The Effect of Computer-Mediated Collaborative Learning on Iranian Advanced Female EFL Learners' Critical Thinking and Writing Performance

Zahra Faghiri [*]
Islamic Azad University Kish International Branch
Mehdi Bazyar
Imam Khomeini International University

Abstract

In this study, the researcher attempted to investigate the effect of computer-mediated collaborative learning on Iranian advanced female English Learners' critical thinking and writing performance. In order to do this, initially 90 participants were chosen. To assure the homogeneity regarding language proficiency, they participated in a TOEFL exam which was used to select 60 out of 90 students whose scores fell between +1 and -1 SD for this study. Participants were then randomly assigned to two 30-member control and experimental groups. In this study, Watson–Glaser Critical Thinking Appraisal-Form A (Watson & Glaser, 1980) was used as a pretest to see to what extent the participants think critically. A writing test was also administered to assess the writing performance of the learners as writing pre-test. This writing was adapted from TOEFL Writing section and the results were scored by 3 raters. Then, two groups participated in ten sessions. The experimental group was provided with 15 laptops as well as with internet access so as to be able to extract the necessary information for completing their writing. Finally, the critical thinking questionnaire was administered again. Also, a post-test writing was administered to investigate the effect of treatment on the writing performance. The results of data analysis indicated that computer-mediated collaboration led to better writing performance of the learners. Computer-mediated collaboration also proved to have a statistically significant effect on critical thinking level of the participants.

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* Islamic Azad University Kish International Branch, Kish. Iran
    Received on: 15/01/2016   Accepted on: 08/03/2016
    Email: *faghiri_z@yahoo.com*

1. Introduction

Most people think that technology is synonymous with computer but a computer is just the latest in a whole series of technological tools used to assist foreign language teaching. Computer and internet are two examples of such technologies which have found their way into many classes generally and language classes in particular throughout the world. Consequently, the term "Computer-Assisted Language Learning" (henceforth, CALL) came into being.

The field of CALL makes use of new technologies such as computer and the internet in the language learning and teaching process. In the same context, many computer programs have been developed so far to assist learners with the language learning tasks. These computer-assisted programs intend to teach various skills of language learning process through the medium of the computer. Computer Assisted Language Learning has been designed for many parts of the language learning process. On the face of it, CALL may seem a newly developed concept that appeared in 21st century. However, reviewing the literature, one can track the use of computer in the context of language learning to several decades earlier.

Prompting collaboration through computer or so-called Computer-based collaborative learning (CBCL) is a promising advantage that can be accomplished through training the learners on how to make use of modern information and communication technology. Within the pedagogical context, collaboration plays a very important role. This is particularly important given the focus of modern language teaching and learning on tasks which require the learners to collaborate and negotiate meaning. Benson (2001) defined "collaboration" as a process in which two or more learners need to work together to achieve a common goal, usually the completion of a task or the answering of a question. Schrage (1990) views collaboration as "the process of shared creation: two or more individuals with complementary skills interacting to create a shared understanding" (p. 40).

Critical thinking can also play an important role in the language classes as it contributes to the autonomy of the learners. Many different definitions have been proposed for critical thinking by various educators such as Lipman (1991), Norris and Ennis (1989), and Siegel (1988). Bailin (2002) defined critical thinking as thinking of a particular quality, essentially good thinking, that meets specified criteria or standards of adequacy and accuracy.

2. Literature Review

2.1 Technology and Language Learning

Many studies have been conducted on how Computer Assisted Language Learning impacts the learning of language learners' four skills namely, listening, speaking, reading and writing. Most findings show that learners can benefit considerably from using CALL in reading and listening and that these receptive skills have been the focus of many current CALL programs. However, most reading and listening software is based on drills (Okonkwo, 2011).

As Okonkwo (2011, p. 78) points out "there has been some success in using CALL, in particular computer-mediated communication, to help speaking skills closely linked to "communicative competence" (ability to engage in meaningful conversation in the target language) and provide controlled interactive speaking practice outside the classroom".

A review of studies on CALL shows that the use of such a technology has been both advocated and criticized, with each camp giving their own reasons. Technology adds dimensions to the already multifaceted domain of second language learning, requiring new knowledge and skills for those who wish to incorporate it into their professional practice or understand its impact on the language teacher and learner.

Some scholars argue that it is impossible at least as of now, to draw definitive conclusions regarding the benefits or disadvantages of CALL as there is no theoretical framework in this regard. It means that practitioners have no universally accepted theoretical basis to provide direction for development and implementation of CALL materials).

Garrett (1998) believes that today CALL has been beset by predicaments in research areas. According to her, some language teachers see no need for research as the technology will be used inevitably and it will soon turn into global practice.

