The relationship between metacognition and multiple intelligence of Iranian elementary and intermediate EFL learners and their reading comprehension

Elham Sharifzadeh [*], Islamic Azad University of Shiraz, Department of Foreign Language, College of Humanities, Fars, Iran

Firooz Sadighi, Islamic Azad University of Shiraz, Department of Foreign Language, College of Humanities, Fars, Iran

Abstract

This study aimed to investigate the relationship between metacognitive, multiple intelligence, and reading comprehension of elementary and intermediate EFL learners. To this end, the researchers recruited 60 elementary students of Hasanzadeh high school in grade 10th and 60 intermediate English learners from Bilan-Taymaz English institute in Kazeroun using the Oxford Placement Test. Afterward, the researchers administered the researcher-made reading comprehension test. Furthermore, the Multiple Intelligence Questionnaire and Metacognitions Questionnaire tests were conducted. Participants were asked to complete these questionnaires and to take the reading comprehension test through separate sessions on the Rubika app. The results revealed a significant relationship between the metacognition and reading comprehension of both elementary and intermediate EFL learners. Furthermore, there was a significant relationship between the multiple intelligences of Iranian elementary and intermediate EFL learners and their reading comprehension. According to the next results obtained through SPSS, the researchers found that there is a significant difference between the metacognition of the elementary and intermediate participants. The same result was obtained for multiple intelligence.

Keywords: Iranian elementary EFL Learners, Iranian intermediate EFL learners metacognition, Multiple intelligence, Reading comprehension;

 ADDRESS OF CORRESPONDENCE: Elham Sharifzadeh, Dr. Firooz Sadighi Islamic Azad University of Shiraz, [*] Department of Foreign Language, College of Humanities, Fars, Iran
Email address: elhamsharifzadeh66@gmail.com

1. Introduction

English as a universal language is used everywhere for numerous purposes which include interaction with different people from distinctive countries and providing a means for conveying knowledge (Mehrpour et al., 2011; Agustin et al, 2022; Cabau, 2009). Reading comprehension is an essential element for instructional fulfillment not most effective for educators but additionally students. A good deal of knowledge from written texts is predicated on reading comprehension that's a method of making an overall understanding of the text (Nelson at al., 2022; Rydland at al., 2019; Woolley, 2011). Readers want to be concerned with the textual content to understand the supposed meaning of the writer. It's far clear that scholars want desirable reading skills in English as their 2nd language to succeed in their academic education (Zare, 2007) in addition to increasing their understanding of the language, lifestyle, and worldwide views (Yang, 2010). The comprehension procedure needs a variant of things along with rudimentary reading abilities, interpreting, language awareness, previous knowledge, grammatical information, reading attitudes, inferencing, opportunities for spoken and written expression, and metacognitive focus (Koda, 2007). According to these components, reading comprehension is consequently such a type of complicated cognitive process.

Metacognition, one of the most critical factors in reading comprehension, may want to help students realize textual content through the system of thinking about thinking. In line with Flavell (1979), metacognition includes understanding approximately the thinking process, active monitoring, and regulation of cognitive activities. Typically, metacognitive reading strategies were laid in many reading activities supporting reading comprehension. As a consequence, plan, aim, aim route, and future-oriented intellectual method are hired at the same time as reading (Salataci & Akyel, 2002). Besides strengthening reading comprehension, reading strategies also work as a predictor of reading comprehension test scores. Furthermore, the relationship between metacognition and reading comprehension seems to engage firmly, in other phrases, the reading comprehension stage may rely on the notion of character metacognition. Although a few preceding research on metacognition claimed that there's a relationship between individuals' metacognition and his/her studying comprehension performance (e.g., Ahmed, 2020; Idris et al., 2022; Maftoon & Fakhri Alamdari, 2016; Taherkhani et al., 2022). Some research revealed that there is no relationship between them, along with the research performed with the support of (Alsamadani, 2014; Mehrdad et al., 2012; Meniado, 2016; Estacio, 2013).

