Butler, 2012; Halpern, 2014; Wisdom & Leavitt, 2015). Although some researchers consider it as a vague notion (McPeck, 1990), and conceive it as an organic part of the culture which can only be developed in unconscious practice and is largely restricted to L1 education (Atkinson, 1997), it is widely emphasized that in the 21st century, the development of CT, as a higher-order thinking ability, should be the top goal of higher educational systems

(Abrami et al., 2015; Bezanilla et al., 2019; Liyanage et al., 2021; Paul, 1987; Van Laar et al., 2017).

As far as language learning is concerned, researchers have asserted that fostering critical thinking skills has positive effects on language learners' achievement in EFL contexts (Davidson & Dunham, 1997) and have highlighted the importance of such skills in language learning classes (Lin, 2018; Zhao, Pandian, & Singh, 2016). Teachers should provide opportunities for language learners to enhance their higher order thinking skills in language learning classes (Davidson, 1998; Lipman, 2003). Learners should be trained to have critical reflection on the materials included for learning which is conducive to both language acquisition and enhancing critical thinking (Hashemi & Ghanizadeh, 2012; Li, 2016). Despite the importance given to the role of explicit teaching of critical thinking and its effectiveness in promoting this skill and language acquisition, the research related to CT is immature; the concept is under-investigated and requires more replicable comprehensive studies (El Soufi & See, 2019; Liang & Fung, 2020).

To verify the abovementioned assumptions and claims that explicit teaching of CT skills in an ESL/EFL context can influence academic achievements and higher order thinking skills of learners, this study has utilized a mixed method design, absent in previous studies, to explore the role of explicit teaching of critical thinking in enhancing reading comprehension ability of university students in an EFL context at Payam Noor University, Iran. The instructional approaches used to explicitly teach CT are the tenets of critical discourse analysis (CDA) and critical linguistics (CL) presented by Fairclough (1989) and Fowler (1991), asking the right and appropriate questions which involves 11 questions developed by Brown and Keeley (2015), and peer-evaluation driven from sociocultural theory which require students to engage in debate pivoted around the

amalgamation of CDA and CL over the provocative texts. The strategies were not addressed in previous studies and are novel, contributing to this study's originality as related to critical thinking, especially in an EFL context.

2. Literature Review

Epstein (2006) argues that Critical Thinking (CT) provides a defense against torrent of information from diverse sources which may manipulate behavior of the people. It is widely accepted that the development of CT as a higher-order thinking ability should be the top goal of the educational systems. Despite the emphasis given over CT, there is controversy over its agreed-upon definition, and there is a lack of consensus on its definition. Some researchers consider it a vague notion (McPeck, 1990), conceiving it as an organic part of the culture which can only be developed in unconscious practice and is largely restricted to L1 education (Atkinson, 1997). Unlike the controversy over the definition of critical thinking, debates over its teaching are fewer and center more about efficient ways of teaching it (Wisdom & Leavit, 2015). Discussions should concentrate on when, where, and how to teach critical thinking efficiently rather than on whether it is teachable or not (Haber, 2020). El Soufi and See (2019) claimed that the research in the field of CT is immature and there is a need for more comprehensive and large-scale well-grounded studies to broaden the field.

It seems that critical discourse analysis (CDA), critical linguistics (CL) and critical thinking are interrelated; CDA and CL provide critical reflection on the linguistic elements of the discourse and aim to disclose fallacies, assumptions, and ideology-laden aspect of it. CDA was introduced by Fairclough in the 1989 as an approach to interrelating language studies and social theory. He explained that CDA "aims to explore often opaque relationships of causality and determination between (a) discursive practices, events and texts, and (b) wider social and cultural structures, relations and

processes" (pp.132-3). Hashemi and Ghanizadeh (2012) contended that pivoting classroom activities and tasks around CDA enhance CT skills of students: CDA as a strategy helps develop CT abilities in EFL context.

Critical Linguistics was developed by Fowler and his colleagues in the 1970s, building on the functional grammar originated by Halliday. Fowler takes the view that any aspect of linguistic structure, whether phonological, syntactic, lexical, sematic, pragmatic or textual, can carry ideological significance. The tools with which he approached media discourse were drawn from functional linguistics and involved the analysis of the transitivity of sentences, including the role and nature of participants, the use of passives and nominalizations which may mystify relations by omitting agents, or reify events by naming them, and the impact of modality which indicated the stance of the speaker towards what was said (Bell, 1995). Review of the literature reveals that although there are general studies on the link between critical thinking and reading comprehension (Husna,2019), to the best of our knowledge there are no studies exclusively focusing on the effect of explicit teaching of critical thinking skills through CDA and CL which are helpful in disclosing the ideologies and assumptions lying behind texts.

