



**Damietta University**  
**College of Education**  
**Department of Curriculum & Instruction**

## **A Research Paper**

# **Using Online Inquiry Cycle-Based Jigsaw for Developing Critical Reading**

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### Abstract

The present study aimed at investigating the effectiveness of an online program based on inquiry cycle based jigsaw (ICBJ) for developing EFL 4<sup>th</sup> year student teachers' critical reading skills. One instrument was developed for the purpose of this study; a pre-post critical reading skills test. The participants of the study consisted of sixty students selected randomly from EFL 4<sup>th</sup> year student teachers at Faculty of Education, Damietta University in the academic year 2020/2021. The study adopted the quasi-experimental research design. Therefore, the participants were randomly assigned into two groups: an experimental group (n=30) and a control one (n=30). The experimental group received training through the proposed program based on an online inquiry cycle based jigsaw (OICBJ). On the other hand, the control group received instruction through the regular method. Participants were pre- and post-tested on the instrument: the EFL critical reading skills test (CRST). Results revealed that the experimental group outperformed the control group in the post administration of the EFL critical reading skills test. The study concluded that the online program based on an online inquiry cycle based jigsaw (OICBJ) enhanced EFL 4<sup>th</sup> year student teachers' critical reading skills. A number of recommendations and suggestions for further studies were presented.

**Keywords:** Jigsaw Strategy, Inquiry Cycle Strategy, On-line Learning, and EFL Critical Reading.

### 1. Background and Problem

#### 1.1. Introduction

Reading is a cornerstone for success throughout life. It is a social, complex and interactive process. It also provides pleasure and leads to readers' professional, social and personal development. Reading in general and critical reading in particular develops the readers' higher thinking skills. Critical reading is an important precursor to critical reflection and has many characteristic features that made learners active for learning. Maltepe (2016) shows that critical reading refers to individuals' thinking about what they read, assessing what they have read, and using their own judgment. In addition, she adds that teachers need to have knowledge about text selection and use of appropriate methods during teaching critical reading skills to students. Moreover, Gulcat (2004, p.1) indicates that critical reading is "an active process during which the reader interacts with the text and maintains an inner dialogue with the author. Therefore, it requires the reader to produce questions while following the author's line of reasoning".

The development of critical reading requires a type of learning with special characteristics that depends on investing the learner's abilities such as analyzing, synthesizing, understanding of relationships and positive interaction between the reader and the reading text. This is provided by a type of learning that has recently been referred to as "inquiry cycle -based jigsaw learning ". According to Perkins and Saris (2001) jigsaw learning has some benefits. It helps students expand the variety of learning experiences ; acquire positive attitudes towards the subject of the study; improve their achievement; get and give help; increase contact, cooperation and support; become collaborative learners; save time more efficiently; teach others; and make active responses. Furthermore, Kleeman (2015) adds that the inquiry cycle as a process starts by assigning questions, problems or scenarios rather than facts for seeking for information, or knowledge to enhance intellectual engagement and deep understanding, and develop a hands-on, minds-on and research based disposition towards learning.

At the current age, reading is no longer limited to paper texts but it includes online interactions. It allows many students and teachers to interact with various scientific materials and discover new contents, concepts and ideas. Rossen and Hartley (2001) consider online learning as a type of e-learning which has some advantages. It allows learners to control their learning by discovery and self-navigation, and to access for a synchronous training from any place in the world with very little technology. It also saves the costs of travel; and provides flexibility in scheduling and speed in delivery.

## **1.2. Statement of the Problem**

The problem of the study is reflected in the low level of EFL 4<sup>th</sup> year student teachers at Faculty of Education in critical reading skills. Therefore, the present study is an attempt to solve this problem through designing an online program based on deep learning approach and testing its impact on developing their critical reading skills.

## **1.3. Questions of the study**

1. What are the critical reading skills necessary for EFL 4<sup>th</sup> year student teachers?
2. What is the current level of EFL 4<sup>th</sup> year student teachers in critical reading skills?
3. What are the components of a program based on an online inquiry cycle-based jigsaw to develop EFL 4<sup>th</sup> year student teachers' critical reading skills?
4. What is the impact of a program based on an online inquiry cycle-based jigsaw on developing EFL 4<sup>th</sup> year student teachers' critical reading skills?

#### **1.4. Hypotheses of the study**

1. There is a statistically significant difference, at the significance level of  $p \leq 0.05$ , in the critical reading test, between the mean scores of the experimental group and those of the control group in the post-measurement in favor of the former.
2. There is a statistically significant difference, at the significance level of  $p \leq 0.05$ , in critical reading test, between the mean scores of the experimental group in the pre-measurement and the mean scores in the post measurement in favor of the latter.