Any other prevalent issue within language teaching and mainly in the realm of teaching English as a foreign or 2nd language is the attention to individual variations. This has resulted in the consideration of the entire individual with his desires, strengths, and pitfalls as being different from one another (Brown, 2001; Achugar, 2009; Poza, 2019; Lai, 2019). A perspective that contributed to the consideration of people as distinctive is the multiple Intelligences theory which has acquired important attention from L2 practitioners and SLA researchers in recent years. The idea of intelligence was once regarded as being a single thing known as Intelligence Quotient (IQ) tapping into the best verbal and mathematical capacity of the people; but, in 1983 and 1999 Howard Gardner proposed the concept of multiple Intelligences (MI) stating that human intelligence is composed of various elements and people are different according to the degree of these differences. Gardner (1983) argued that children have distinctive abilities, capabilities, and preferences and that they have unique learning styles. The idea of intelligence has developed from a general factor called the g-factor which represents a one-dimensional technique toward intelligence (Spearman, 1904; as mentioned in Simmons, 2001). MI as put forward using Gardner (1983, 1999) goes beyond this basic view of intelligence and offers a multidimensional picture of this concept with various but related facets. Gardner's (1983) listing of MI includes Linguistic, Spatial (visible), Logical-mathematical, Interpersonal, Intrapersonal, physical-kinesthetic, Musical, Naturalistic, and Existential. The last two components, this is, Naturalistic, and Existential intelligence were not among many of the intelligence kinds when it was first introduced, and they have been later delivered to the listing.

Having considered the important function of metacognition and multiple intelligence in reading comprehension, there seems to be a gap regarding the relationship between these concepts. That is, studies conducted till now cannot provide us with the relationship between them. Further, to the researchers' best knowledge, the relationship between the reading comprehension of Iranian EFL learners and their metacognition and multiple intelligence has not been addressed.

1.1. Significance of the study

The importance of the relationship between Metacognition, Multiple Intelligence, and Reading Comprehension of Iranian EFL Learners is a crucial topic in second/foreign language learning. This study is useful for both language teachers and language learners because the improvement of the relationship between Metacognition, Multiple Intelligence and Reading Comprehension of Iranian EFL Learners' knowledge leads to the development of overall language proficiency. Relationship Between Metacognition, Multiple Intelligence and, Reading Comprehension of Iranian EFL Learners is considered the problematic part in developing language proficiency of EFL learners, so language learners suffer many problems in the improvement of this knowledge. Given that, the research is beneficial to language teachers to use the findings of the research to improve their learners' knowledge.

As stated earlier, no research was conducted on exploring the relationship between metacognition, multiple intelligence, and reading comprehension of Iranian EFL learners. Therefore, the present study can be considered novel research. The findings of this study may prove beneficial to material developers in the sense that they may get to be concerned about the inclusion of special types of relationships, between metacognition, multiple intelligence, and reading comprehension of Iranian EFL learners to provide language learners with the chance to receive suitable amount of relationship between metacognition, multiple intelligence and reading comprehension of Iranian EFL learners to grasp a more natural command of English. English teachers may also take advantage of the possible findings by being more aware of how to adapt ELT materials and educational learners, in particular, to compensate for any possible discrepancy. Finally, the current study may benefit language learners by providing them with an idea of how much similarity they will enjoy having the relationship between metacognition, multiple intelligence, and reading comprehension of Iranian EFL learners which may be critical to them in mastering the way this relationship takes place in real language.

1.2. Research objectives

The present study aims to explore the relationship between metacognition, multiple intelligence, and reading comprehension of Iranian EFL learners.

In light of the research questions posed and the hypotheses, the researchers first intend to identify the reading comprehension ability of participants. In this phase, a researcher-made test is employed to collect data.

The researchers also intend to investigate the participants' metacognition through Metacognition Questionnaire (MCQ-30; Wells and Cartwright-Hatton, 2004). It is aimed to determine whether there is a relationship between the metacognition of the students and their reading comprehension.

Also, in this study, the multiple intelligence of the students is measured through Multiple Intelligences Developmental Assessment Scales (MIDAS, developed by Shearer in 1996), to determine whether there is a relationship between the multiple intelligence of the students and their reading comprehension.

1.3. Research questions and hypotheses

To fulfill the purpose of the study, the following research questions were proposed:

Q1. Is there any significant relationship between Iranian elementary EFL learners' metacognition and their reading comprehension?

Q2. Is there any significant relationship between Iranian elementary EFL learners' multiple intelligence and their reading comprehension?