Glasen and Bonk (1990) asserted that although there are different approaches and strategies to teach critical thinking, the approaches that focus on asking questions have the greatest impact on developing the competency and this can be more efficient when the level of questions is proportional to the level of learners. In developing teaching activities, teachers should reflect on the purposes, level and kinds of questions in order to achieve the objectives set. They believe that achieving this aim is not simple and requires practicing and training on formulating complex questions. However, the use of this instructional tool should be related to the subject area of the courses offered and teachers should not present kinds of questions irrelevant to the

subject (Williams, 2005). A teacher assigned to teach science cannot allocate class time to argue political views about events in the world in classroom, unless it is related to subject matter in the course.

This study adopts the questions developed by Brown and Keeley (2015). They provided eleven questions as a guide to critical thinking and argued appropriate and analytical application of them to the text analysis. These give a sense of direction to individuals and help them improve the quality of their thinking, judgment, writing, and speaking. To develop an operative style of thinking, researchers can use "Asking the Right Questions" (title of the book) to explicitly teach critical thinking and help learners to have critical reflection on the credibility of the materials. The 11 questions are: 1. What are the issues and conclusion? 2. What are the reasons? 3. What words or phrases are ambiguous? 4. What are the value and descriptive assumptions? 5. Are there any fallacies in the reasoning? 6. How good is the evidence: intuition, personal experience, case examples, appeals to authority, and testimonials? 7. How good is the evidence: personal observation, research studies and analogies? 8. Are there rival causes? 9. Are the statistics deceptive? 10. What significant information is omitted? 11. What reasonable conclusions are possible? (Brown & Keeley, 2015).

From the sociocultural theory stance, advancement in cognition and learning is a mediated process which arises from dialogue with others or with the self (Lantolf & Pavlenko, 1995); and accordingly, peer-review and peer-evaluation as mediational instruments are helpful to advance individuals' cognition and learning. Daud, et al. (2013) studied the effect of peer review, self-evaluation and peer evaluation on enhancing learners' higher order thinking skills and writing abilities in English for an Academic Writing course. The authors reported high correlation between critical thinking skills and academic writing abilities of the students for the peer-evaluation and

peer-review groups and showed that these assessment techniques were more efficient than the self-review and self-evaluation techniques. As the third technique of teaching critical thinking this study amalgamates CDA and CL with peer-evaluation to induce students to judge peers' analysis on the basis of guidelines from CDA and CL; it leads to an interactive and argumentative approach toward the text analysis.

Novelty of this study in terms of the role of peer review refers to the evaluation of peers in interpreting provocative texts; in this group, students evaluate each other's interpretation according to the tenets of CDA and CL. It denotes that in this group CDA and CL are amalgamated by debate and argument to evaluate other's interpretation and understanding of the same texts shared among students.

To sum up, the above literature review indicates that previous research studies have been reductionist in dealing with the role of explicit teaching of CT. This study takes a more comprehensive approach both in design (mixed methods) and options for explicit teaching of CT, creating the possibility of the comparison among four groups. To this end, the researchers have posed the following research questions for further scrutiny:

1. Does explicit teaching of critical thinking have any impact on the reading performance/ comprehension of EFL university students?
2. What are the most effective explicit teaching techniques of critical thinking to enhance reading performance/comprehension in the views of EFL university students?

3. Methodology

3.1 Participants

The population was sophomore TEFL students who were taking an oral translation course in Payam Noor University, West Azerbaijan, Iran; out of 108 participants, 37 of students had averages below 14 and were excluded from the study and all 71 remaining students were employed as the sample.