#### **1.5. Purpose of the Study**

1. Using an online program based on inquiry cycle-based jigsaw for developing EFL 4<sup>th</sup> year student teachers' critical reading skills.
2. Identifying critical reading skills necessary for EFL 4<sup>th</sup> year student teachers.
3. Investigating the effectiveness of an online program based on inquiry cycle-based jigsaw for developing EFL 4<sup>th</sup> year student teachers' critical reading skills.

#### **1.6. Significance of the Study**

1. Raising EFL 4<sup>th</sup> student teachers' awareness of the importance of using a program based on an online inquiry cycle based jigsaw in learning the English language.
2. Developing EFL student teachers' performance in the critical reading skills.
3. Providing guidelines for designing programs for improving EFL student teachers' critical reading skills in the four academic years.

#### **1.7. Delimitations of the Study**

1. A sample of students from EFL 4<sup>th</sup> year student teachers at Damietta Faculty of Education, in the academic year 2020/2021
2. Critical reading skills appropriate for EFL 4<sup>th</sup> year student teachers (making inferences, drawing conclusions to the text, distinguishing facts from opinion, generating arguments based on evidence, and summarizing information in a text).

#### **1.8. Design of the Study**

The present study follows the quasi-experimental design to investigate the effectiveness of a program based on an online inquiry cycle-based jigsaw to develop EFL student teachers' critical reading skills. Two groups from EFL 4<sup>th</sup> year student teachers at Damietta Faculty of Education, are selected at random to represent the experimental and control groups. The experimental group will receive instruction through a program based on an online inquiry cycle-based jigsaw to develop critical reading skills. On the other hand, the control group will receive instruction through the regular method. Moreover, the experimental and control groups will be subjected to a pre-post critical reading test, prepared by the researcher.

### **1.9. Instruments and Materials of the study**

1. A questionnaire for identifying the EFL critical reading skills required for EFL 4<sup>th</sup> year student teachers, prepared by the researcher.
2. Pre-post critical reading skills test, prepared by the researcher.
3. A program based on an online inquiry cycle-based jigsaw for developing EFL student teachers' critical reading skills.

### **1.10. Definition of Terms**

#### **1.10.1. Jigsaw Strategy**

Sabbah (2016) defines jigsaw strategy as a cooperative learning technique that encourages listening, engagement, interaction, teaching, and cooperation.

Hedeen (2003) defines jigsaw as a process that happens in four essential steps : 1) First, students gather in 'jigsaw groups' of three to six and the material is divided to be covered within each group, 2) Next, each member of the group studies the specified section in jigsaw group, 3) Then, students form 'expert groups' by gathering with members of other jigsaw groups who are provided the same section of the material to discuss and plan how they will teach to other members of their jigsaw groups, 4) At last, students return to

their jigsaw groups to teach their learned materials to their group and to learn the materials taught by other members.

The present research refers to jigsaw as a cooperative process that happens in four steps. First, students gather in 'jigsaw groups' to identify their tasks. Next, students study the specified sections individually through each group. Then, students move to 'experts groups' to discuss the same sections. At last, students return in their jigsaw groups to teach their peers.

### **1.10.2. Inquiry Cycle Strategy**

Bruce and Casey (2012) defines inquiry cycle strategy with a spiral path includes five stages: 1) Ask, it begins with asking new questions are inspired by learners' curiosity about real world experiences and challenges. 2) Investigate, learners research to turn curiosity into action. Therefore, they gather information, study, observe, or interview, and become self-motivated learners. 3) Create, they form active meaning of knowledge, and make connections for composing significant new ideas and extending their prior experiences. 4) Discuss, they argue, share their ideas to others, ask others about their own experiences, and construct knowledge together. 5) Reflect, they take the time to look back at the initial questions, the research path, the conclusion made and the inventory, and make observations and new decisions.

Li, Moorman and Dyjur (2010) defines this strategy as an inquiry process starts with meaningful questions inspired by students about real world experience. Then, they investigate by gathering information and interviewing to answer the questions. After that, they act the creative task by integrating ideas and important thoughts to create new knowledge. Next, they discuss their ideas with others and build information through shared knowledge. Finally, they step back, reflecting on the questions and the research path, and make new decisions.