The applicability of CALL in instruction settings was the first concern in the initial decades of its presence. Among pioneer programmers in language learning process, Suppes, Kemeny, Kurtz, and Bitzer can be mentioned. In the primary program, the ambition was to teach a particular subject without bearing in mind any theoretical background or philosophy behind it. While CALL was developed practically, scholars began to study and approach it theoretically in their research.

The first research developed to have been done by the computers in teaching initiative (CTI) centers for modern languages in the UK in 1989, which analyzed its cost effectiveness and teachers' attitudes toward computers, incorporated for higher education (Broncano & Ribeiro, 1999).

Little by little, the online programs were designed in a way that some scholars shifted toward developing web-based materials and courses in which the whole or a part of the content was delivered online rather than using computers as mere add-ons in traditional language classes. In fact, this incident happened by the emergence of new spaces (website hosting, Moodle, weblog, wiki, and the like) in the virtual environment. Similarly, online programs even provided the users with some degrees of feedback.

CALL research has addressed the four main skills of language learning and its subdivisions like accuracy, spelling, pronunciation, vocabulary, grammar, etc. The introduction of computers to the field of language learning supported learners with many opportunities to access copious amounts of language materials. At the same time, researchers examined the effectiveness of computer and technology in students' language learning process.

2.2 Computer-Assisted Collaborative Learning

Recently, Computer-assisted collaborative learning as a subcategory of computer-assisted language learning has caught the attention of educators and researchers (Crook, 1994) within the fields of language teaching and learning. Put briefly, Computer-supported collaborative learning (CSCL) deals with how collaborative learning enhanced by computer can improve peer interaction and work in groups, and how collaboration and computer lead to increased sharing and distributing knowledge and expertise among community members.

CSCL was considered as a new paradigm of educational technology by Koschmann (1996) who argued that compared to CAI (Computer Assisted Instruction) computer-supported collaborative learning (CSCL) studies is based on a very different concept of learning, research questions, pedagogy, and research methods.

Going beyond the realms of teaching and learning, Arreerard et al. (2006) look at collaborative learning as a 'theme' in education. He enumerates some learning objectives achieved as results of engaging in collaborative learning (e.g., sense of collective learning as a group, grasping a deeper understanding of collaboration in general and collaborative learning in particular).

As Arreerard et al. (2006) argue, it is obvious that the modern technology has been used for educational purposes gradually. Furthermore, the educational technology provides an opportunity with an inter-personal interactive learning system to learn anytime and anywhere independently. Moreover, the online-learning system decreases the interval of the differences

in time, place, and participants. Result of the online-learning system indicated that the level of the achievement was satisfying (Jaitip, 1999).

Similarly, Johnson and Smith (1991) believe that collaborative learning is a new paradigm of teaching in academic institutes. They characterize it as "the instructional use of small groups so that student's work together to maximize their own and each other's learning" (p. 14). Slavin (1995) perceives collaborative learning as "a variety of teaching methods in which students work in small groups to help one another learn academic content" (p. 2).

Collaborative learning is considered by Jacobs (2001) as a 'theme' in education where instructors using collaborative learning set learning objectives that are social, affective, and academic. In that, this environment is conducive to the rise of mentality that focus not only on one's learning but on group members' learning as well.

2.3 CALL and the Development of Writing Skill

The employment of CALL and Online learning practices are alienated into different categories and it is proven by previous studies that the approach provides numerous advantages for the effectiveness of teaching and learning. This effectiveness can be manifested in the development of language skills, more particularly writing skill. In addition, compared to traditional courses, online learning provides interactive materials that allow easy access to information and feedback from others. (Abu Mansor & Ismail, 2012)

Writing as one of the four major language skills, has traditionally not received enough consideration in EFL setting and language classes due to lack of teachers and time in school, in spite of its exclusive role in developing communicative skills as well as critical thinking (Chastain, 1988). It is the productive skill for communicating ideas and messages as well as learning the form of language (Chastain, 1988). Yet what distinguishes it from other skills is its "permanence and distance...coupled with its unique rhetorical conventions" (Brown, 2001, p. 335).

Within the progress of writing, different scholars have assumed particular steps. For example, White (1998) considers thinking, acting, and repairing as the three crucial stages in writing process, and for Murray (1980) they are rehearsing, drafting, and revising. In the same vein, Seow (2002) calls them the planning, drafting, editing, and revising steps.

As an important language skill, one can depict different types of writing. Chastain (1988) draw a distinction between in-class and real writing. Whereas the former is concerned with teaching learners how to write, the latter refers to "authentic writing tasks that students engage in during their normal life" (Chastain, 1988, p. 249). The closer in-class teaching writing

gets to such authentic writing, the more successful the outcome would be (Kramsch, A'Ness, & Lam, 2000).

