

Journal of English Language
Teaching and Learning
No. 16, 2015

**The Effect of Teaching Critical Thinking Skills on the Language
Learning Strategy Use of EFL Learners across Different EQ Levels**

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Abstract

The present study was conducted to investigate how EFL learners with distinct levels of emotional intelligence might benefit from Critical Thinking-based instruction and use different language learning strategies. A further concern of this study was to investigate the relationship among critical thinking, language learning strategy, and emotional intelligence of EFL learners. To this end, 88 EFL learners studying at private English language institutes in Shiraz took 4 sets of instruments: Oxford Placement Test, California Critical Thinking Skills Test (CCTST), Bar-On Emotional Quotient inventory (EQ-i), and the Strategy Inventory for Language Learning (SILL). The results of the statistical analysis revealed that teaching CT skills had a significant effect on the LLS use of EFL learners across different EQ levels. However, no significant difference was found between LLS scores of students with high and low EQ levels. Moreover, a significant positive relationship was found between critical thinking and emotional intelligence, and overall language learning strategy and critical thinking. The results of the present study might give insight to EFL teachers so as to make them aware of the higher order thinking skills required for a successful application of language learning strategies in foreign language learning context.

Keywords: Critical Thinking, Language Learning Strategy, Emotional Intelligence

تأیید نهایی: ۹۴/۷/۱۴

تاریخ وصول: ۹۳/۱۲/۲۵

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Introduction

Recent trends in the education domain, especially language learning and teaching, emphasize the importance of critical thinking skills and the role it plays in students' academic success and life. The primary purpose of meaningful education is to teach students the higher order thinking skills (Paul, 1993). Moreover, conscious learning and active teaching with the focus on critical thinking skills might result in students' success in any field, particularly foreign language learning where a combination of cultural, social, and political issues is involved (Arends, 1998).

In 1990s, there was a shift of emphasis from the products of learning towards the processes through which learning takes place (Oxford, 1990). As a result, the concept of strategies and their roles in the facilitation of learning the second language gained widespread attention. Language learning strategies are "specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferable to new situations" (Oxford, 1990, p. 8). Interest in teaching language learning strategies to second language learners is due in large part to the fact that learner-centered methods of teaching has gained widespread attention.

The use of LLSs can be related to personal factors such as gender, age, and proficiency level on the one hand. On the other hand, it is possible to look for some links between LLSs and cognitive factors such as critical thinking. As far as language learning and thinking are closely correlated, the teaching of higher-order thinking skills is of utmost importance in developing EFL learners' LLS use. Scholars have emphasized the importance of enhancing CT skills and critical language awareness in foreign language classrooms (Tarvin & Al-Arishi, 1991; Davidson, 1994; Chamot, 1995). According to Curry (1999), English language learning classroom might be an ideal place for CT-integrated activities where social empowerment can be fostered through challenging and questioning.

Although the classroom setting is the best place for the development of critical thinking skills, for English language learners, the combination of critical thinking with four macro skills is still a

challenge (Kagnarith, Tara& Klein, 2007). Unfortunately, sometimes EFL learners are not aware of critical thinking skills and effective language learning strategies. For example, Usuki (2000) found that there are some psychological barriers to the adoption of effective language learning strategies by Japanese students, who are usually considered as passive learners. It seems that the same condition is common in some language classrooms in our country (Rabi   2010).

Observing EFL classes, Rabi  (2010) stated that activities such as defining basic concepts, recalling facts, stating the main existing ideas, summarizing the texts, and paraphrasing the sentences were common in most of the classes in Iran. Such activities, according to Bloom (1956) taxonomy of educational objectives, are regarded as lower-order thinking skills. Furthermore, Iranian EFL learners accept ideas without judging them in terms of truthful pieces of evidence (Tabatabaei & Parsafar, 2012, p. 57).

Emotional Intelligence (EI) is one of the personal factors that have gained widespread attention in recent years. Previously, intelligence was viewed as taking only verbal and mathematical capabilities of individuals, thus failed to count for language learners potentials for further growth. The concept of EI was first introduced in 1990 by Salovey and Mayer. Later, with the publication of Goleman's book entitled *Emotional Intelligence* in 1995, the concept gained widespread attention. In this view, *intelligence* is the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and action (Salovey & Mayer, 1990, p. 189). Thus, it is worth shedding light on the relationship of EI and LLS, and recognizing its contribution to LLS use in L2 context, considering that there is some evidence (e.g. Olivares-Cuhant, 2011) that both LLS and EI variables can result in L2 learners' success.