The present research refers to inquiry cycle strategy as an interactive process that occurs in five stages (ask, investigate, create, discuss, and reflect) for inspiring meaningful questions, gathering

information, integrating ideas and thoughts, and reflecting and making decisions.

### **1.10.3. On-line learning**

University of Massachusettes (2002) defines online learning as faculty-delivered instruction via the Internet. Online instruction includes real-time (synchronous) and anytime, anywhere (asynchronous) interactions. Furthermore, Bakia, Shear, Toyama and Lasseter (2012) defines online learning as instructional environments supported by the Internet. It comprises a wide variety of programs that use the Internet within and beyond school walls to provide access to instructional materials as well as facilitate interaction among teachers and students. It can be fully online or blended with face-to-face interactions.

The present research refers to on-line learning as instructional environments which allow varied interactions with the assistance of the internet in real or delayed time to achieve educational goals.

### **1.10.4. Critical reading**

Khdary and AbdAllah (2014) defines critical reading as a technique for evaluating what is read. It involves the ability to identify the main idea, find the evidence the text employs, show author's point of view, guess the meaning of words in context, guess the author's intended meaning, identify cause and effect relationships, recognize bias, draw conclusions, identify the audience, make inferences and recognize the tone. Moreover, El-Mistikawy (2016) defines critical reading as a mental process including the internal responses to a written text and it involves the mental processes that require the reader's skills to explain, infer and argue the meanings from the read text.

The present research refers to critical reading as intellectual processes of analyzing, interpreting and evaluating. It involves a deeper examination of arguments presented and the interpretations made to make inferences, draw conclusions to the text, distinguish facts from opinion, generate arguments based on evidence, and summarize information in a text.



## 2. Review of Literature

### 2.1. Teaching Critical Reading in Classrooms and Online courses

Handsen (2016) refers that reading is a basic skill in learning and in acquisition of languages. Readers get knowledge and information from several sources; traditional sources such as books, newspaper, and modern sources as digital ones. They need many skills as the ability to navigate in the text, read digitally, and comprehend the written text with its words, phrases, structures and genres, and combine information together. Particularly, she adds that readers require further competences to read digitally. They are able to be critics, search relevantly and cope with numerous links. Meanwhile, Marschell and Davis (2012) suggest a three stage framework for teaching critical reading skills to adult Students in the classroom that consists of pre-reading, experiential reading and post-reading. It is built on the basis of Harvey and Goudvis' (2007), Langer's (1994, 1995) and Kolb's (2001) approaches as shown in table1. In the first stage, pre-reading, instructors assign an activity to encourage students to engage with a text before reading it. Students can examine physical properties such as cover design, preface, introduction, footnotes and endnotes, illustrations, graphics and table of contents. Then, students are encouraged to skim the text and identify unfamiliar vocabulary and concepts. Finally, they use their prior knowledge and experience to begin the focus on the text "envisioning". In the second stage, experiential reading, students integrate experience with reflection, abstract conceptualization and original experimentation. They can develop some comprehension strategies such as questioning, visualizing and inferring. Thus, they expand the meaning of the text through discussion and writing, and reflect on the text in connection with their own lives, the lives of others and the human condition. Whereas, the third stage, post-reading, students go beyond the context to new knowledge. Students can develop some comprehension strategies such as summarizing and synthesizing. Thus, they objectify the reading and relate it to new ideas outside the text.

**Table1.**

*A Conceptual Framework for Teaching Critical Reading Skills to Adult Students*

<b>Kolb's cycle of experiential learning</b>	<b>Reading stage</b>	<b>Critical reading technique Harvey &amp; Goudvis (2007) , Langer (1994, 1995)</b>	
Concrete experience	Pre-reading	Activating and connecting	Envision
Reflective observation	Experiential reading	Questioning, visualizing, and inferring	Extend
Abstract conceptualization and active experimentation	Post-reading	Summarizing and synthesizing	Develop and objectify

Source: Marschell and Davis (2012, p.67)

In summary, teaching critical reading in traditional and virtual classrooms helps learners to promote their higher level thinking skills. Therefore, they have the ability to comprehend, make a decision, draw inferences, arrive at conclusions based on evidence, solve problems, and engage actively in reasoning activities.