Q3. Is there any significant relationship between Iranian intermediate EFL learners' metacognition and their reading comprehension?

Q4. Is there any significant relationship between Iranian intermediate EFL learners' multiple intelligence and their reading comprehension?

Q5. Is there any significant difference between Iranian elementary and intermediate EFL learners' metacognition?

Q6. Is there any significant difference between Iranian elementary and intermediate EFL learners' multiple intelligence?

In line with the mentioned research questions, this study addresses the following null hypotheses:

H01. There is no significant relationship between Iranian elementary EFL learners' metacognition and their reading comprehension.

H02. There is no significant relationship between Iranian elementary EFL learners' multiple intelligence and their reading comprehension.

H03. There is no significant relationship between Iranian intermediate EFL learners' metacognition and their reading comprehension.

H04. There is no significant relationship between Iranian intermediate EFL learners' multiple intelligence and their reading comprehension.

H05. There is no significant difference between Iranian elementary and intermediate EFL learners' metacognition.

H06. There is no significant difference between Iranian elementary and intermediate EFL learners' multiple intelligence.

1.4. Literature review

Various studies have revealed that reading skills can be improved more if students benefit from metacognitive processes; occurs when students are aware of monitoring and take control of their reading (Hacker, 1998; White & Frederiksen, 1998). In Asia, Wang et al. (2009) studied 110 EFL students in Taiwan and found strong associations between metacognitive awareness and reading comprehension. Similarly, Gou (2008) examined the relationship between metacognitive awareness of reading strategies and reading comprehension among 278 Chinese university students. The results revealed that there is a significant relationship between metacognitive awareness and reading comprehension. In the European context, Gelderen et al. (2003) used a questionnaire to measure metacognitive awareness and a multiple-choice English Reading Test to measure reading comprehension with 397 Dutch students and found a significant positive correlation of 0.72. Indeed, many researchers have revealed the role of metacognitive awareness in reading comprehension. (Barnett, 1989; Carrell & Floyd, 1987; Chamot, 2005; Gou, 2008; Idris et al., 2022).

In addition, multiple intelligence has received a lot of interest in psychological scope as well as metacognition. As suggested by Gardner, the multiple intelligence theory teaches that all students are smart but in different ways. "Teachers and principals are finding that using multiple intelligences not only

increases the opportunities for students to learn but also gives adults and children more avenues and ways to grow professionally and personally" (Kuzniewski, et al., 1998).

According to Gaines and Lehmann (2002), based on data analysis of reading comprehension scores, the results revealed a significant improvement in reading comprehension in English. They noted that various MI interventions provide different ways for students to use their intelligence to their advantage as they plan and pursue their futures.

Reading comprehension has been accepted as a product of the reader's interaction with a text to create meaning (Al-Jamal et al., 2013). It also refers to the cognitive process consisting of different components: physical actions, psychological factors, and social environment (Diakidoy et al., 2005). To connect with the text, readers should respond to the ideas in the text by asking some questions about the text, organizing the ideas in the text, and linking these ideas with their previous knowledge (Irvin et al., 2007). In this process, comprehension occurs when the reader extracts and integrates various information from the text and combines them with previously known information (Koda, 2005). It can be said that the reader can find the intended meaning of the text by actively entering the text. Singhal (2001) stated that reading comprehension depends not only on cognitive processes, but also on psychological processes, complex grammar, and especially on reading strategies necessary to improve reading comprehension and cope with reading comprehension problems.

2. Methodology

This section deals with some elements of the methodology of the study; that is, the design, participants, instruments, data collection procedures, and data analysis procedure.

2.1 Research design

The current study employed a quantitative method. A quantitative method refers to collecting and analyzing numeric data to explain and predict an outcome. Correlational design in the present study was used to show the relationship between metacognition, multiple intelligence, and reading comprehension of Iranian elementary and intermediate EFL learners. Furthermore, the researchers employed the descriptive design to indicate the difference between metacognition and multiple intelligence of participants.

2.2 Participants

The researchers did not have access to all Iranian EFL learners; as a result, she recruited the participants through convenient sampling. The sample included 60 elementary students of Hasanzadeh high school in grade 10th and 60 intermediate English learners from Bilan-Taymaz English institute in Kazeroun.

2.3 Data collection tools

After the determination of the participants, the correct, relevant, and useful data should be gathered through a valid method.