Considering the fact that LLS facilitates language learning and leads to better performance and success while learning a new language (O'Malley & Chamot, 1990), this study seeks to empirically uncover variables affecting or relating to LLS (i.e. critical thinking and emotional intelligence). The link between language learning strategy

and academic achievement in different fields of study has been proved. However, to the researchers best knowledge, it seems that the number of studies conducted on the significant role of CT-based instruction in English language classrooms as an important factor that might affect the language learning strategy use is rare, while it seems to be one of the major challenges that Iranian EFL learners face in second language classrooms.

Based on what has been mentioned above, involving the EFL learners explicitly in critical thinking opportunities might prove to be an effective approach in making them select and apply more language learning strategies, and become creative users of English. Therefore, the researchers hope that the results of the study would shed more light on the effect of CT instruction, and help EFL learners use more language learning strategies. It further aimed to investigate the relationship between EI, LLS and CT, and determine how individuals with distinct levels of emotional intelligence might benefit from training CT skills.

Literature Review

Teaching critical thinking skills

The significance of teaching critical thinking skills in educational context has been documented extensively in previous literature (e.g. Chamot, 1995; Chapple & Curtis, 2000; Davidson, 1995; Heyman, 2008; Tarvin & Al-Arishi, 1991; Van Gelder, 2005; Willingham, 2007). As Robinson (1987) reports, if students are to function successfully in a highly technical society, then they must be equipped with lifelong learning and thinking skills necessary to acquire and process information in an ever-changing world (p. 16).

In an EFL context, ways and models through which CT might be taught have been the subject of controversy among scholars in the field (Thompson, 2002). Various instructional strategies have been proposed by researchers to encourage the development of CT skills, such as cooperative learning, problem based learning, constructivist techniques, and modeling. Ennis (1987) typology of the instructional approaches in critical thinking includes the following:

- The general approach: Critical thinking can be taught separately.
- The infusion approach: Critical thinking can be infused in instruction in existing subject matter areas.
- The immersion approach: Critical thinking can be resulted from a student's immersion in the subject matter.
- The mixed approach: Critical thinking can be taught as a combination of the general approach with infusion or immersion (p. 4).

Other approaches in teaching critical thinking skills involve direct versus inferential techniques. In the direct technique, critical thinking skills are taught explicitly to students, while in inferential technique, students are placed in circumstances which call for them to apply these skills (Cotton, 1991). Whether to teach in the direct or infusion method is not an easy question to answer. As Yucel (2008) claims, there is not a specific framework showing which approach should be used for a particular situation because of the lack of comparative studies in this respect (p. 24).

Specific classroom learning activities are also found to be effective in promoting CT skills, such as graphic organizers, KWL charts, in a nutshell writings, exit slips, mock trials (Bonk & Smith, 1998), self-assessment and peer assessment (Rezaei, Derakhshan, & Bagherkazemi, 2011), and media analysis. Furthermore, questionnaire projects that integrate the four macro skills can develop CT skills (Kagnarith et.al, 2007). Exposing students to news stories and reports that contain ideological, political, and socio-cultural assumptions are also effective techniques to foster EFL learners' CT skills. Unfortunately, in an EFL context like that of Iran, the lower order thinking skills such as defining basic concepts, recalling facts, stating the main existing ideas, and summarizing the texts are still focused on (Rabi et al, 2010) and most of the instructional programs for teacher training courses lack the necessary techniques through which the CT skills can be taught and practiced in the language classrooms.

Consequently, considering the fact that high-level thinking skills can be improved by training, the researchers deemed it necessary to

design a CT-based instructional program in an EFL context to help language learners select and apply appropriate language learning strategies and thereby become creative users of English.

Studies on critical thinking, emotional intelligence, and learning strategies

Since 1990, a cluster of variables have been explored in L2 contexts to determine their relationship with or effects on learners' strategy use. Among these factors, emotional intelligence (e.g. Hasanzadeh & Shahmohamadi, 2011; Nosratinia, Niknam & Sarabchian, 2013; Rahmani, Sadeghi & Khanlari, 2013; Zarafshan & Ardeshiri, 2012), and critical thinking (e.g. Nikoopour, Amiri Farsani & Nasiri, 2011; Nosratinia, Ghanbari Asiabar & Sarabchian, 2014) have been the subject of investigation.