Advances in information and new technology (IT) have ushered in a new pattern for knowledge delivery modules, that is, online learning (OL). Almost all education institutions, particularly higher education, started using this paradigm in their teaching and learning processes (Abu Mansor & Ismail, 2012). As a result of enormous rise in informational activities caused by the Internet and other information technology-enabled opportunities which has made literacy skills increasingly important (AgéliiGenlott & Grönlund, 2013) and the emergence of various online spaces and environments like weblogs, wikis, chatrooms, mailing, etc. (Murphy, Kruger, & Grieszl, 1998), "The ability to write effectively is becoming increasingly important in our global community, and instruction in writing is thus assuming an increasing role in both second and foreign language education" (Weigle, 2002, p. 1).

The ability to write properly is an indication of critical thinking and reasoning (Weigle, 2002). Accordingly, due to its standardized system, writing needs instruction in order to be acquired effectively (Grabowski, 1996). Yet developing a course for teaching writing, which also involves other skills, notably the skills of planning, drafting, and revising" (Dudley-Evanns & St John, 1998, p. 115) does not appear to be an easy task; hence, educators need to search for, develop, and present different mediums that lend themselves to the effective and fruitful teaching of writing.

2.4 Critical Thinking

Thinking critically involves taking an in-depth reflective approach to the problems and issues one may run into. Broadly speaking, critical thinking focuses on humans and the judgments they make drawing in the first place on reason. Critical thinking is a higher-order cognitive process that is demonstrated by a range of behaviors from evaluating arguments, expressing judgments to inferences, theory or proposing solutions to a problem and analyzing possible consequences (McKenzie & Murphy, 2000). Astleitner (2002) and Frampton (1994) further refine the definition to include conceptual, methodical and contextual considerations upon which the judgment is based. Therefore, it is a skill that is demonstrated by deep processing characterized by organized thought, justified argumentation and the ability to relate new knowledge with previously learned knowledge.

Many researchers (Giancarlo & Facione, 2001; Moore, 1995; Tsui, 1998) have described critical thinking as one of the concepts which has been demonstrated to serve as a good predictor of academic achievement. Therefore, it is of great benefit for teachers in general and language teachers in particular to be aware of the extent to which their students enjoy critical

thinking. Critical thinking is also believed to play an important role in the acquisition of language skills in particular, reading and writing (Moore, 1995; Seung-Ryul Shin, 2002; Shaharom Abdullah, 2004; Stapleton, 2001).

Despite the consensus on the importance of critical thinking and the positive contributions it can make to the learning, there is no consensus on the definitions so far have been given of this construct. Raising the same issue, Rezaei (2011, p. 769) states that "there is widespread consensus that the instruction of critical thinking is an all important issue standing in need of further research."

However, psychologists and language methodologists have difficulty putting forward a precise and rigorous definition of critical thinking. That is why Halonen (1995) states that "critical thinking scholarship is in a mystified state. No single definition of critical thinking is widely accepted" (p. 75). Along the same lines, Minnich (1990) asserts that critical thinking is a mystified concept (p. 5). Focusing on various definitions of critical thinking, Siegel (1988) categorizes them into two broad groups: the "pure skills" and the "skills plus tendencies" (p. 6) conceptualizations of critical thinking.

The pure skills aspect deals with one's abilities to evaluate propositions and statements. Drawing on this viewpoint, one can say that a person is a critical thinker if she/he possesses the skills required for properly evaluating the statements. However, this aspect does not take account of the actual realization of these skills in a person's everyday life. According Rezaei et al. (2011, p. 770), "the impact of this conception of critical thinking on the educational context could be less than promising if students drew upon critical thinking in tests only to get good grades in exams but not outside the testing context".

Siegel (1988) argues that critical thinking needs something more than skills. He (1988) calls the second aspect of critical thinking the "skills plus tendencies" (p. 6) conception. This conception recognizes that a critical thinker possesses both the abilities and skills for properly evaluating statements as well as actions and also the desire to put to use those proficiencies in their ordinary statement- (and action-) assessing activities (p. 6). Based on this view, one is considered a critical thinker, if he or she is able and ready to think critically.

Thus, given the significance of critical thinking in the language classes, this study aims to investigate the effect of computer-mediated collaborative learning on critical thinking and writing performance of Iranian English learners. To this end, the present study seeks to find answers to the following questions:

1. Does Computer-mediated collaborative learning lead to the enhancement of Iranian advanced female EFL learners' critical thinking?

2. Does Computer-mediated collaborative learning lead to the improvement of Iranian advanced female EFL learners' writing performance?

3. Method

3.1 Design

This study used randomly selected groups as well as the treatment to investigate the research questions. Thus, it falls within the experimental category of research.

3.2 Participants

Four classes comprising a total number of 90 advanced female English students at Kish Language Institute were selected randomly from among ten advanced classes studying at different times of the day. They were mostly high school students, ranging in age from 17 to 20 years old.