But due to the unexpected problems in URUSUN, software for teaching and evaluation in Payam Noor University, and internet connection issues, 9 out of 71 students were dropped from the study and data from 62 students were used for final analysis. Two pre-tests including the critical thinking appraisal test (Watson & Glaser, 2002) and the reading comprehension section of an institutional TOEFL test (ETS, 2003) as well as the average scores of students in the previous semester (those with an average lower than 14 were excluded from the study) were used to screen participants for inclusion and to homogenize groups. Due to the limited number of participants and unexpected emergence of COVID 19 which led to logistic problems (providing acceptable internet for all participants and class participation) the research followed an intact group design with 16 students in groups one and two and 15 students in group three as experimental groups (3 groups) and 15 students in control group; 15 out of 62 students were males and 47 of them were females. Based on pretests and students' average, groups were formed and were confirmed by ANOVA to be homogenous.

3.2 Data collection Instrument

To collect data to show the effects of explicit teaching of critical thinking skills on learners' reading comprehension the "Watson-Glaser Critical Thinking Appraisal" (CTA) (Watson & Glaser, 2002) and a sample TOEFL reading comprehension test (administered in 2003 by Educational Testing Service or ETS) were administered twice for both control and experimental groups; initially as pretests then as posttests. Although no explicit information by CTA developers has been reported on its validity, the explanations offered by its providers (according to the W-G User-Guide and Technical Manual) speak to its adequate validity and reliability. "W-GCTA passages contain stimulus material similar to that encountered on a daily basis at work, in the classroom, and in newspaper or magazine articles"

(2012, p. 38). Therefore, the tasks require critical thinking which is relevant to contextual material.

TOEFL reading comprehension test included 38 questions selected randomly from the abovementioned book. Both the TOEFL test and CT questionnaire were piloted with students similar to target samples. The researchers estimated the reliability of the TOEFL test and questionnaire via Cronbach's alpha which were found to be .86 for both of them. CTA includes 80 items with 5 subtests; subtests of CTA along with the corresponding descriptions include:

Test 1: Inference: Discriminating among degrees of truth or falsity of inference drawn from given data (items 1-16).
Test 2: Recognizing Unstated Assumptions: Recognizing unstated assumptions or presuppositions in given statements or assertions (items 17-32).
Test 3: Deduction: Determining whether certain conclusions necessarily follow from information in given statement or premises (items 33-48)
Test 4: Interpretation: Weighing evidence and deciding if generalizations or conclusions based on the given data are warranted (items 49-64).
Test 5: Evaluation of Arguments: Evaluation of Arguments: Distinguishing between arguments that are strong and relevant and those that are weak or relevant to a particular question at issue (items 65-80).

Also, to triangulate the findings obtained from the quantitative data collection and analyses, narrative feedback was obtained in written form from the students about the effects of treatments to fathom the processes that learners went through in different experimental and control groups. The narration focused on the attitudes of learners toward the explicit teaching of critical thinking and how they thought that it could motivate them more to have critical reflection on their thoughts, reading comprehension texts and exposed information from different perspectives. Also, narration focused on how learners detached their feelings and emotions in discourse and text interpretation and how they tried to decipher the truth on the bases of evidence, statistics, and reflection on the ideology-laden linguistic features. Qualitative reflection on the aspects of critical thinking may help to have

deep understanding of the effects of explicit teaching of critical thinking from the learners' perspectives.

As students might not have the language requirements to represent their means the narration was conducted in Persian; the students who were proficient in writing skills provided their narrative in English. Also, it should be mentioned that the narrative feedbacks which were incomplete and irrelevant to the research aim were dropped and in the case of vagueness the researcher asked learners to elaborate on what they meant. In order to obtain rich and comprehensive data, some relevant questions as follows were provided for students to scaffold them:

1. How do you think the treatment may help you to process texts and reading comprehension critically?
2. How do you think the treatment may help you to interrelate instructional materials with social and life affairs?
3. Do the treatments induce you to consider any kind of claims from divergent perspectives? If yes, how?
4. Were the treatments helpful in developing impartial thinking and metacognitive strategies?