Regarding the importance of learning as a complex process which is the result of various factors like cognition, emotions and strategies, Hasanzadeh and Shahmohamadi (2011) conducted a study to investigate the relationship between Emotional Intelligence and Learning Strategies at the academic level. To carry out the study, 100 university students from different fields of study were selected randomly. For data collection, two sets of questionnaires were given to the participants: Bar-On questionnaire and Learning and Study Strategies Inventory (LASSI). The findings revealed a significant relationship between students' total emotional intelligence and learning strategy use in both females and males. Further, no significant differences were found between students' emotional intelligence, learning strategies and their field of study.

The relationship between language learning strategy use and critical thinking was examined by Nikoopour, Amiri Farsani, and Nasiri (2011). To that end, Strategy Inventory for Language Learning (SILL), and a questionnaire of Critical Thinking were administered to 100 college students majoring in English Translation. The findings revealed a statistically significant relationship between specific direct and indirect language learning strategies such as cognitive, metacognitive, and social strategies with critical thinking, whereas memory, compensation, and affective strategies appeared to have no

relationship with critical thinking. They concluded that the utilization of language learning strategies could help students to enhance their way of thinking, and think more critically.

Likewise, Nosratinia, Ghanbari Asiabar, and Sarabchian (2014) randomly selected 250 sophomore, junior, and senior undergraduate students majoring in English Translation and English Literature and asked them to fill in the two questionnaires on Strategy Inventory for Language Learning (SILL) by Oxford (1990), and a questionnaire of Critical Thinking (CT). Correlation analysis resulted in significant relationships between EFL learners' use of language learning strategies and critical thinking. Also, results of regression analysis revealed that memory strategy, social strategy, metacognitive strategy, and compensation strategy were the best predictor of critical thinking respectively.

To investigate the relationship between critical thinking and emotional intelligence, and determine the roles of age and gender as moderating variables, Ghanizadeh and Moafian (2011) administered the Watson-Glaser's critical thinking appraisal (form A), and the Bar-On's EQ-i questionnaire to 85 EFL university students. The results of Pearson correlation and ANOVA indicated that among the components of EQ, *flexibility* and *social responsibility* were found to have the highest correlations with CT and were also shown to be positive predictors of CT. Besides, the relationship between EFL learners' EQ and CT was not moderated by their age and gender.

Along the same line of research and using the same type of instruments, Haghani, Aminian, Kamali, and Jamshidian (2010) conducted a study to determine the relationship between critical thinking skills and Emotional Intelligence (EQ) of students of medicine. The results indicated that the mean score of deductive reasoning was significantly higher than inductive reasoning, and no significant relationship was found between total scores of Critical Thinking and Emotional Intelligence. Among the subcomponents of EQ, social responsibility was directly related to Critical Thinking score. Thus, the results reflected the lack of critical thinking training in the Iranian educational curriculum.

The contributions of the aforementioned studies should be recognized. However, research on the direct effect of teaching critical thinking skills seems to be scarce as the researchers of the current study were not able to spot any study with such a focus. Thus, this further step can shed light on the aforementioned results and let L2 teachers open door to more effective L2 teaching.

Purpose of the Study

The researchers hope that implementation of the study would shed more light on the effect of CT instruction, and help EFL learners use appropriate language learning strategies.

To achieve the goals of this study, the following research questions were posed:

1. Does teaching critical thinking skills have any significant effect on the language learning strategy use of EFL learners?
2. Does teaching critical thinking skills have any significant effect on the language learning strategy use of EFL learners across different EQ levels?
3. Is there any significant difference between language learning strategy use of EFL learners with high EQ and low EQ levels?
4. Is there any significant correlation between EFL learners critical thinking and their EQ levels?
5. Is there any significant correlation between EFL learners critical thinking and language learning strategy?