2.3.1. Oxford Placement Test (OPT)

OPT is an English language examination provided by Oxford University Press Language Assessment. This test was used at the beginning of the research to determine the student's level of language proficiency. All aspects of language proficiency are considered in OPT so it is a reliable proficiency test. OPT has 50 items related to all language skills, as far as this test is developed by Oxford Language University, it is considered a reliable test.

2.3.2 Metacognitions Questionnaire-30 (MCQ-30)

The questionnaire was originally developed by Wells and Cartwright-Hatton (2004) who subsequently developed a short version of the questionnaire containing 30 items (MCQ-30). The questionnaire consists of 30 statements and a 4-point Likert scale ranging from (1) Do not agree to (4) Agree very much. The internal consistency of the motivation questionnaire was 0.722 which confirmed the reliability of the questionnaire. This test was already piloted with a small sample for acknowledging its reliability.

2.3.3 Multiple intelligence questionnaire

The multiple intelligence questionnaire was developed by Tirri and Nokelainen (2011). The questionnaire measures learners' multiple intelligences and moral sensitivities in education based on the Five-point Likert scale. The questionnaire consisted of 28 statements using a 5-point Likert scale ranging from Totally Disagree (1) to Totally Agree (5). The Cronbach's Alpha reliability coefficient was used for checking the internal consistency.

2.3.4 Reading comprehension test

To measure the reading comprehension ability of the participants, a teacher-made reading comprehension test was used which included 4 reading texts. All the texts were extracted from their textbook. Each one is followed by 5 comprehension questions. The reliability of the reading comprehension test was checked by piloting it on 15 students who were similar to the target sample. Conducting the test-retest method indicated a correlation coefficient of 0.78 which seems to be acceptable.

Concerning the validity of the reading test, two experts at Azad university of Kazeroun were asked to check the test against the common standards, and their ideas were taken into account in revising the test.

2.4 Data collection procedures

The number of students who participated in the study was 60 elementary and 60 intermediate students. They were sampled based on random sampling. Their native language was Persian and they study English as a foreign language. In the first step, OPT was conducted to check students' proficiency levels. Afterward, the researchers administered the reading comprehension test. Furthermore, the Multiple Intelligence Questionnaire and Metacognitions Questionnaire tests were conducted. Participants were asked to complete these questionnaires and to take the reading comprehension test through separate sessions on the Rubika app. Having received the questionnaires, the scores obtained based on the performance of the participants on the tests were fed into the SPSS software version (26) for analysis.

2.5. Data analysis procedures

The statistical analysis is conducted using the statistical package for social sciences (SPSS). To answer the four first research questions, depending on the normality status of the distributions, the Spearman correlation was run and the results with relevant tables were reported to show the relationship between metacognition, multiple intelligence, and reading comprehension of Iranian elementary and intermediate EFL learners.

To answer the two last questions, the researchers ran two independent t-tests aimed to indicate the difference between metacognition, and multiple intelligence of elementary and intermediate EFL learners.

2.6. Compliance with ethics

In this study, "Scientific Research and Publication Ethics" all the rules to be followed within the scope of the study were complied with and scientific values were adhered to. Scientific none of the acts contrary to research and publication ethics not carried out.

3. Results

The results of descriptive statistics of elementary participants are reported in Table 1.

Table 1

Table 1. Descriptive statistics of elementary participants

Descriptive Statistics			
	Mean	Std. Deviation	N
Elementary metacognition	78.2000	13.28922	60
Elementary multiple intelligence	85.5500	13.33839	60
Elementary reading comprehension	16.3000	1.80677	60

In Table 1, the Mean score, Std. Deviation and the number of elementary participants were shown. According to this table, the Mean score and Std. Deviations related to the metacognition of elementary participants are M = 78.20 and Std.= 13.28922, the Mean score and Std. Deviation of multiple intelligence is M = 85.5500 and Std.=13.33839. Also, descriptive statistics show that the mean score of reading comprehension is 16.3000, and the Std. deviation is 1.80677, respectively. At the next stage of data analysis, the Pearson correlation coefficient is used to show the linear association between elementary EFL learners' metacognition, multiple intelligence, and reading comprehension. The results are shown in the following table.

