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Contributory Role of Critical Thinking in Enhancing Reading Comprehension Ability of Iranian ESP Students

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Abstract

The present study aimed to investigate the possible relationship between ESP learners' critical thinking abilities and their reading comprehension. For this purpose, from the population of students studying in different fields of engineering at Amol Islamic Azad University, a sample of 202 ESP participants were selected based on a purposive sampling method. A critical thinking questionnaire was then given whereby the targeted respondents answered the prompts underlying the critical thinking construct. Subsequently, a valid reading comprehension test with an acceptable reliability index was administered and the data were analyzed using the related descriptive and inferential statistics. The findings revealed that there was a robust and positive correlation between ESP learners' levels of critical thinking ability and their reading comprehension. Moreover, it was found that ESP students regarded as high critical thinkers significantly outperformed those with lower levels of critical thinking on the reading comprehension test. Notably, the results may offer useful implications to both language teachers and English learners indicating that critical thinking strategies play a pivotal role in the reading comprehension process.

Keywords: academic text, critical thinking, ESP students, reading comprehension

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1. Introduction

Over the centuries, the ability to think critically and to reason well has been considered an important and necessary outcome of life and education. According to Dewey (1933), learning to think is the central goal of education. Critical thinkers demonstrate a progress in skill to reflect critically, communicate efficiently, and find solution for problems. It leads learners to think logically, manipulate proof, and as a result, unravel previously hidden information. All in all, it can be stated that the critical thinking construct has received a lot of ink in research pertaining to Second Language Acquisition (SLA).

Critical thinking plays a vital role in Socratic theories. According to Socrates, one's justification could not rest on confused meaning, inadequate evidence, and self-contradictory beliefs. Sound thinking, citing Kanik (2010), needs "approaching issues with critical scrutiny and does not allow human beings to commit themselves to beliefs they do not know to be absolutely true because knowledge they acquire is subject to change under conditions in life" (p. 13). Similarly, Dewey (1933) defines critical thinking as a kind of "reflective thinking" which incorporates "an active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of the grounds which support it and the further conclusions to which it tends" (p. 9). More notably, Dewey (1933) stresses that critical thinking is an active process as opposed to a passive approach to receiving ideas and knowledge. Accordingly, critical thinkers contemplate things, raise questions, and look for information all by themselves.

Reed and Kromely (2001) state that critical thinking is a process of analyzing highly complex issues in order to identify alternative viewpoints according to specific criteria for making appropriate inferences and to reach reasonable conclusions in terms of reliable evidence. According to Reed and Kromely (2001), critical thinkers need to apply sound justifications in reaching logical conclusions. Alternatively, to Menkes (2005), critical thinking is a "cognitive skill that determines how well someone gathers, processes, and applies information in order to identify the best way to reach a particular goal or navigate a complex situation" (p. 3). Kanik (2010), however, believes that the critical thinking skill encompasses:

a) a set of information and belief generating and processing skills, and

b) the disposition to use those skills to guide behavior.

On this basis, critical thinking should not be regarded as the acquisition and storage of information, rather it is a process of seeking and processing information, which goes beyond mere possession of skills involving an interplay between learning and thinking critically. That is why Richards (2001) divides curricula into two different categories; namely, standard and the reflective critical curricula. In the standard curriculum, clear-cut and unmistakable information is transformed from teachers to students. Teachers are authorities of the class while students follow their instruction. On the contrary, reflective education pursues an active and ongoing participation of learners whereby teachers direct learners how to think about what they learn rather than focusing on absorbing information.

In a reflective paradigm, curriculum developers need to consider several things. To begin with, to be a critical thinker, students should question and explore issues. Students ought to ask and focus on underlying meanings instead of reflecting on end results and products (Zare, Behjat, Abdollrahimzadeh, Izadi, 2013). In doing so, students are required to participate in a group, ponder, and support their remarks while giving and receiving feedback on them. Reflective paradigm incorporates learners who apply critical processes and challenge one another to present reasons and infer from what has been said (Richards, 2001).

As such, critical thinking is a pivotal concept in education where teachers can instruct students to learn to be reasonable in order that they come up with reasonable patterns. In point of fact, teachers can help learners to be autonomous. Taking the responsibility of learning is the essence of a critical paradigm. Autonomous learners self-instruct and self-evaluate themselves and argue discussion and reflection about the subject matter of the discipline (Richards, 2001). Despite its paramount importance, critical thinking construct is neglected in language learning, particularly in case of students involved in English for Specific Purposes (ESP). ESP students have to use English languages during their studies such as specific English textbooks, academic journals, etc.