3.3 Procedure

The study was conducted from 26 September until 30 December in 2020 over 16 sessions: within two sessions (for 3 hours) students were familiarized with the concept of CT; within 3 sessions (for 4.30 hours) groups received treatments, except control group which without any CT-related instruction, engaged in general discussion and analysis of texts; and within 11 sessions (for 14.30 hours) both control and experimental groups engaged in the analyses of 33 texts chosen from the book *Asking the Right Questions: A Guide to Critical Thinking* (Brown & Keeley, 2015). The following steps were followed sequentially: 1. the researchers introduced the concept of critical thinking to all students taking the course in 2 sessions; 2. both control and experimental groups took reading comprehension pretest; 3. both control

and experimental groups took CT pretest; 4. every experimental group received treatment for 3 sessions (as described next) and control group without any CT-related instruction engaged in general discussion and analysis of texts for 3 sessions; 5. both control and experimental groups engaged in the analyses of texts according to the treatments they received for 11 sessions with 3 texts being analyzed each session; 6. both control and experimental groups took reading comprehension posttest; and 7. all participants in control and experimental groups provided their narrative feedback in written form; students who were proficient enough provided them in English; other narrative feedbacks that were provided in Persian were translated into English by researchers themselves who are university lecturers.

The researchers introduced the concept of critical thinking to all students taking the course in 2 sessions; and then based on the average of students in the previous semester, and critical thinking and reading comprehension pre-tests, they formed the study groups and started the treatments. The formed groups agreed with the initial structure of intact classes. In experimental group one, the researchers used strategies including Nominalization, Passivization, Transitivity, and Over-lexicalization, as tenets of Critical Linguistics (Fowler, 1991), to raise consciousness of the students toward the ideology-laden aspects of news.

Also, to analyze texts critically the researchers amalgamated critical linguistics with critical discourse analysis and referred to Fairclough's (1989) three-dimensional model including: description, interpretation, and explanation.

To employ these strategies in text analysis, the researchers provided some argumentative headlines and texts with divergent perspectives from FOX NEWS and ALJAZIERE and analyzed them. For example, two headlines

were provided: 63 terrorists killed in Iraq (FOX NEWS) vs. Scores of fighters martyred in Iraq (ALJAZIERE) and were analyzed by answering questions like why sentences were used in the passive form; and why news agents with divergent perspectives cover the same event differently through the use of different ideological lexis. The researchers taught these strategies and applied them in the analyses of some sample texts and news headlines within 3 sessions to help students how to apply them in the analyses of 33 texts.

In experimental group 2, the researchers presented within 3 sessions 11 questions driven from Brown and Keeley (2015) and taught students how to challenge and analyze critically every kind of discourse by asking these questions in the right time. These questions helped the students to base their interpretation on evidence and facts and also helped them to decipher surreptitious fallacies employed by networks and texts which were beyond understanding of ordinary people. To help students how to apply these questions the researchers provided some sample texts and through these questions discovered the issues and arguments of texts and the evidence which supported claims and also discovered the assumptions residing in texts. In experimental group three, the researchers amalgamated CDA and CL and then asked students to analyze the texts critically and evaluate peers' interpretation based on the tenets of CDA and CL and also asked them to engage in debate over the interpretations; this was also done within 3 sessions. In control group the students within 3 sessions were asked to provide their suggestions about how to analyze texts critically without receiving any treatments.

After providing treatments and scaffolding feedbacks (as described earlier) about how to analyze the texts, students were asked to analyze 3 texts, same for all groups, critically every session; in control group they

analyzed the texts using their own resources. Including structured guidance or collaborative arrangements in designing and implementing course (Yuan,Yang, & Stapleton, 2020) and critical reflection on the texts are very helpful in advancing higher order thinking skills and internalizing the language (Li, 2016; Liang & Fung, 2020). Three texts were provided for every session for eleven sessions, totally 33 texts, and the reason of selection from the book by Brown & Keeley (2015) was due to the provocativeness and argumentativeness of the texts in different subjects including politics, human rights, sports, advertisements, education, medicine, ethics, law, sanitation, etc. Students analyzed 33 texts during the research project in online classes and then took part in posttests. One day before every session the researchers delivered 3 texts for analysis and when the online classes started students presented their analysis and interpretations, which lasted for 1.30 hours, according to the treatments they received.

It should be mentioned that due to COVID 19 and strict limitation for the presence of students in the classroom all activities were done by URUSUN (a software system for online teaching and evaluation in *Payam Noor University*). Qualitative data were received after quantitative data and students sent their narration through URUSUN three days after posttests.

3.4 Data Analysis

As the study compared the performance of more than two groups with one independent variable (the effects of explicit teaching of critical thinking) and one dependent variable (reading comprehension performance of the students) one-way ANOVA statistical technique was used for this purpose. The qualitative data were analyzed descriptively and manually.