## **2.2. Best Practices in Online Learning Environments**

Reviewing previous studies findings showed that online learning not only has more successful learning practices than traditional learning but also provides distinguished instructional opportunities. For instance, Means, Toyama, Murphy, and Baki's study (2013) investigated the effectiveness of online learning in general, and both purely online and blended versions of online learning in particular as compared with traditional face-to-face learning, for a variety of learners and with a range of different contexts and practices. This meta-analysis study revealed that online learning produced better student learning outcomes than face-to-face instruction. Moreover, learning practices (such as the duration of the

intervention, provision of synchronous computer-mediated communication, and the incorporation of learner feedback) exposed how online learning was implemented (e.g., whether online students had the opportunity to interact with an instructor). Meanwhile, Chang's study (2002) examined the effectiveness of asynchronous online learning in the promotion of critical thinking indicators (authenticity, community, reflection, and multiple perspectives) and students' perceptions of opportunities for critical thinking on three online courses at a distance education program at a major university in New York City. This study revealed that asynchronous online learning could support critical thinking with the support of constructive instructional design, cooperative/collaborative learning, critically reflective learning strategies, and the opportunity to engage multiple perspectives.

In addition, Lindblom-Ylance and Pihlajamaki's study (2003) investigated whether a computer supported learning environment enhances essay writing by providing an opportunity to share drafts with mate students and receive feedback from a draft version. Twenty-five law students participated in this qualitative study. Data for this study were collected by both the students' and the teachers' interviews. The results showed that the students could deepen their understanding, express their own ideas, improve critical thinking skills, and develop self-regulation. Furthermore, Xiaoming and Zhuo's study (2017) examined a proposed comprehensive method to implement online virtual experiments that incorporates learning assessment and course design based on the unique nature of virtual experiment. The results showed that students could control the pace, frequency, time of the experiment and evaluate their learning achievements effectively, develop their autonomous learning ability, and combine theory with practice for improving their learning efficiency greatly. Moreover, Hanover Research Council (2009) mention best practices in online strategies can be organized into three major components of the instructional process as following:

1. *Best practices in planning and development:*

The planning process involves the best technological option suited for the online course to create a learning community among students and the instructors. Moreover, teaching methods include training in technology for distance learning, interactive teaching that fosters critical dialogue, mentoring, and cooperative peer learning.

### *2. Best practices in teaching-in-action:*

Distance education provides many opportunities to foster an interactive classroom through two techniques: (1) online discussion forms that promote constructivist thinking, critical thinking, and higher-order thinking, and (2) student collaboration that relies on the use of educational technologies to simulate face to face meetings when students work together on assignments.

### *3. Best practices in student assessment and data evaluation :*

- Assessment through an evaluation process that uses several methods and applies specific standards for student learning.
- The regular review of intended learning outcomes to ensure clarity, utility, and appropriateness.
- Timely evaluations at regular intervals to increase course flexibility for students.
- The assurance that monitoring/proctoring policies are in place during assessments of student learning.
- Assessment strategies are integral to the learning experience, enabling learners to assess their progress, identify areas for review, and re-establish immediate learning or lessons goals.
- Strategies are varied (self-tests, quizzes, journals, writing assignments, projects, exams, etc.) and aligned to instructional goals.
- Assessment criteria are clearly articulated.

To sum up, best practices that occur in online learning enable learners to be responsible for their learning and proactive to engage actively in different courses and programs by using its diverse tools. As well as, online instructors seek to foster these practices by attracting learners' attention to the best usable strategies and techniques.

### 2.3. Jigsaw Strategy

Jigsaw is a cooperative learning strategy that facilitates the communication process among learners. Hedeem (2003) considers jigsaw as a process that happens in four essential steps : 1) First, students gather in 'jigsaw groups' of three to six and the material is divided to be covered within each group, 2) Next, each member of the group studies the specified section in jigsaw group, 3) Then, students form 'expert groups' by gathering with members of other jigsaw groups who are provided the same section of the material to discuss and plan how they will teach to other members of their jigsaw groups, 4) At last, students return to their jigsaw groups to teach their learned materials to their group and to learn the materials taught by other members.

Larasati (2009) mentions some principles of jigsaw techniques that are: (1) small diverse groups for providing opportunities of oral interactions, (2) positive interdependence for achieving tasks effectively, (3) individual accountability for doing own assignments and helping others, (4) purposeful talk for exploring and sharing ideas, and (5) group skills for working properly in groups.

Several researches stressed the affective influences of Jigsaw on EFL students' language learning. For example, Keshta's study (2016) investigated using jigsaw strategy on improving reading comprehension and communication skills among eleventh graders in Rafah and revealed that there were significant differences in learning English reading comprehension and communication skills between both groups: the experimental and the control ones, in favor of the experimental group due to using the jigsaw strategy.