Methodology

Participants

To begin data collection, students from three different English language institutes in Shiraz were initially considered to participate in the study. The participants were drawn from four classes consisting of 96 students who were selected based on convenience sampling over the 2014 spring semester (each class was considered as a group). The participants' age range was between 14 and 25. Female students were chosen only so as to neutralize the potential effect of sex on the outcome of the study. To homogenize the proficiency level of 96

participants of the study, they were asked to take part in the Oxford Placement Test (OPT). From among the 96 students who took part in the OPT, the outliers were excluded, and 88 students whose scores were between one standard deviation below and above the mean were selected as the participants of the study. From among the 88 selected participants, 44 students were in the experimental groups (2 classes) and 44 students were in the control groups (2 classes).

Instruments

Strategy Inventory for Language Learning (SILL). The SILL ESL/EFL Version was designed by Oxford (1989) as a self-report instrument for measuring the frequency of language learning strategy use by EFL learners. This questionnaire consists of 50 items in the two constructs of direct (29 items) and indirect (21 Items) learning strategies. Direct strategies are subdivided into memory, cognitive, and compensation strategies, whereas indirect strategies are subdivided into metacognitive, affective, and social strategies. The internal consistency reliability of the SILL as reported by Oxford and Nyikos (1989) has been an acceptable Alpha value of 0.96. Moreover, the result of the factor analysis by Hsiao and Oxford (2002) showed that Oxford's 6° factor strategy taxonomy was consistent with learners strategy use.

California Critical Thinking Skills Test; Form B (CCTST). To evaluate the participants' critical thinking ability, they were given the California Critical Thinking Skills Test- Form B (CCTST-B-34) developed by Facione (1991). This test contains 34 multiple-choice items, and incorporates five critical thinking skills, including evaluation, inference, analysis, deductive reasoning, and inductive reasoning. For this study, the Persian version was used to guarantee complete understanding of CT by the participants. The test enjoys an acceptable level of construct validity and reliability as reported by Khalili and Hosseinzadeh (2003).

Bar-On Emotional Quotient inventory (EQ-i). In order to measure students' emotional intelligence, a Likert-scale questionnaire, developed by Bar-On (1996), was employed; the questionnaire consists of 133 questions and fifteen sub-scales. It includes five

components of intrapersonal intelligence, interpersonal intelligence, adaptability, stress management, and general mood.

Oxford Placement Test (OPT). Oxford Placement Test (OPT) was developed by Edwards (2007) for high beginning to intermediate levels and evaluates skills in three areas of grammar, vocabulary, and reading. It contains 50 multiple choice questions which assess students' knowledge of grammar and vocabulary from elementary to intermediate levels, and a reading text with 10 graded comprehension questions.

Data collection procedures

Initially, to ensure that the participants were at the expected proficiency level, the Oxford Placement Test (OPT) was administered to the participants. Then, the Bar-On EQ questionnaire was given to the participants. Based on the results, each group was divided into two sub-groups of participants with high EQ and low EQ levels. The SILL questionnaire was also given to all the participants to determine their language learning strategy use. Further, in order to measure the participants' critical thinking abilities, they were asked to complete the CCTST.

In the next step, the participants in the experimental groups were taught the critical thinking skills through Yang (2012) model of CT-integrated instruction under the Mixed Approach proposed by Ennis (1987). In the Mixed Approach, the CT skills were taught explicitly and then infused into the English language content. The treatment lasted for 14 sessions and each session lasted for 30 minutes.

In the first session, the necessary guidelines were given to the students in order to make them familiar with the CT-integrated skills. The techniques through which the CT-integrated skills were taught to the experimental groups were presented in the following order:

First, in order to develop students' inductive reasoning, they were divided into small groups. Pictures with some controversial points included were shown to the students. Then, the students were given enough time to think about the picture while sharing their opinions with their friends. Finally, they were asked to write an appropriate title

or summary for the pictures and defend their ideas by providing judgments and drawing inferences.

In teaching deductive reasoning, a scenario (or story) without a conclusion was presented to the class. In small groups, students were required to reach a conclusion from different premises based on evidence in the scenarios and establish logical relationships among the statements.

In order to enhance the interpretation skills of the students, they were asked to write personal reflections about a controversial report related to the current classroom content taken from newspapers, magazines, and television. Using this technique, students were able to develop their critical writing skills.

Written assignments were utilized in order to increase students evaluation skills. Students were required to cooperatively write a short argumentative essay on a controversial issue. They were asked to elaborate, compare, and give their own ideas on the topic. In order to enhance students open-mindedness and confidence in speaking, they were asked to discuss a challenging topic related to their daily life or the content of the lesson. The students were given enough time to think about the topic from different perspectives and express their ideas freely and critically.