4. Results

Findings of the research are presented in two sections based on the quantitative and qualitative research questions as the study used a mixed

methods design. As reported next, a comparison of the quantitative data obtained from pretests and posttests for groups revealed significant improvements in reading comprehension scores for experimental groups which can be attributed to the strategies utilized to teach critical thinking skills. Also, data from narrative feedback revealed how students perceived the role of explicit teaching of critical thinking in their academic achievements and social and personal life.

4.1 Quantitative Results

To answer the quantitative research question (question 1), one-way ANOVA was applied. The results of one-way ANOVA for pretests obtained from Reading Comprehension test and Critical Thinking Appraisal and also for average of the students displayed no significant differences among the groups. Table 1 includes descriptive statistics for pretests of Reading Comprehension and Critical Thinking and also for Averages of groups.

Table 1
Descriptive statistics for Averages and pretests of Reading Comprehension and Critical Thinking

Groups	N Statistic	Range Statistic	Mean Statistic	Std. Error	Std. Deviation	Variance Statistic
Group1 Aver	16	4.50	15.54	0.33	1.32	1.75
Group2 Aver	16	4.71	15.64	0.35	1.41	2.00
Group3 Aver	15	3.74	15.84	0.28	1.12	1.26
Group4 Aver	15	3.83	15.55	0.31	1.20	1.46
Group1 Reading	16	24.0	19.87	1.56	6.24	39.05
Group2 Reading	16	21.00	19.62	1.60	6.41	41.18
Group3 Reading	15	19.00	19.53	1.60	6.20	38.55
Group4 Reading	15	23.00	20.33	1.68	6.53	42.66
Group 1 CT	16	28.00	39.31	1.87	7.48	55.96
Group2 CT	16	18.00	39.62	1.27	5.08	25.85
Group3 CT	15	27.00	39.73	1.73	6.70	44.92
Group4 CT	15	21.00	39.86	0.50	5.81	33.83

Also as shown in Table 2, with an alpha level .05, one-way ANOVA displayed that groups were homogenous in terms of averages and pretests of Reading Comprehension and Critical Thinking.

Table 2
One-way ANOVA for Averages and pretests (Reading Comprehension and CT)

	S.O.V	Sum of Squares	df	Mean Square	F	P
Aver	Between Groups	0.49	3	0.16	0.10	0.959
	Within Groups	94.58	58	1.63		
	Total	95.07	61			
CT	Between Groups	2.61	3	0.871	0.02	0.99
	Within Groups	2329.85	58	40.17		
	Total	2332.46	61			
Reading	Between Groups	5.82	3	1.94	0.04	0.98
	Within Groups	2340.56	58	40.35		
	Total	2346.38	61			

After the students were grouped homogenously, they received treatments and then were asked to apply received strategies to analyze the texts critically. Reading post-test was used to measure the effects of treatments over the Reading Comprehension of participants. Table 3 displays descriptive statistics of how experimental groups are different from control group and also how achievements in experimental groups are different from each other and from the achievements of pretests.

Table 3
Descriptive statistics for posttest of Reading Comprehension

	N	Range	Mean		Std. Deviation	Variance
Groups	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Group1	16	21.0	25.62	1.45	5.80	33.71
Group2	16	20.00	26.62	1.45	5.80	33.71
Group3	15	20.00	23.26	1.59	6.1	38.2

Group4	15	23.00	20.46	1.76	6.85
46.98					

To confirm descriptive statistics and significance of achievement for experimental groups one-way ANOVA was employed to compare post-test performances. As shown in Table 4, with an alpha level .05, the result of one-way ANOVA for Reading Comprehension posttest displayed significant differences between the groups. Comparison of tables for pretests and posttest illustrates significance of Reading Comprehension achievements which are due to the effects of explicit teaching of critical thinking by the abovementioned strategies; also, the result was significant for the posttest of Critical Thinking Appraisal which is not presented in this study.

Table 4

one-way ANOVA for posttest of Reading Comprehension

	Sum of Squares	df	Mean Square	F	p
Between Groups	347.575	3	115.858	3.049	.036
Within Groups	2204.167	58	38.003		
Total	2551.742	61			

To understand whether relevant treatment in each group led to gains in reading performance, gain scores for each group were calculated. Table 5 shows these for reading scores.