Firstly learners needed to be homogenized in terms of language proficiency. To assure their homogeneity they were required to take a TOEFL (See Appendix C) exam which was used to select 60 students whose score lied within one standard deviation from the mean of this study. In other words, the participants who had outperformed the others or obtained very low scores were discarded from the study. That is to say, only the participants whose scores fell under the normal curve were chosen for the purposes of the study.

3.3 Data Collection Procedure

Initially, an attempt was made to ensure that all participants enjoyed not widely varying degrees of computer literacy. To this end, the researcher used a combination of computer use demonstrations and interviews. The leaners were provided with pamphlets on the basics of computer and how to use and surf the internet.

Participants were randomly assigned to two 30-member control and experimental groups. For the purpose of the present study, Watson–Glaser Critical Thinking Appraisal-Form A (Watson & Glaser, 1980) was used as a pretest (See Appendix A). According to Watson–Glaser Critical Thinking Appraisal-Form A manual regarding the reliability and validity of this test for a sample used in the initial development of the Watson-Glaser Short Form in 1994 (N= 1,608), Cronbach's alpha coefficient (r) was estimated to be .81. Cronbach's alpha and the SEM were also estimated for a number of groups separately and indicated a high validity and reliability for this test. Many

more instances of the evidence for the reliability and validity of the test can be found at:

http://us.talentlens.com/wpcontent/uploads/pdf/WatsonGlaser_Short_For001.pdf

This critical thinking appraisal comprises five subsections which practically measure the five aspects of critical thinking as defined by Watson and Glaser. These five aspects are: 1) Drawing inferences based on factual statements; 2) Recognition of assumptions in a number of assertive statements; 3) Making deductions: To determine if conclusions follow from information in given statements; 4) Interpreting evidence to decide if conclusions are legitimate or not; 5) Evaluating arguments as being strong or weak.

A writing test was also administered to assess the writing performance of the learners as writing pre-test. This writing was adapted from TOEFL Writing section and the results were scored by 3 raters. Then, two groups participated in 5 sessions as follows:

The experimental group was provided with 15 laptops as well as with internet access so as to be able to extract the necessary information for completing their writing. All writing task was done in dyads or groups. They proceeded in two stages as follows:

In the first stage, the experimental group was sub-divided into 15 pairs. Each pair negotiated over the topic that was to be selected for writing. Then they had brainstorming aiming at tapping the most relevant materials and ideas concerning the selected topic. To this end, each learner used internet to download the relevant texts and materials which were paraphrased if necessary. Then each pair typed a draft of the composition, based on the ideas gained in brainstorming stage. Finally members in each pair contributed their final ideas and revisions to the composition and a finalized agreed-on version of the composition was typed. Experimental group typed 15 compositions as there were 15 pairs in this group. This stage continued for 5 one-hour sessions.

In the second stage, the experimental group was subdivided into 10 three member groups. Given the fact that they had already learned how to write collaboratively, this stage was easy for them. The same steps taken in stage one were followed. However, this lasted for two hours given the larger number of the members in each group. This stage continued for 5 sessions.

The control group proceeded with traditional classes in which they were required to perform writing tasks in dyads or groups. Here an attempt was made to provide the learners with resources and materials such as books and magazines for completing their writing. Finally the critical thinking questionnaire was administered again. Also, a post-test writing was

administered to investigate the effect of treatment on the writing performance.

3.4 Instrumentation

TOEFL Test: A standard proficiency Test of English as a Foreign Language (TOEFL) was administered to make sure that learners were homogeneous with respect to their language proficiency.

Writing Test: Two writing tests were administered as pre-test and post-test. The writings were assessed by three raters, using a scoring scheme comprising of 5 criteria. These criteria are mainly used to score the writing part of standardized tests such as TOEFL and IELTS (See Appendix B). The five criteria include Content, Organization, Mechanics, Grammar, and Style which are present in the scoring scheme used for the purposes of this study. Each criterion was assessed, with results ranging from 1(unsatisfactory) to 10 (outstanding).

In order to assure the reliability of scoring procedure, the scores given by each rater on different sections of writings were correlated. The high correlations between the scores indicated the reliability of the scoring scheme and writing scores.

Laptops: 15 Laptops were used for implementing computer-mediated collaborative learning.