Thus, all the previous investigations confirm that Jigsaw technique develops students' language skills, their competency in English; encourages cooperation and engagement; improves their attitudes and motivations towards English learning; and increases self-confidence.

## 2.4. Inquiry Cycle Strategy

Inquiry cycle strategy is one of the interactive processes of inquiry based learning. It is based on engaged learning and the building of knowledge. It is profitable for students' thinking and learning (Friedman, Crews, Caicedo, Besley, Weinberg & Freeman, 2019). Edutech Wiki (2019) introduces this strategy as a process has five steps: Ask, Investigate, Create, Discuss and Reflect; engages students to ask and answer questions on the basis of collected information; and leads to the creation of new ideas and concepts.

Casey and Bruce (2011) show that the stages of inquiry cycle are mutually reinforcing and interrelated; and are used to inform and guide educational experiences for learners. In addition to that, they add that digital media practices can enrich the inquiry cycle by offering new entry points such as taking pictures, and facilitating different modes of experience and engagement such as visual, aural enrichment, narrative, music, text and symbols.

In this respect, Bruce and Bishop's study (2003) showed the effectiveness of using web to support inquiry-based literacy development. Therefore, the students used an inquiry page as a website for collaborative curriculum development through the creation of inquiry units. These units become starting points for inquiry through which students are encouraged to ask questions, investigate, create, discuss, and reflect. This inquiry page was also used for supporting the integration of knowledge across a community of inquiry, providing a means for all students to collaborate and learn from one another, and developing an active digital library. In a research study conducted by Maming (2016), she found that the inquiry process develops students' self-belief on their selves; builds up their interest, motivation and creativity; constructs their constructivism; creates the meaningful and enjoyable learning atmosphere; and improves the students' achievement, and their critical and analytical thinking skill.

To sum up, Inquiry cycle strategy is a process which consists of five stages: Ask, Investigate, Create, Discuss, Reflect. These stages are mutually reinforcing and interrelated. This strategy helps students to enrich intellectual engagement and deep understanding; develop their self-belief on their selves; and build up their interest, motivation and creativity. Moreover, Both teachers and students can use digital media practices to enhance it in teaching and learning.

### **3. Methods and Analysis**

#### **3.1. Validity of the Critical Reading Skills Questionnaire**

The designed questionnaire consisted of eleven critical reading skills with three levels of importance: very important, important, and less important. This questionnaire was submitted to a panel of jury of specialists in the field of teaching English as a foreign language to determine the degree of importance of each skill and the appropriateness of the skills of the EFL 3<sup>rd</sup> year student teachers. Moreover, the panel of jury was requested to modify, omit or add to the critical reading skills anything they considered essential. Based on their viewpoints, the researcher modified the items of the questionnaire to five critical reading skills on the basis of the jurors' points of view.

#### **3.2. A Pre-Post Critical Reading Skills Test**

##### **3.2.1. Validity of Critical Reading Skills Test**

###### **3.2.1.1. Face Validity**

To measure test content validity, the present researcher made use of face validity where the jurors decided on: a) statement of the test items; b) suitability of test items for assessing critical reading skills; c) suitability of test items for the EFL 4<sup>th</sup> year student teachers' level; d) any other comments or suggestions.

### 3.2.1.2. Construct Validity

To calculate the construct validity of the pre-post critical reading skills test, the researcher used Pearson Statistical Formula as follows:

a. Using Pearson Correlation, the researcher estimated the correlation coefficient of the grade of each item with the total score of the critical reading skill. The results are shown in table2.

**Table2.**

*Construct Validity of the EFL CRST*

Skills	Questions	Correlation coefficient (r)
Making inferences	Question 1	0.64**
	Question 2	0.73**
	Question 4	0.68**
Drawing conclusions to the text	Question 3	0.65**
	Question 10	0.76**
	Question 11	0.57**
Distinguishing facts from opinion	Question 5.1	0.85**
	Question 5.2	0.80**
	Question 5.3	0.85**
	Question 5.4	0.62**
Summarizing information in a text	Question 8	0.82**
	Question 9	0.54**
	Question 13	0.85**

\*\* Significant at 0.01 level

The statistical findings in table(2) indicate that there was a significant correlation between the different items and their skills at the 0.01 level. Also, it can be noticed that the estimates ranged



between 0.54 and 0.85. This means that there was strong and important correlation between scores of the different items and the total score of their skills.

b. Using Pearson Correlation, the researcher estimated the correlation coefficient between the score of each skill and the total score of the whole test. The results are shown in table (3).