Table 5

T-Test for Gain Scores in Experimental and Control Groups

		M	SD	df	T	
(G1) 15	R2 – R1	5.75000	4.21900	5.452	.000	
(G2) 15	R2 – R1	7.00000	3.38625	8.269	.000	
(G3) 14	R2 – R1	3.73333	3.86313	3.743	.002	
(G4) 1 4	R2 – R1	.13333	2.29492	.225	.825	

Also, the researchers used one-way ANOVA to understand whether gain scores were significant across groups. As shown in Table 6, the difference was significant across groups.

Table 6
One-way ANOVA for Gain Scores in Reading Comprehension

	Sum of Squares	df	Mean Square	F	p
Between Groups	415.172	3	138.391	11.122	.000
Within Groups	721.667	58	12.443		
Total	1136.839	61			

As there are sig differences between groups, the researchers used Tukey as a post hoc test to identify the place of difference; as shown in Table 7.

Table 7
Tukey test for reading comprehension

Dependent Variable	(I) groups	(J) gruops	Mean Difference (I-J)	Std. Error	p
Reading	1	2	-1.00000		
		3	2.17953		.968
		4	2.35833		
	2	1	2.21556		.712
		3	5.15833		
		4	2.21556		.103
	3	1	1.00000		
		2	2.17953		.968
		4	3.35833		
	4	1	2.21556		.435
		2	6.15833*		
		3	2.21556		.036
			-2.35833		
			2.21556		.712
			-3.35833		
			2.21556		.435
			2.80000		
			2.25101		.602
			-5.15833		
			2.21556		.103
			-6.15833*		
			2.21556		.036
			-2.80000		
			2.25101		.602

*. The mean difference is significant at the 0.05 level.

Tukey post hoc test represents that except group 2 all other groups are similar and do not represent significant differences for treatments. Here, every group is compared by other three groups one by one and the table 7 displays that groups 1 and 3, as experimental groups, and group 4, as control group, do not show any significant differences in achievements as a result of CT teaching; although one-way ANOVA and t-test for gain scores displayed significant achievements for experimental groups 1 and 3. Tukey post hoc test recognizes the highest significance for Asking 11 Right Questions, group 2, and indicates explanatory authority of the 11 Right Questions in significantly improving reading comprehension competency of the students. .

One-way ANOVA, t-test for gain scores, and descriptive statistics helped to answer the research question that explicit teaching of critical thinking through 3 strategies in 3 experimental groups has impact on the reading performance/ comprehension of EFL university students. The results indicated that explicit teaching of critical thinking through Asking 11 Right Questions (with M=7 for gain scores) had the highest and most significant influence followed by amalgamation of CDA and CL (M=5.75), and amalgamation of CDA and CL accompanied by Peer-evaluation (M= 3.73), respectively with control group (M=.13) representing no significant gain. To sum up, although Tuckey post hoc test appointed the highest and significant role for Asking 11 Right Questions, achievements for 3 experimental groups were confirmed to be significant as far as gain scores are concerned.

4.2 Qualitative Findings

In order to triangulate quantitative findings, and to fathom the processes that learners go through in different experimental and control groups, the researchers obtained qualitative data in the form of narrative feedback. It was conducted in Persian as students might not have had the language requirements to represent their ideas clearly in English; the students

proficient in writing in English provided their narrative feedbacks in English and others were translated into English by researchers. The narrative feedback focused on the attitudes of the learners toward the effects of explicit teaching of critical thinking over reading comprehension and how they thought that it could motivate them more to view the exposed information from different perspectives and represented students' perspectives of the issue. To uncover efficiency of the treatments from learners' perspective the researchers provided some provocative questions mentioned before, and after receiving the narrative feedback from all of the students, selected those which included full viewpoints for analysis (i.e., they had reflected on all posed questions); for all groups without any consideration unhelpful and uninformative feedbacks were dropped. This indicates that narrative feedbacks irrelevant to the treatment and activities done in the classroom and those based on students' commonsense understanding of the concept and materials driven from the internet were removed from the analysis. The word mean for narrative feedbacks in four groups was estimated to be 238 words.