4. Results and Disscusion

Initially, based on the normal curve of TOEFL scores and the respective histogram, 60 subjects whose scores fell within the range of 52-72 were selected (Figure 1).
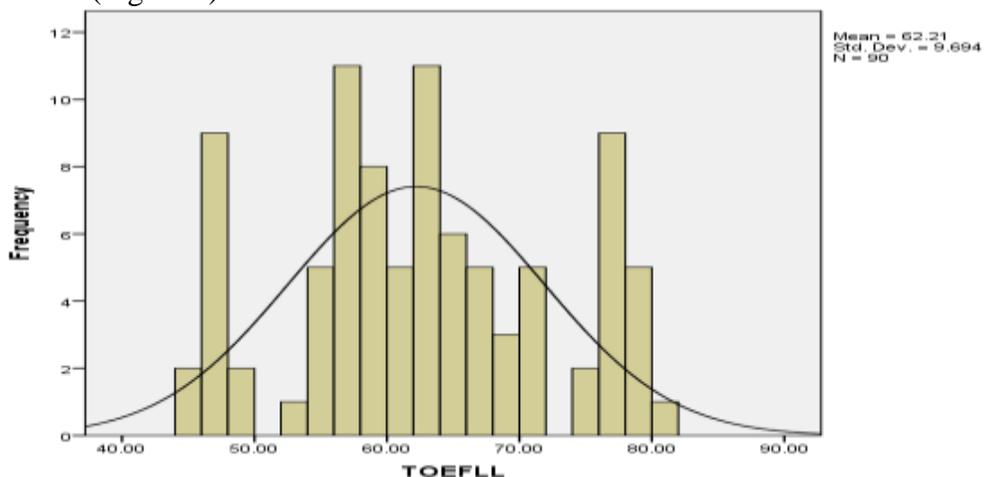

Figure 1. Histogram of TOEFL with the normal Distribution Curve

The participants scoring below and above the range of 52-72 were excluded from the subject pool. These sixty participants were randomly assigned to two 30-member groups. According to the following figure, 30 participants who scored very high or very low were eliminated. Concerning the descriptive statistics it should be said that the mean of the participants who took part in TOEFL proficiency test turned out to be 62.21. The standard deviation of the participants was 9.694. Therefore, according to the information gained from the participants, 60 of them were chosen, the ones whose scores fell between one standard deviation below and above the mean.
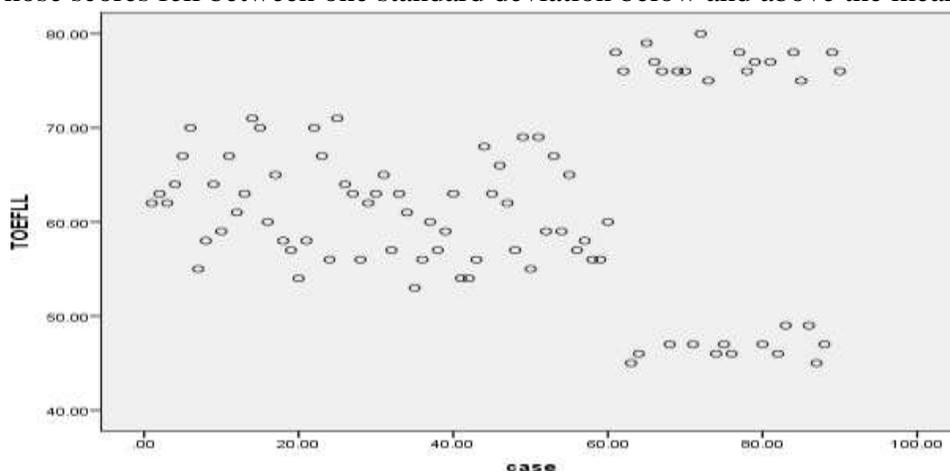

Figure 2. The dispersion of the participants' scores

To compare the pre-treatment scores of two groups concerning writing performance for the purpose of assuring homogeneity, an independent T-Test was run. Table 1 indicates the result of descriptive statistics (P= 0.17). Thus, it can be concluded that the two groups were not significantly different in terms of writing performance prior to the treatment.

Table 1
The Descriptive Statistics for Comparing Pre-treatment Scores Regarding Writing Performance

	Group	Mean	SD	T	Sig
Writing (pre-test)	Experiment	28.16	1.83	1.386	0.171
	Control	27.53	1.69		

The following figure displays the writing scores of the control and experimental group prior to the treatment. The horizontal line shows the number of participants while the vertical line shows the scores. As it is shown the two groups including the experimental and control groups were not significantly different in terms of their writing performance before administration of the treatment.
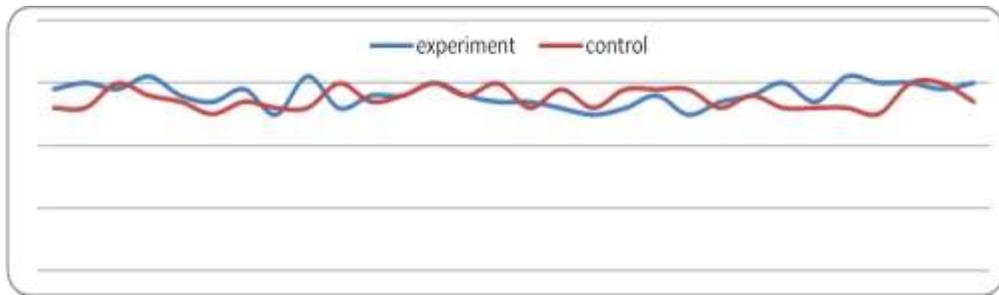
Figure 3. The writing scores of the control and experimental group prior to the treatment

To compare the post-treatment scores of the two groups with respect to writing performance, an independent T-Test was run. Table 2 indicates the descriptive statistics of the two groups with respect to writing performance scores after the administration of treatment.