As a consequence, thinking critically may help learners to think for themselves and learn how to evaluate and monitor their thinking while assessing others' thoughts and methods. In such a community where questioning becomes a way of reflection, students are stimulated to inquire the validity of sources of information, including teachers (Kanik, 2010).

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2. Literature Review

Martinez (2008) reported the strategy use of ESP university students, particularly learners from the Faculty of Chemistry and the Technical School of Engineering. Differences between male and female students in their perceived use of reading strategies while reading academic materials were addressed. 157 non-native-English speaking Spanish students (48% female and 52% male), from the University of Oviedo took part in the study. To collect data, Metacognitive Awareness of Reading Strategies Inventory (MARSI), Global Reading Strategies (GLOB), Problem-Solving Strategies (PROB), and Support Reading Strategies (SUP) were administrated among learners. It was found out that there was a moderate to high overall use of reading strategies among Spanish ESP students when reading their academic materials. Moreover, the findings also revealed that learners' use of problem-solving and global reading strategies were significantly high. The study also reported that female learners were significantly better at using reading strategies.

In a different study, Tanyeli (2009) trained learners in an online course. Law students in Eastern Mediterranean University (EMU) were observed in web-assisted and traditional methods of learning. Learners' reading proficiency and comprehension were measured in pre-test and post-tests administered before and after the experiment. The results indicated that there was a considerable improvement in the reading comprehension skills of the experimental group involved in online reading skills.

Alternatively, Park (2005) studying agriscience learners explored learners' comprehension by enlisting different instruments such as content area reading strategies (CARS). Grade level, gender, ethnicity, socioeconomic status (SES), grade point average (GPA), Florida Comprehensive Assessment Test (FCAT), and reading levels of students. The main focus was on the variance in comprehension of agricultural materials as well as students' motivation to read such texts. The study followed a quasi-experimental nonequivalent control group design investigating the effect of using CARS on agricultural comprehension and attitude toward reading of a purposively selected sample (n=95) of secondary agriscience learners, enrolled in Agriscience Foundations in Florida. The study compared CARS instruction with the teacher's normal instruction. Park (2005) concluded:

Over 60% of students read at the lowest two FCAT reading levels, while 11.6% read at the highest two levels. Students were generally lacking in motivation to read. Agriculture pre-test score, grade level, GPA, gender, ethnicity, and FCAT reading level predicted 65.0% of variance in agriculture post-test scores. Regression analysis did not produce a model that was statistically significant for motivation to read. GPA and FCAT reading level predicted 39.4% of variance in the comprehension portion post-test score (p. xv).

Within the Iranian context, Jafari and Shokrpour (2012) studied the reading strategies of Iranian EMP students when they read authentic expository texts in English. 81 male/female university sophomore students studying environmental health, occupational health and safety, and midwifery at Shiraz University of Medical Sciences were selected as the subjects of the study. The Persian version of Survey of Reading Strategies (SORS) and a reading comprehension test were administrated. It was found that the targeted learners showed moderate awareness of reading strategies and the most frequently employed strategies were support strategies, followed by global strategies, and problem-solving strategies. Furthermore, learners majoring in environmental health employed more overall reading strategies than those majoring in occupational health and safety and midwifery.

Notably, the results addressed by these studies unanimously support the fact that ESP learners' reading abilities may be improved through increasing the ability to reason, analyze, synthetize, apply, and evaluate information during the reading process. In this regard, the present study aimed to explore the possible relationship between critical thinking ability and reading ability of ESP learners. Particularly, the study pursued two different but complementary objectives:

a) Is there any relationship between critical thinking and reading ability of ESP students?

b) Is there any difference between ESP high and low critical thinkers with respect to their reading abilities?

3. Methodology

3.1 Design of the Study

The overall goal of this study was to explore the possible relationship between ESP learners' critical thinking ability and their reading comprehension ability. In this regard, the study adopted a descriptive research design to examine the possible correlation. Quantitative data analysis was run to check the significance of the relationship.

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3.2 Participants

A total of 248 students from Imam Hossein University were taken as the subjects of the study. For sampling, convenience sampling was applied to select learners as those were the students whom the researchers had access to. However, prior to the study, students participated in a proficiency test (First Certificate in English) and the students who passed the proficiency test (n=202) were selected. Students were all male learners ranging in age from 18 to 25. They study mechanical (n=67), electronic (n=70), and navigation (n=65) and were in their first or second year of their academic studies. All of the participants had experienced formal instruction in English for a period of 7 years during their public education. At the time of data collection, the participants were enrolled in a general English course with four hours of instruction per week focused on reading comprehension through different topics in the field of academic sciences.