In group 1 in which students were treated through amalgamation of CL and CDA, 5 acceptable narrative feedbacks out of 16 revealed a common point; Critical Linguistics and Critical Discourse analyses helped them to reflect critically on any exposed data, the lexis and structure of texts, and reading comprehension. Narration revealed that students raised questions to address the structure and lexis of texts; some of the examples include: "Why is the text used in this way than another way? Why did the author use the sentences in passive or active form? Are texts and sociocultural factors interrelated? What power relationships are presented in the text?" Also, they mentioned that after treatments and working with texts they began to become suspicious of their ideas and how they can enhance the quality of their thought. One of the students stated

> "After our mind was illustrated about CT, CDA, and CL we started to think carefully about every kind of subject and tried to discover mysterious points about the texts… as I practiced application of critical Linguistics and Critical Discourse Analysis in text analysis in online classes, I tried to be careful of the structures and expressions in doing the reading comprehension".

In group 2 in which critical thinking was taught by raising 11 questions, 4 out of 16 narrative feedbacks were accepted and included for descriptive analyses. The analysis revealed that 11 questions were practical in convincing students to be curious about the claims and the data that they encounter and they revealed that the questions made students address the reading comprehension texts from divergent perspectives to understand the true intention of the author. Also, the narrations revealed how the questions were encouraging in students' personal life and showing how the thought was fraught with fallacious, biased, false and unanalyzed data. For example, one of the students stated

> These questions helped me to reflect critically on the exposed data and to discover hidden meaning in the texts….in answering reading comprehension questions I was very curious to find the fallacies and unstated assumptions surreptitious in texts. Before the course I had the desire to think critically but teaching the strategies revealed that I misunderstood the concept; scaffolding my desire with 11 questions helped me a lot in dealing with texts and analyzing them critically.

To sum up, they confirmed that the treatments were helpful in their personal, social, and academic life but they also mentioned that the teaching was insufficient and incorporation of critical thinking in curriculum should be compulsory and start from early ages.

> Group 3 students were taught CT through CDA and CL and were required to engage in peer-evaluation afterwards. 4 out of 15 narrative feedbacks were found acceptable for analysis and revealed that applying the techniques and evaluation by peers were practical in helping students to

> see the texts from divergent perspectives, in inducing them to reflect on themselves, in seeing how their thinking was limited and contaminated with egocentric and socio-centric issues; but at the same time notes indicated that it was a difficult work and required more perseverance. For example one of the students stated "Critical Linguistics and Critical Discourse Analysis are like a filter that separates biased from real and authentic opinions and help us not to make uncritical and blind decisions… they in social and personal life give individual opportunities to discover relationships between society and language and also help me to have self-knowledge…After this course and evaluation of my peers' interpretations I returned to the broacher of make-up once I used to reconsider discourse features of the advertisement and discovered some tricks and recognized why I didn't get the purported result from its use…they are very helpful in advancing thinking and learning styles but at the same time they are very breathtaking."

Narrative feedbacks in experimental groups and control group corroborate the findings of quantitative data analysis.

In control group out of 15 feedbacks, 5 of them were accepted and revealed that students had a desire to reflect critically in the analyses of texts but they did not clarify how to analyze the texts critically; they provided definition of critical thinking driven from internet and talked about the analyses of texts based on their own common sense. They did not mention anything about how the concept of critical thinking and text interpretation helped them in answering reading comprehension or how critical thinking could help them in their personal or academic life; their narration triangulated findings of quantitative data analysis. For example, one of the students stated "Thinking is a powerful instrument which distinguishes man from animals and we should learn to think critically to show our priority over other creatures…all people should think critically in reading texts…." To sum up, narrative feedbacks provided by experimental groups revealed that the treatments were practical in helping students to reflect critically on materials

in the classroom and also enhanced their reading comprehension ability; but this was not the case for the control group.

5. Discussion and Conclusions

This study set out to explore how explicit teaching of critical thinking through amalgamation of CDA and CL, Asking 11 Questions, and amalgamation of CDA and CL accompanied with Peer-evaluation can influence reading comprehension of university students in an EFL context. The results clarified how providing provocative texts and requiring students to discover the claims and surreptitious ideology residing in them mediated readers' mind and thought; challenges and scaffolding supports by treatments helped students to advance their reading comprehension performance. Comparison of the pretests and posttests revealed the significance of the findings for three experimental groups while no gains were attained for the control group.

Both quantitative and qualitative results provided positive answers to the research questions and confirmed that explicit teaching of critical thinking in experimental groups through three different strategies was efficient in helping students to explore and interpret the texts critically; this efficiency was represented post intervention in answering reading comprehension tests.