Table 2
Descriptive Statistics of Post-Treatment Scores of the Two Groups Concerning Writing Performance

	Group	*Mean*	*SD*	*T*	*Sig*
Writing (post-test)	Experiment	32.66	1.88	9.603	0.000
	Control	27.80	2.04		

As Table 2 shows, the p-value is less than 0.0005, as a result, it can be concluded that the post-treatment means of the two groups in terms of writing performance are significantly different. It can be seen that the experimental group outperformed the control group.

The following figure displays the effect of computer-mediated collaborative learning on writing performance after the treatment. The horizontal line shows the number of participants while the vertical line shows the scores. As it is shown the blue line which is the experimental group outperformed the red line which is the control group after administration of the treatment.

To compare the pre-treatment scores of the two groups concerning critical thinking for the purpose of assuring homogeneity, an independent T-Test was run. Table 3 indicates the results of descriptive statistics (P=0.271). It shows that the two groups were not significantly different in terms of critical thinking performance prior to the treatment.
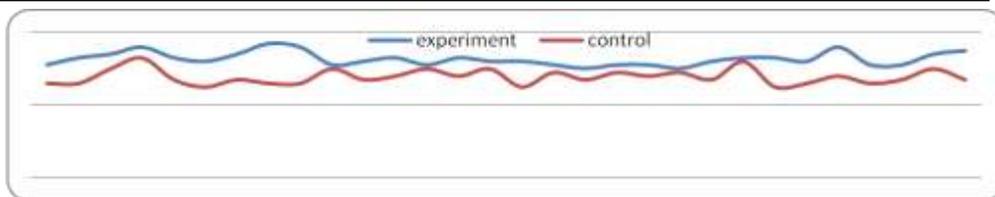
Figure 4. The effect of computer-mediated collaborative learning on writing performance after the treatment

Table 3
The Descriptive Statistics for Comparing Pre-treatment Scores Regarding Critical Thinking

	Group	*Mean*	*SD*	*T*	*Sig*
Critical thinking (pre-test)	Experiment	34.10	6.03	0.275	0.271
	Control	33.70	5.20		

The following chart illustrates the mean scores of the two groups concerning critical thinking before the treatment. The following figure displays the critical thinking scores of the experimental and control group before the treatment. The horizontal line shows the number of participants while the vertical line shows the scores. As it is shown the two groups weren't significantly different in terms of critical thinking before administration of the treatment.
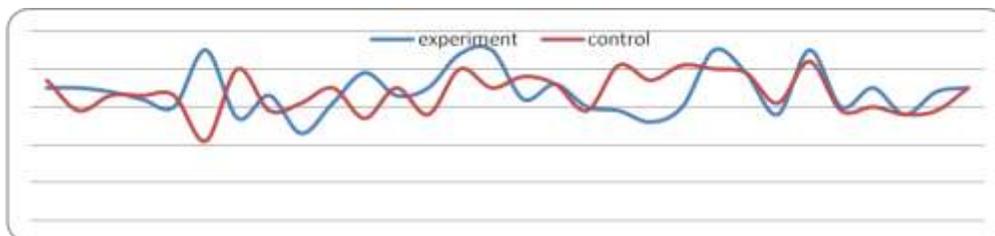

Figure 4. The critical thinking scores of the experimental and control group before the treatment

To compare the post-treatment scores of the two groups regarding critical thinking, an independent T-Test was run. Table 4 shows the descriptive statistics of the two groups with respect to critical thinking scores after the administration of the treatment.

Based on this table, the mean score has increased after the administration of the treatment. Thus, it can be concluded that Computer-mediated collaborative learning has also had a significant effect on the critical thinking level of the learners. The following figure displays the effect of computer-mediated collaborative learning on critical thinking after the

treatment. The horizontal line shows the number of participants while the vertical line shows the scores. As it is shown the blue line which is the experimental group outperformed the red line which is the control group after administration of the treatment.