To encourage students truth-seeking and curiosity, the teacher asked the students to read the story of a well-known person, i.e., Nelson Mandela who demonstrated the attitudinal and behavioral characteristics of critical thinking. While reading the story, the students were taught to annotate the text. In other words, they were asked to highlight the main ideas, underline the keywords, write their questions or ideas in the margin, mark important parts of the text, and make notes of anything interesting, important, or questionable. Then, using Socratic Questioning, the students were required to talk about the main points included in the story, such as the possible reasons for the character's achievements during his life .

The course book taught to all groups was *Top Notch Fundamentals*. The participants in the control group were taught based

on the conventional approaches used in the institutes. They just followed their regular curriculum where they learned by taking notes and memorizing selected vocabularies, and providing standardized answers for exercises with less opportunities for students' discussion of alternative solutions and problem solving activities. For example, in the reading section, the lower order thinking skills such as recall, paraphrase, and classification were emphasized. The students were asked to skim and scan the text, give a short summary, and do the follow-up exercises.

In the final step, the SILL questionnaire was administered to all groups for the second time to determine the possible effects of the treatment on students' language learning strategy use.

Results and Discussion

As mentioned above, to examine whether there is any statistically significant difference among the proficiency levels of the selected groups, One-Way ANOVA was run. The results are shown in Table 1.

Table 1
One-Way ANOVA for the Proficiency Test Scores of All Groups

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.08	3	6.02	.53	.66
Within Groups	950.99	84	11.32		
Total	969.08	87			

As illustrated in Table 1, it was statistically proven that there was no significant difference between the mean scores of the four groups with regard to their English proficiency level at the outset of the study ($F(3, 84) = .53, p < .05$).

Research question 1: Testing the effects of CT-based instruction on LLS use

In order to answer this question, an Independent Samples t-test was run. However, before presenting the results of this test, the descriptive statistics of the experimental and control groups are presented in Table 2.

Table 2

Descriptive Statistics for Language Learning Strategy Scores

Groups		N	Mean	Std. Deviation	Std. Error Mean
SILL1	Experimental	44	177.45	24.68	3.72
	Control	44	168.59	29.15	4.39
SILL2	Experimental	44	183.25	26.98	4.06
	Control	44	164.70	28.14	4.24

As displayed in Table 2, regarding the pretest (SILL 1) mean scores, the control group gained a mean score of 168.59 which was lower than the mean score of the experimental group (M=177.45). On the posttest (SILL 2), similarly, the experimental group (M=183.25) outperformed the control group (M=164.70).

Table 3 reports the results of the Independent Samples t-test comparing the experimental and control groups language learning strategy scores before and after the treatment.

Table 3

Independent Samples T-test for Language Learning Strategy Scores

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	
SILL1	Equal variances assumed	.40	.52	1.53	86	.12	8.86
	Equal variances not assumed			1.53	83.71	.12	8.86
SILL2	Equal variances assumed	.03	.84	3.15	86	.00	18.54
	Equal variances not assumed			3.15	85.8400		18.54

As Table 3 indicates, the first column is the Levene test for the assumption that the variances are equal or homogeneous. In this case, the Levene test is not significant, so the assumption is not violated and the variances are assumed to be equal. The third column presents the results of the t-test. As indicated in Table 3, no statistically significant difference was found between the experimental and control groups language learning strategy scores prior to the treatment ($t(86) = 1.53, p < .05$); However, a significant difference was found between the experimental and control groups language learning strategy scores after the treatment ($t(86) = 3.15, p < .05$). We can conclude that the experimental group ($M = 183.25, SD = 26.98$) outperformed the control group ($M = 164.70, SD = 28.14$) on the SILL 2, and the effect size was medium, $d = 0.67$. Therefore, the first null hypothesis was rejected, indicating that teaching critical thinking skills had a statistically significant effect on the language learning strategy scores of intermediate EFL learners.

The results are in line with Nikoopour, Amini Farsani, and Nasiri (2011) study where a statistically significant relationship was found between specific direct and indirect language learning strategies

such as cognitive, metacognitive, and social strategies with critical thinking. The results are further compatible with the findings of the recent study by Nosratinia, Ghanbari Asiabar, and Sarabchain (2014) who found a significant relationship between the EFL learners use of language learning strategies and their critical thinking.