Effects of questions in teaching critical thinking to advance the academic achievements of learners confirm that asking well-organized questions is a cognitive activity which assists students in applying, analyzing, evaluating, and creating as the key educational objectives at the Higher Order Thinking level (Zohar & Barzilai, 2015). Quantitative and qualitative findings confirm explanatory authority of the 11 questions in developing the competency of the students and enrich the background of the study. Findings of the study confirm that pivoting classroom activities around the tasks which require students to have critical reflection on the materials or talks are facilitative to

boost higher order thinking skills related with metacognitive operations (Liang & Fung, 2020) and accelerate language acquisition (Li, 2016). These claims are represented in the quantitative and qualitative findings of the study and prove how critical reflection on the materials in EFL contexts aids students to advance their reading comprehension skills; this view of critical reflection on the materials in language learning classes is under-researched and vague for teachers. Also, the findings substantiated that providing students with opportunities to reflect critically on the exposed materials and also requiring them to scaffold each other enhance higher order thinking skills and academic achievements of the students; scaffolding feedbacks as mediational instruments are helpful in advancing individuals' cognition and learning (Daud, et al. 2013; Lantolf & Pavlenko, 1995; Zare et al., 2021).

The significance of this study resides in the fact that the findings reverberate positive role of explicit teaching of critical thinking in enhancing academic achievements of learners. Second, the findings of the present study certify sociocultural theory which asserts that feedbacks in the forms of social and interpersonal interactions play significant role in knowledge construction and cognitive development (Mousavi & Ketabi, 2021) and also certify that learning is a process of discovering, questioning, and reformulating hypotheses (Pennycook, 1994). Third, the study verified that exposing students to provocative texts containing ideological conjectures and requiring them to be aware of the quality of the language used in the construction or analysis of argument are beneficial in enhancing reading comprehension of the students. Fourth, the study unlike previous studies which talked vaguely about the role of questions in developing critical thinking and academic achievements of students indicated that providing well-worked questions applicable to every kind of discourse to challenge the ideological assumptions of authors is a beneficial metacognitive practice which move

students beyond rote learning. Finally, it focused on critical reflection on the linguistic features of texts by interrelating them with sociocultural and political contexts which helps learners go beyond surface to fathom hidden meaning; reading comprehension is enhanced through critical reflection on language.

Also, the study provides the following implications for learners, teachers and teacher educators. First, this study can be helpful for learners in different ways: Above all, it helps them to interrelate educational and life context which means that they should consider learning materials not neutral but as involving social practices laden with social, cultural, and ideological issues. Second, in EFL contexts, like Iran, it helps learners to have critical reflection on the learning materials to decipher and challenge hidden cultural and ideological aspects of the texts and lexis which consequently helps to defend cultural invasion and acts as a focus-on-form strategy to facilitate language acquisition. Third, as critical thinking is considered a standard of high intellectual excellence, its promotion may act as cognitive and metacognitive strategies to address learning or hurdles of learning; this helps learners in their academic achievements. Fourth, in EFL contexts like Iran teachers mainly focus on the linguistic features of materials and teaching language and do not receive adequate training about critical thinking and its interrelationship with academic achievements (Birjandi et al., 2018); this study provides insights for them how to apply strategies and techniques to enhance critical thinking skills which are conducive to academic achievements of learners. Finally, this comprehensive study is beneficiary for teachers in helping them to be critical and reflective of their own practices, strategies and methods applied in classrooms. It helps them to have contemplation on the source of their ideologies about teaching practices and

induces them to be open about new teaching methodologies, technologies, and changes and also welcome challenges created by students.

To sum up, as this study followed a replicable comprehensive and multi-dimensional and mixed-methods approach, it can broaden the field of study related to the explicit teaching of critical thinking through efficient techniques and strategies and its effects on academic achievements of students in EFL contexts. Although the study generated significant findings and has significant pedagogical implications, it is limited in one way; due to COVID 19 all activities and treatments were done online through the use of URUSUN, a software for teaching and evaluation in Payam Noor University in which some unexpected events occurred and influenced the richness of study. As some students did not have full access to the internet, 9 of them were dropped from the study; and during the course, there were internet connection problems; it seems that claims may not be proportionate to the number of participants. Second, as the research was done over a semester and the concept was completely unfamiliar for students in the EFL context in question, and the researchers unexpectedly were compelled to teach online, the time for intervention and applying questionnaires was limited.

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