Table 4

The Descriptive Statistics for Comparing Post-Treatment Scores Regarding Critical Thinking

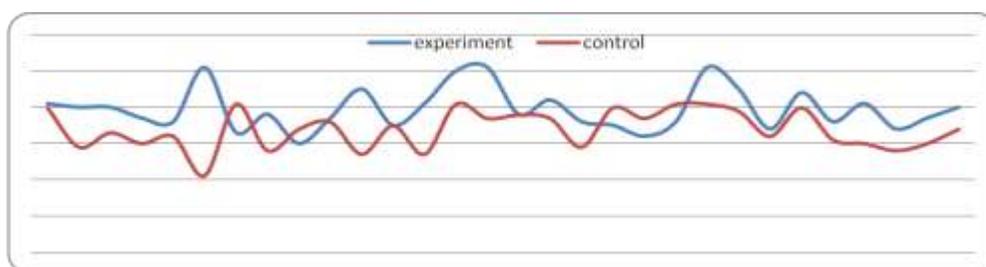|	*Group*	*Mean*	*SD*	*T*	*Sig.*
Critical thinking (post-test)	Experiment	39.53	5.76	3.898	0.000
	Control	33.93	5.35		

Figure 5. The effect of computer-mediated collaborative learning on critical thinking after the treatment

5. Conclusions and Implications

The results of T-Test indicated that Computer-mediated collaborative learning may lead to a better critical thinking level. As pointed out earlier critical thinking is defined as thinking of a particular quality (essentially good thinking) that meets specified criteria or standards of adequacy and accuracy (Bailin, 2002). It was also revealed that Computer-mediated collaborative learning may lead to a better writing performance among learners. Computer assisted language learning (CALL) is referred to as a form of computer-based learning which is of two important features: bidirectional learning and individualized learning. It is claimed that this model is not a method. Moreover, the focus of CALL is learning and not teaching.

In using such model of learning, teachers give suggestions with respect to how to use computers in learning, teachers provide students with how to use computers to facilitate the process of learning. The results of this study confirm the views held by some supporters of language learning. For example, there are studies that have proved computer-based learning would cause improvement in language learning (Chang & Smith, 1991; Johnson &

Chung, 1999; Warschauer, 2000). That is, computer-mediated collaboration would make learners learn language more effectively specifically writing performance which was one of the dependent variables of the current study. Computer-mediated collaboration also led to better critical thinking on the part of the learners.

Finally, the results of this investigation indicate the necessity for the language teachers, especially in Iran, to pay more attention to computer-assisted collaborative learning and to replace traditional methods with techniques which involve the process of using computers in learning. The reason why it is suggested is that using computers in learning would cause better performance on the part of learners in that they would probably be more interested in learning when they make use of technology. This fact could also lead to better writing performance. It could also help students in getting more advantage of critical thinking. Further qualitative research in this area can shed more light on the perception of the students of computer-assisted collaborative learning which they can use during the learning process. It is suggested not only because it enhances students' knowledge of computer-assisted collaborative learning but also it helps them better understand what critical thinking is and how exactly it works. Therefore, gaining more knowledge, students would probably be able to improve their writing performance as well.

In this study, it was proved that learners who use computers as a tool to learn English had better writing performance than the learners who did not. The reason we came to this conclusion might be that many learners nowadays are familiar with how to use a computer effectively. They are also more motivated to learn English using a computer than being in class or staying at home using papers or other tools. It was also proved that, computer-mediated collaboration positively affected the critical thinking of the learners. The reason might be that the learners who are using computers as a tool are more motivated to think critically.

References

Abu Mansor, M., & Ismail, A. (2012). Learning styles and perception of engineering students towards online learning. *Procedia: Social and Behavioral Sciences, 69,* 669-674.

Agélii Genlott, A., & Grönlund, A. (2013). Improving literacy skills through learning reading by writing: The iWTR method presented and tested. *Computers & Education, 67*, 98-104.

Arreerard, W., & Sanrach, C. (2006).*The development of the collaborative intelligent computer-assisted instruction model using computer network*. New York: CICAI Model Publications.

Astleitner, H. (2002). *Teaching critical thinking online.* Retrieved 24, January, 2014 from: http://www.findarticles.com.

Bailin, S. (2002). Critical thinking and science education. *Science & Education, 11*(4), 361-375.

Beatty, K. (2010). *Teaching and researching: Computer-assisted language learning.* Harlow: Pearson Education.

Beatty, K., & Nunan, D. (2004). Computer-mediated collaborative learning, *System, 32,* 165-183.

Benson, P. (2001). *Teaching and researching autonomy in language learning.* London: Longman.

Brown, H. D. (2000). *Teaching by principles: An interactive approach to language pedagogy* (2nd ed.). White Plains, NY: Longman.

Brown, J. D. (2001). *Using surveys in language programs*. Cambridge: Cambridge University Press.

Chang, K. Y. R, & Smith, F. (1991). Cooperative learning and CALL/IVD in beginning Spanish: An experiment. *The Modern Language Journal*, *75*(2), 205-211.

Chastain, K. (1988). *Developing second language skills: Theory and practice*. Orlando: Harcourt Brace Jovanovich Publishers.

Crook, C. (1994). *Computers and the collaborative experience of learning.* London: Routledge.