Previous research findings confirmed the effectiveness of CT skills and LLSs in learner centered teaching and language learners success (Atkinson, 1997; Crookal, 1989; Giancarlo & Facione, 2001; Oxford & Nunan, 1997). Thus, language learners should be encouraged to develop critical thinking skills and enhance the application of language learning strategies in order to become responsible for their own learning and make language classroom more meaningful.

Research question 2: Testing the effects of CT-based instruction on LLS use across different EQ levels

To answer the second research question, both the experimental and the control groups were divided into two groups of participants with high and low EQ levels based on their median score.

Table 4

Descriptive Statistics for Language Learning Strategy Use of Students across Different EQ Levels

		N	Mean	Std. Deviation	Std. Error
SILL1	Experimental High EQ	21	177.57	27.81	6.06
	Experimental Low EQ	23	177.34	22.08	4.60
	Control High EQ	23	173.39	24.45	5.09
	Control Low EQ	21	163.33	33.38	7.28
	Total	88	173.02	27.22	2.90
SILL2	Experimental High EQ	21	187.71	28.24	6.16
	Experimental Low EQ	23	178.52	25.07	5.22
	Control High EQ	23	160.73	30.34	6.32
	Control Low EQ	21	169.04	25.54	5.57
	Total	88	173.80	28.78	3.06

Table 4 shows that before the treatment, the experimental group with high EQ level had the highest mean score (M=177.57), and used more language learning strategies, while the control group with low EQ level had the lowest mean score (M=163.33).

Also, the mean scores on the posttest indicated that the experimental group with high EQ level (M= 187.71) used more language learning strategies than the control group with high EQ level (M=160. 73) that had the lowest mean score. In order to test the assumption of equal variances, the Levene's test was run.

Table 5

Test of Homogeneity of Variances

	Levene's Statistic	df1	df2	Sig.
SILL1	1.52	3	84	.21
SILL2	.37	3	84	.77

As indicated in Table 5, the Levene's test is not significant, so the assumption of equal variances is not violated, and the groups enjoy homogenous variances. In order to compare the mean scores of all four groups, prior to and after the treatment, One-Way ANOVA was run. The results are shown in Table 6.

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Table 6
One-Way ANOVA among the Four Groups in their Language Learning Strategy Scores prior to and after the Treatment

		Sum of Squares	df	Mean Square	F	Sig.
SILL1	Between Groups	2839.44	3	946.48	1.29	.28
	Within Groups	61644.50	84	733.86		
	Total	64483.95	87			
SILL2	Between Groups	8976.30	3	2992.10	3.98	.01
	Within Groups	63091.41	84	751.08		
	Total	72067.71	87			

As shown in Table 6, the difference among the four groups was not statistically significant prior to the treatment ($F(3, 84) = 1.29, p < .05$). However, after the treatment, the F -observed value was found to be 3.98 which was higher than the critical value of 2.72 and p -value was lower than the significance level of .05, indicating that there were statistically significant differences between the mean scores of the four groups on the SILL2 after teaching critical thinking skills ($F(3, 84) = 3.98, p < .05$). Thus, the second null hypothesis was rejected, and teaching critical thinking skills turned out to have a statistically significant effect on the language learning strategy scores of EFL learners across different EQ levels.

In order to determine where exactly the differences lay among the experimental and control groups with high and low EQ levels, a Post hoc comparison of means on SILL 2; i. e. Tukey HSD test was run.

Table 7
Multiple Comparisons: Tukey HSD
 Dependent Variable: SILL2

(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.
Experimental High EQ	Experimental Low EQ	9.19	8.27	.68
	Control High EQ	26.97*	8.27	.00
	Control Low EQ	18.66	8.45	.13
Experimental Low EQ	Experimental High EQ	-9.19	8.27	.68
	Control High EQ	17.78	8.08	.13
	Control Low EQ	9.47	8.27	.66
Control High EQ	Experimental High EQ	-	8.27	.00
	Experimental Low EQ	-17.78	8.08	.13
	Control Low EQ	-8.30	8.27	.74
Control Low EQ	Experimental High EQ	-18.66	8.45	.13
	Experimental Low EQ	-9.47	8.27	.66
	Control High EQ	8.30	8.27	.74

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

The results of the Tukey HSD as displayed in Table 7, indicated that there was a statistically significant difference between the experimental group with high EQ levels ($M= 177.57$) and the control group with high EQ levels ($M= 160.73$) on the test of language learning strategy ($MD= 26.97$, $p=. 00<.05$). This indicated that teaching critical thinking skills had a noticeable effect on the language learning strategy scores of the experimental and control groups across different EQ levels, with the largest amount of variety found between the experimental and control groups with high EQ levels.