3.3 Instruments

3.3.1 Cambridge First English Test

To check learners' language proficiency, Cambridge First English Test known as the First Certificate in English (FCE) was applied. The test is an English language examination developed by Cambridge English Language Assessment. It tests subjects' proficiency level at intermediate and an upper-intermediate levels. This test focuses on four language skills. The first part includes 56 questions for reading and writing, the second part contains 25 questions for listening, and the last part assesses learners' speaking ability. For the purpose of this study, only the first part of the test i.e. the reading section was administered among learners in order to homogenize them.

3.3.2 Critical Thinking Questionnaire

To study learners' critical thinking beliefs, a Critical Thinking questionnaire adapted from Naieni (2005) was employed. The scale was originally developed by Peter Honey (2000). The present questionnaire was improved and suited for Iranian EFL learners. Moreover, the reliability of the scale was reported a high consistency 0.86 (Naieni, 2005). The questionnaire consists of 30 items using a 5-point Likert scale. Students were asked to read items and select an option ranging from never to always in terms of their critical thinking beliefs.

3.3.3 IELTS Reading Test

The reading section of IELTS Test is implemented to check its possible correlation with ESP learners' critical thinking abilities. The test is taken from Cambridge Practice Tests for IELTS 1 (Jakeman & McDowell, 2006). IELTS test is a standard means of assessing learners' language ability and due to this reason it is chosen as the main measure of reading evaluation in this study. The test consists of three passages of forty one questions required to be answered in 60 minutes. The passages are taken from books, journals, magazines, and newspapers, and have been written for a non-specialist audience. All the topics are of general interest. They deal with issues which are interesting, recognizably appropriate, and accessible to test takers.

3.4 Procedure

A questionnaire and a test were adopted to collect data. They were administered during final-term session. The researchers asked learners firstly complete the critical thinking questionnaire. The researchers asked them to read carefully each item and honestly answer them. After critical thinking questionnaire, learners were asked to answer the reading test. After responding to the tests, data were collected to further analysis.

3.5 Data Analysis

Descriptive statistics and inferential statistics including Pearson product-moment correlation coefficient and t-test were run to analyze data.

4. Results

The first research question of the study explored whether there is any significant relationship between critical thinking and reading comprehension of Iranian ESP learners. The data collected from critical thinking questionnaire and the reading test were analyzed using descriptive and inferential statistics. Table 1 below depicts the descriptive statistics of critical thinking and reading comprehension of learners.

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Table 1. The descriptive statistics of critical thinking and reading comprehension

	N	Minimum	Maximum	Mean	Std. Deviation
Critical thinking	202	79.00	113.00	99.62	9.98
Reading comprehension	202	19.00	40.00	31.67	4.99
Valid N (listwise)	202				

According to Table 1, the mean score of learners' critical thinking is M=99.62 (SD=9.98). The mean score of learners' reading comprehension is M=31.67 (SD=4.99). To check the possible relationship between the two variables, Pearson correlation was run. Table 2 provides the results of correlation. According to the results, there is a significant relationship between ESP learners' critical thinking and their reading comprehension skill ($p=0.00\leq0.01$). The correlation is also strong and positive (r=0.87). It means the higher critical thinking ability ESP students have, it is likely they show higher reading ability.

Table 2. Pearson correlation between critical thinking and reading comprehension

		Critical thinking	Reading comprehension
Critical thinking	Pearson Correlation	1	.877**
	Sig. (2-tailed)		.000
	N	60	202
Reading comprehension	Pearson Correlation	.877**	1
	Sig. (2-tailed)	.000	
	N	202	202

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

The second research question of the study explored whether there is any significant difference between ESP high- and low-critical thinkers regarding their reading achievement. Independent samples t-test was applied to check the difference. To begin with, learners were divided to two groups of high and low critical thinkers based on the mean score of critical thinking ability (M=99.62). As Table 1 shows, cut-point was indicated according to average of minimum (79.00) and maximum (113.00) scores of the students in the questionnaire. Based on learners' mean score, the mean score of 96 was computed as the cut-point to divide learners to two groups. Out of 202 learners, 126 students belong to the high group and the rest of students, 76, enter the low critical thinker group. The descriptive statistics of the two groups are presented in Table 3.

Table 3. Descriptive statistics of high and low critical thinkers

	Group	N	Mean	Std. Deviation	Std. Error Mean
Critical thinking	1.00	126	106.43	4.36	.388
	2.00	76	88.32	5.31	.609

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To test whether high and low critical thinkers are significantly different, an independent samples t-test as run. According to Table 4, ESP high critical thinkers are significantly better in reasoning and problem solving compared to low critical thinkers (t(200)=26.29, p=.00).