Dudley-Evans, T., & St John, M. J. (1998). *Developments in English for specific purposes: A multi-disciplinary approach.* Cambridge: CUP.

Frampton, D. (1994). Analyzing cognitions in a hypermedia learning environment. *Australian Journal of Educational Technology*, *10*(2), 81-95.

Garrett, G. (1998). *Partisan politics in the global economy*. Cambridge: Cambridge University Press.

Giancarlo, C. A., & Facione, P. A. (2001). A look across four years at the disposition towards critical thinking among undergraduate students. *The Journal of General Education*, *50*(1), 29-55.

Grabowski, J. (1996). Writing and speaking: Common grounds and differences toward a regulation theory of written language production. In C. M. Levy, & S. Ransdell (Eds.), *The Science of writing* (pp. 75-86). Mahwah, NJ: Lawrence Erlbaum Association.

Halonen, J. S. (1995). Demystifying critical thinking. *Teaching of Psychology, 22,* 75-81.

Jaitip, N. (1999). *Web-based instruction*. Chulalongkorn: Faculty of Education Chulalongkorn University Publications.

Koschmann, T. (1996). Paradigm shifts and instructional technology: An introduction. In T. Koschmann (Ed.), *CSCL: Theory and practice of*

an emerging paradigm (pp. 1-23). Mahwah, NJ: Lawrence Erlbaum Association.

Kramsch, C., A'Ness, F., & Lam, W. S. E. (2000). Authenticity and authorship in the computer-mediated acquisition of L2 literacy. *Language learning and Technology, 4,* 78-104.

Levy, M. (1997). *CALL conceptualization*, Oxford: Oxford University Press.

Lipman, M. (1991). *Thinking in education.* Cambridge: Cambridge University Press.

Minnich, E. (1990). *Transforming knowledge*. Philadelphia: Temple University Press.

Murphy, M., Kruger, A., & Grieszl, A. (1998). RECALL providing and individualized CALL environment. In S. J. Nerbonne, & V. Essen (Eds.), *Language teaching and language technology* (pp. 231-149). Lisse: Swets Zeitlinger Publishers.

Murray, D. M. (1980). Writing as a process: How writing finds its own meaning. In T. R. Donovan, & B. W. McClelland (Eds.), *Eight approaches to teaching composition* (pp. 300-312). Urbana-Champaign: National Council of Teachers of English.

Norris, S. P., & Ennis, R. (1989). *Evaluating critical thinking*. Pacific Grove, California: Critical Thinking Press and Software.

Okonkwo, U. (2011). Computer assisted language learning (CALL) software: Evaluation of its influence in a language learning process. *African Journals Online, 12,* 76-89.

Rezaei, S., Derakhshan, A., & Bagherkazemi, M. (2011). Critical thinking in language education. *Journal of Language Teaching and Research*, 2(4), 769-777.

Seung-Ryul, S. (2002). *The effects of a metacognitive art criticism teaching strategy that Incorporates computer technology on critical thinking skill and art critiquing ability.* Dissertation Abstract International. (UMI Number: 3072012).

Seow, A. (2002). The writing process and process writing. In J. C. Richards, & W. A. Renandya (Eds.), *Methodology in language teaching: An anthology of current practice* (pp. 315-320). Cambridge: Cambridge University Press.

Shaharom A. (2004). *Reading comprehension test as a measurement of critical thinking ability*. Unpublished Ph.D. dissertation, University Pendidikan Sultan Idris, Malaysia.

Siegel, H. (1988). *Educating reason: Rationality, critical thinking and education*. New York: Routledge & Metheun.

Simuth, J., & Sarmany-Schuller, I. (2014). Cognitive style variable in E-learning.*Procedia: Social and Behavioral Sciences, 116,* 1464-1467.

Stapleton, P. (2001). Assessing critical thinking in the writing of Japanese university students: Insights about assumptions and content familiarity. *Written Communication*, *18*(4), 506-548.

Schrage, M. (1990). *Shared minds: The new technologies of collaboration.* New York, NY: Random House.

Tsui, L. (1998). A review of research on critical thinking. *ASHE Annual Meeting Paper.* (ERIC Document Reproduction Service No. ED427572).

Warschauer, M. (2000). Online learning in second language classroom: An ethnographic study. In M. Waschauer, & R. Kerm (Eds.), *Network-based language teaching: Concepts and practice* (pp. 41-58). Cambridge: Cambridge University Press.

Watson, G., & Glaser, E. (1980). *Watson– Glaser critical thinking appraisal.* England: The Psychological Corporation.

Weigle, S. C. (2002). *Assessing writing*. Cambridge: Cambridge University Press.

White, J. (1998). Getting the learners' attention: A typographical input enhancement study. In C. Doughty, & J. Williams (Eds.), *Focus-on-form in second language classroom acquisition* (pp. 91-128). Cambridge: Cambridge University Press.