This finding provided further evidence for the findings of Nour Mohammadi, Heidari, and Dehghan Niray (2012) who found that critical thinking ability of Iranian EFL learners affects their use of reading strategies slightly and those who thought more critically used more reading strategies. Therefore, language teachers are suggested to use techniques in order to enhance learners' CT skills to help them utilize different language learning strategies.

Research question 3: Testing the difference between LLS use of EFL learners with high and low EQ levels

In order to answer the third research question, all the participants were divided into two groups of students with high and low EQ levels based on their median score, regardless of being either at the experimental or the control group. Then, an Independent Samples t-test was run to reveal the probable significant differences between the participants with high and low EQ levels in their language learning strategy scores.

Table 8

Descriptive Statistics for Language Learning Strategy Scores of Students with High and Low EQ Levels

Groups		N	Mean	Std. Deviation	Std. Error Mean
SILL1	High EQ	44	175.38	25.88	3.90
	Low EQ	44	170.65	28.60	4.31
SILL2	High EQ	44	173.95	32.38	4.88
	Low EQ	44	174.00	25.45	3.83

As shown in Table 8, regarding the pretest mean scores, learners with high EQ gained a mean score of 175.38 which was higher than the mean score of learners with low EQ (M=170.65). However, on the posttest, learners with low EQ performed better and obtained a mean score of 174, as compared to that of learners with high EQ (M=173.95).

Table 9

Independent Samples T-test for Investigating the Difference between the High and Low EQ Participants in Terms of their Language Learning Strategy Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SILL1	Equal variances assumed	.24	.62	.81	86	.41	4.72
	Equal variances not assumed			.81	85.15	.41	4.72
SILL2	Equal variances assumed	2.11	.14	-.00	86	.99	-.04
	Equal variances not assumed			-.00	81.46	.99	-.04

As shown in Table 9, the Levene test is not significant, so the assumption of equal variances is not violated and the variances are assumed to be equal. As the results of the t-test indicated, no significant difference was found between language learning strategy scores of the participants with high and low EQ levels before the treatment ($t(86) = .81, p < .05$) and after the treatment ($t(86) = -.00, p < .05$). Therefore, the third null hypothesis was not rejected. In other words, there was no significant difference between language learning strategy scores of students with high and low EQ levels.

Research question 4: Testing the correlation between EQ and CT

Since the scores of the EFL learners' critical thinking were not normally distributed, the non-parametric equivalent of the Pearson Product Moment Correlation, i.e., the Spearman Rho was run to test the possible correlations between critical thinking and emotional intelligence.

Table 10

Spearman's Rho Correlation between Emotional Intelligence and Critical Thinking

	Emotional Intelligence	
Spearman's rhoCritical Thinking	Correlation Coefficient	.59**
	Sig. (2-tailed)	.00
	N	88

** . Correlation is significant at the 0.01 level (2-tailed).

As indicated in Table 10, a statistically significant positive correlation was found between emotional intelligence and critical thinking ($r(86) = .59, p < .01, N=88$). The strength of the relationship (R squared value) was .35. In other words, the two variables had 35% of common variance, which was the medium effect size. Therefore, the null hypothesis was rejected, which implied that there was a significant relationship between emotional intelligence and critical thinking. Moreover, the relationship was found to be positive, indicating that the EFL learners with a high degree of emotional intelligence had also a high degree of critical thinking, and those with low EQ levels had low degrees of critical thinking.

The results of the present research are in line with Stedman and Andenoro s (2007) study in which a significant positive correlation was found between EQ and CT disposition in undergraduate leadership students. Moreover, the results are compatible with Ghanizadeh and Moafian (2011) study, where a significant positive relationship was found between CT and EQ in undergraduate EFL students. The findings are also consistent with Moon s(2008) grounded model in which emotions can affect the process of critical thinking, and also might rise from this process. However, the results are in contrast to the findings of Haghani, Aminian, Kamali, and Jamshidian (2010) who found no significant relationship between the total scores of Critical Thinking and Emotional Intelligence.