Table 2
Table 2. The correlation between metacognition, multiple intelligence, and reading comprehension of elementary participants

Correlations		Elementary metacognition	Elementary multiple intelligence	Elementary reading comprehension
Elementary metacognition	Pearson Correlation	1	0.630[**]	0.946[**]
	Sig. (2-tailed)		0.000	0.000
	N	60	60	60
Elementary multiple intelligence	Pearson Correlation	0.630[**]	1	0.620[**]
	Sig. (2-tailed)	0.000		0.000
	N	60	60	60
Elementary reading comprehension	Pearson Correlation	0.946[**]	0.620[**]	1
	Sig. (2-tailed)	0.000	0.000	
	N	60	60	60
**. Correlation is significant at the 0.01 level (2-tailed).				

The results show that there is a relationship between participants' metacognition and reading comprehension in this research (sig = 0.000). Furthermore, there is a relationship between multiple intelligence and reading comprehension of elementary participants (sig = 0.000).), that is, the higher level of metacognition or multiple intelligence, the higher level of reading comprehension.

The other issue to be considered in correlation analysis is the size of the value of the correlation coefficient. This value indicates the strength of the relationship between the two variables (metacognition and reading comprehension= 0.946, multiple intelligence and reading comprehension= 0.620, metacognition and multiple intelligence= 0.630). So it is concluded that there is a significant relationship between elementary participants' metacognition and reading comprehension and the first hypothesis of

this study is rejected. Furthermore, it is shown that there is a significant relationship between participants' multiple intelligence and their reading comprehension. So the second hypothesis is rejected.

In addition, the results of descriptive statistics of intermediate participants are reported.

Table 3

Table 3. Descriptive statistics of intermediate participants

Descriptive Statistics

	Mean	Std. Deviation	N
Intermediate metacognition	83.0000	10.73407	60
Intermediate multiple intelligence	90.4500	10.50654	60
Intermediate reading comprehension	16.8667	1.44347	60

In Table 3, the Mean score, the Std. Deviation, and the number of intermediate participants were indicated. The Mean score and Std. Deviation of metacognition of intermediate participants are M=83.000 and Std.=10.73407, the Mean score and Std. Deviation related to multiple intelligence are shown as M=90.4500 and Std.=10.50654. Moreover, descriptive statistics indicate a Mean score of 16.3000 and the Std. deviation 0f 1.80677 for reading comprehension.

Next, the Pearson correlation coefficient is used to show the relationship between intermediate EFL learners' metacognition, multiple intelligence, and reading comprehension. The results are presented in the table below.

Table 4.

Table 4. The correlation between metacognition, multiple intelligence, and reading comprehension of intermediate participants

Correlations

		Intermediate metacognition	Intermediate multiple intelligence	Intermediate reading comprehension
Intermediate metacognition	Pearson Correlation	1	0.780[**]	0.529[**]
	Sig. (2-tailed)		0.000	0.000
	N	60	60	60
Intermediate multiple intelligence	Pearson Correlation	0.780[**]	1	0.502[**]
	Sig. (2-tailed)	0.000		0.000
	N	60	60	60
Intermediate reading comprehension	Pearson Correlation	0.529[**]	0.502[**]	1
	Sig. (2-tailed)	0.000	0.000	
	N	60	60	60
**. Correlation is significant at the 0.01 level (2-tailed).				

In Table 4, the sig of 0.000 indicates that there is a significant relationship between participants' metacognition and reading comprehension in this research. Furthermore, the results show that there is a significant relationship between multiple intelligence and reading comprehension of intermediate participants (sig=0.000). The value of the correlation coefficient indicates the strength of the relationship between variables. (metacognition and reading comprehension= 0.529, multiple intelligence and reading comprehension= 0.502, and metacognition and multiple intelligence= 0.780). So it could be concluded that there is a significant relationship between intermediate participants' metacognition and reading

comprehension. Furthermore, it is shown that there is a significant relationship between participants' multiple intelligence and their reading comprehension. So the third and fourth hypotheses are rejected.

To answer research questions number five and six, descriptive analysis and two independent sample t-tests were run. The results were shown in the following tables and the researchers report each table in brief.