Table 4. Independent samples t-test between high and low critical thinkers

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Critical thinking	Equal variances assumed	6.196	.014	26.29	200	.000	18.11	.68
	Equal variances not assumed			25.04	135.00	.000	18.11	.72

In order to check whether there is a significant difference between the two groups regarding their reading comprehension ability, an independent samples t-test was run. According to Table 5, there is a significant difference between ESP high and low critical thinkers in their reading performances (t (200)=16.28, p=.00). Higher critical thinkers significantly understand the receptive input better than the low critical thinkers.

Table 5. Independent samples t-test between high and low critical thinkers regarding their reading comprehension

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Reading comprehension	Equal variances assumed	.978	.324	16.28	200	.000	7.76	.47
	Equal variances not assumed			15.89	146.39	.000	7.76	.48

5. Discussion

The present findings confirm the previous studies (e.g. Villavicencio, 2011). In his ten-year study, Cotton (1991) asserted that critical thinking considerably facilitates academic achievements. Thinking skills such as making inferences, self-questioning, formulating hypotheses, drawing conclusions, and solving problems result in achievement gains. Similarly, Villavicencio (2011) studied critical thinking in relation to achievements, reported that critical thinking significantly positively correlates with their proficiency. In his study, Sheikhy Behdani (2009) further

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supported a high significant correlation between EFL learners' critical thinking ability and their reading comprehension. Ulas, Kocak, and Karabacak (2012) also reported a high critical thinking skill for 610 5th grade students from 6 different primary schools in the countries of Palandöken and Yakutiye in Erzurum as well as a high correlation was indicated between learners' critical thinking and their Turkish language course success. In line with previous findings and based on the present study, it can be concluded that ESP learners' critical thinking ability has a positive relationship with their ability to handle reading passages. It denotes that ESP learners can think critically, formulate inferences, and make decision in order to better understand specific reading passages.

Regarding the second research question of the study, the findings of the study highlight that higher level of reasoning, contemplating, and judging results in a better consideration of reading passages. Learners with higher critical thinking skill evaluate the hidden message and confirm and disconfirm what is important in getting the point. Kamali and Fahim (2011) also found that EFL high critical thinkers (M=14.61) perform better in face of reading tasks as opposed to their low counterparts (M=9.91). Moreover, t-test table revealed significant differences between groups with regard to their reading performances (p=0.00). The cognitive skills of synthesis, assessment, implication, and monitoring used in receptive skills (Celce-Murcia, 2001) are those cognitive skills which according to Facione (2007) are central to critical thinking: "as to the cognitive skills here is what the experts include as being at the very core of critical thinking: interpretation, analysis, evaluation, inference, explanation, and self-regulation" (p. 4). As referred by Kamali and Fahim (2011), comprehension skills can effectively be improved through increasing learners' critical skill.

6. Conclusion

Critical thinking as a cognitive construct demonstrates how students infer, reason, deduce, and analyze task and the context at hand. Critical learners show more competence in the use of ideas, assumptions, inferences, and intellectual processes. They specify the ability to evaluate related questions and subjects clearly and accurately, bring together and formulate information precisely, differentiate the relevant from irrelevant, identify questionable assumptions, as well as reveal sensitive to important implications and conclusions (Zare et al., 2013). This stresses the unquestionable role of critical thinking in language development.

Based on the findings of the study, it is very critical that teachers and curriculum developers help to develop critical thinking abilities of ESP learners. A strong correlation between ESP learners' critical thinking skill and reading attainment signifies effectual role of reasoning and inferring. It is implied that developing a positive critical thinking belief can strengthen ESP learners' confidence to read and call the task into challenge. From the viewpoints of instructors, promoting ESP learners' critical thinking abilities help "analyzing complex issues and situations and generating solutions, making connections and transferring insights to new contexts, and developing standards for decision making" (Reed, 1998, p. 162), which are requirements in order to be successful.

The findings of the study support the improvement of the learners' thinking skill, which will result in the promotion of reading skill. Teachers should instruct learners to read critically during reading. They should be taught to focus on information from context, and tasks to get the points. This study also indicated that higher critical learners are more successful in their reading. It is implied that helping students to apply logical considerations result in a better development in language improvement especially a receptive ability like reading. Proving the results of the study, it is suggested that ESP students are experimentally studied in order to see how they perform in their reading tasks in an experimental research. Similar experimental analysis will help instructors and students to have a better experience of language teaching and learning.

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