Research question 5: Testing the correlation between CT and LL

The last research question was also tested through the Spearman rho correlation.

Table 11

Spearman's rho Correlation between Critical Thinking and Language Learning Strategy

		SILL1	SILL2
	Correlation Coefficient	.00	.31**
Critical Thinking	Sig. (2-tailed)	.98	.00
	N	88	88

As indicated in Table 11, no significant correlation was found between critical thinking and language learning strategy scores before the treatment ($r(86) = .00, p < .01, N=88$). However, a significant and positive correlation was found between critical thinking and language learning strategy scores after the treatment ($r(86) = .31, p < .01, N=88$). Therefore, the null hypothesis was rejected. Although the correlation was statistically significant, it may not be practically significant due to the small effect size which was found to be only .09.

This finding is consistent with the results of the study conducted by Nikoopour, Amiri Farsani, and Nasiri (2011) where direct LLSs such as cognitive, metacognitive, and compensation strategies appeared to have a significant relationship with critical thinking. The results are also compatible with the findings of the study by Nosratinia, Ghanbari Asiabar, and Sarabchian (2014) who found a significant relationship between the Iranian EFL learners use of language learning strategies and their critical thinking.

The results of the study further confirmed Mall-Amiri and Ahmadi (2014) findings, where a significant positive correlation was found between metacognitive strategies and critical thinking. The same finding was also observed in Magno (2010) study in which, factors of meta-cognition were significantly related to the factors of critical thinking. The results are also in line with Fahim and Komijani (2010) study who found a significant positive correlation

between critical thinking and metacognitive, memorization, and cognitive strategies of L2 vocabulary learning. Similar findings were also reported by Choy and Cheah (2009) who confirmed the significant role of critical thinking abilities in enhancing students metacognitive strategies.

Conclusion and Implications

Higher-order thinking skills have been regarded as an important factor in language classrooms (Chamot, 1995; Tarvin & Al-Arishi, 1991), and previous research findings confirmed the effectiveness of teaching critical thinking skills in foreign language classrooms (Chapple & Curtis, 2000; Davidson, 1994, 1995). Moreover, it has been proven that there is a strong relationship between using appropriate language learning strategies and successful foreign language learning (O Malley & Chamot, 1990). The present study attempted to explore the possible effects of critical thinking instruction on EFL learners language learning strategy use on the one hand, and determine the possible correlations between CT, LLS, and EQ, on the other. Outcomes of the statistical analysis revealed that critical thinking-based instruction helped trigger and reinforce the EFL learners LLS use, and a significant positive correlation was found between CT and EQ, and CT and LLS.

To sum up, since it was found that teaching CT skills is a factor which affects the frequency of language learning strategies use, and also a significant correlation was found between CT and LLS use, it can be concluded that teaching CT skills should be incorporated into EFL classes to help learners enhance and develop a greater range of language learning strategies, and become responsible for their own learning.

The first implication of this study is for EFL teachers. The results of the present study might give insight to EFL teachers so as to make them aware of the higher order thinking skills required for a successful application of language learning strategies in second or foreign language learning context. They can help develop EFL students CT skills and LLS use simultaneously. Teachers can also

assist the language learning process by promoting language learning strategy awareness and use.

The second implication would be directed to the syllabus designers and materials developers who may benefit from the findings of the study and develop a better understanding of the role of CT skills in language instruction and provide materials which incorporate critical thinking skills as one of the effective elements for learners' career and academic success. Providing course-books with the necessary higher-order thinking skills, results in intellectual, flexible, and autonomous students who process information accurately, defend their own ideas, recognize assumptions, and analyze questions precisely. Moreover, critical thinking skills can be incorporated in teacher training courses in order to make them aware of different techniques through which CT skills might be taught and practiced in the language classrooms.

Limitations of the study

Needless to say, the results of this study brought about some limitations that should be clarified to overcome doubts about its reliability and validity. Firstly, the results of this study are limited to a relatively small sample of Iranian EFL learners, and it is not known whether the same results would be obtained when other samples are investigated. Secondly, because of the rules and limitations of the institutes, the random selection of the participants was not possible. Thus, the results could not be generalized to all EFL learners at the intermediate levels.

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