Table 5

Table 5. The metacognition statistics of elementary and intermediate participants

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Metacognition	MCe	60	78.2000	13.28922	1.71563
	MCinter	60	83.0000	10.73407	1.38576

In Table 5, the Mean, Std. Deviation, and Std. Error Mean related to metacognition of elementary and intermediate participants was indicated. The mean score of elementary participants equals 78.2000, the Standard Deviation is 13.28922 and the Standard Error Mean equals 1.71563. Furthermore, the Mean, Standard Deviation, and Standard Error Mean of intermediate participants were shown. (M=83.0000, Std.=10.73407 and Std. Error Mean=1.38576).

The difference between these two groups was examined through an independent sample t-test. The following table shows the results.

Table 6.

Table 6. The differences between metacognition of elementary and intermediate participants

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference		Lower	Upper
Metacognition	Equal variances assumed	2.050	0.155	-2.176	118	0.032	-4.80000		-9.16727	-0.43273
	Equal variances not assumed			-2.176	113.000	0.032	-4.80000		-9.16927	-0.43073

According to this table, sig=0.032 which is <0.05 shows that there is a significant difference between the metacognition of elementary and intermediate participants. So, research question number five was answered.

The same procedures were done to examine the difference between the multiple intelligence of elementary and intermediate participants.

Table 7

Table 7. The multiple intelligence statistics of elementary and intermediate participants

	Group Statistics				
	Group	N	Mean	Std. Deviation	Std. Error Mean
Multiple intelligence	MIe	60	85.5667	13.37005	1.72607
	MIinter	60	90.4500	10.50654	1.35639

The descriptive statistics show a Mean score of 85.5667, the Standard Deviation of 13.37005, and the Std. Error Mean of 1.72607 for multiple intelligence of elementary participants. Furthermore, the Mean score of intermediate participants is 90.4500, the Standard Deviation is 10.506554 and the Standard Error Mean equals 1.35639.

Then, the difference between these two groups was examined through another independent sample t-test.

Table 8.

Table 8. The differences between multiple intelligence of elementary and intermediate participants

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std Error df	Lower	Upper
Multiple intelligence	Equal variances assumed	5.646	0.019	-2.225	118	0.028	-4.88333	2.19524	-9.23051	-.53615
	Equal variances not assumed			-2.225	111.752	0.028	-4.88333	2.19524	-9.23303	-.53364

This table indicates the sig. of 0.019. This is <0.05. Thus, it could be concluded that there is a significant difference between the multiple intelligence of elementary and intermediate participants.

4. Discussion and Conclusion

The main goal of this study was to examine the relationship between metacognition, multiple intelligences, and reading comprehension of Iranian elementary and intermediate EFL students. The results revealed a strong association between metacognition and reading comprehension in both groups of participants. Furthermore, there was a significant relationship between the multiple intelligences of Iranian elementary and intermediate EFL students and their reading comprehension.

According to the next results obtained through SPSS, the researchers found that there is a significant difference between the metacognition of the elementary and intermediate participants. The same result was obtained for multiple intelligence.

As a result, this research has taken a small step forward in terms of linking variables to real L2 reading comprehension. As many scholars (e.g., Ahmed, 2020; Idris et al., 2022; Maftoon & Fakhri Alamdari, 2016; Taherkhani et al., 2022) have pointed out, metacognition assists language learners in planning, organizing, and evaluating their learning, making them more independent, self-sufficient, and empowered. Hence,

there is a relationship between metacognition and the reading comprehension of learners (Leaver et al., 2005; Oxford, 1995).

While reading ability was previously associated with multiple intelligence and distinct brain structures in the left hemisphere, one can now show the interaction of all of the multiple intelligence forms while processing the experience of reading. Language teachers are strongly advised to portray all types of intelligence within a multiple-intelligence system while keeping in mind that their primary goal is to teach language. Furthermore, advocates of multiple-intelligence-based education see the classroom not only as a place where students learn but also as a place where students learn how to learn and think critically about what they've learned. The findings of the current study are in line with some previous studies such as Mojgan Mesbah, et al. (2018). They stated that there is a positive relationship between multiple intelligence and reading comprehension of EFL learners.

Furthermore, Gardner (1993) discusses the social benefits that come from applying his theory: we must acknowledge and cultivate all of the various human intelligence. We are all so different since we all have a mix of intelligence. Gardner maintains that: if we accept this, we would have a greater chance of coping appropriately with the world's many problems.

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