**Table3.**

*Pearson Coefficients of the Critical Reading Skills.*

Skills	Correlation coefficient (r)
Making inferences	0.87**
Drawing conclusions to the text	0.84**
Distinguishing facts from opinion	0.74**
Generating arguments based on evidence	0.78**
Summarizing information in a text	0.75**

\*\* Significant at 0.01 level

Table3. reveals that all correlation coefficients were positive and significant at 0.01 levels as they ranged from 0.74 to 0.87 . This indicated that there was a strong and important relationship between the score of each skill and the total score of the whole test of critical reading.

### **3.2.2. Test Reliability**

To estimate the reliability of the test, the researcher used Cronbach's Coefficient Alpha Formula. It revealed that the value of Cronbach's Alpha was (0.84). This means that the test was reliable. Hence, the test was developed in its final version. Table4. shows the reliability coefficient of the critical reading skills test.

**Table4.**

*The Reliability of the EFL CRST*

<b>Study Tool</b>	<b>Questions</b>	<b>Cronbach's Alpha</b>
Critical reading skills test	16	0.84

### **3.2.3. Test Analysis**

The test items were analyzed using the discrimination and difficulty coefficient for each item in the test as shown in table5.

**Table5.**

*The Discrimination and Difficulty Coefficient of the EFL CRST*

Skills	Questions	Difficult coefficient	Discrimination Coefficient
Making inferences	Question 1	0.33	0.67
	Question 2	0.27	0.53
	Question 4	0.23	0.47
Drawing conclusions to the text	Question 3	0.37	0.73
	Question 10	0.30	0.60
	Question 11	0.30	0.60
Generating arguments based on evidence	Question 6	0.40	0.80
	Question 7	0.30	0.60
	Question 12	0.27	0.53
Summarizing information in a text	Question 8	0.30	0.60
	Question 9	0.43	0.87
	Question 13	0.33	0.67
Distinguishing facts from opinion	Question 5-1	0.27	0.53
	Question 5-2	0.23	0.47
	Question 5-3	0.23	0.47
	Question 5-4	0.23	0.47

### **Discrimination Coefficients**

The discrimination coefficient of each item in the test was estimated. The discrimination coefficient ranged between 0.47 and 0.87. Therefore, all the items were acceptable i.e. they were in the normal limit of discrimination.

### **Difficulty Coefficients**

Difficulty coefficient of each item of the test was calculated. The results indicated that the difficulty coefficients ranged between 0.23 and 0.43 for all CRST items, i.e. they were of medium difficulty. Each item was acceptable or in the normal limit of difficulties according to the viewpoint of assessment and evaluation specialists.

#### 4. Results and Discussion

##### - Analyzing the Results for Testing the First Hypothesis

The first hypothesis stated that: there is a statistically significant difference, at the significance level of  $p \leq 0.05$ , in the critical reading test, between the mean scores of the experimental group and those of the control group in the post-measurement in favor of the former.

To verify the hypothesis, the researcher used parametric statistics in analyzing the data. In this respect, the researcher uses T-test of Independent samples for testing the significance of differences between the mean scores of the experimental group students and the mean scores of the control group students in the post-measurement of the critical reading skills test. For more explanation, Table 7. shows the significance of differences between the mean scores of the two groups in the post-measurement.

**Table7.**

*Comparing the EFL Critical Reading Performance of the Two Groups on the Post-Measurement*

Skills	Study groups	Mean	SD	t-test	
				t	DF
Making Inferences	Experimental group	4.20	1.61	8.13**	58
	Control group	1.47	0.90		
Drawing Conclusions to the text	Experimental group	4.33	1.67	7.49**	58
	Control group	1.80	0.81		
Distinguishing	Experimental group	4.35	1.27	9.49**	58

facts from opinion	Control group	1.55	1.00		
Generating arguments based on evidence	Experimental group	4.57	0.97	14.85**	58
	Control group	1.43	0.63		
Summarizing information in a text	Experimental group	4.47	0.90	12.34**	58
	Control group	1.83	0.75		
Critical Reading Test	Experimental group	21.92	4.43	15.42**	58
	Control group	8.08	2.12		

\*\* Significant at 0.01 level

Table 7. illustrates that there is statistically significant difference, at the significance level of  $p \leq 0.001$ , in the critical reading skills, between the mean scores of the experimental group students and the mean scores of the control group students in the post-measurement in favor of the former. Statistics show that the mean score of the experimental group was 21.92 compared to that of the control group ( $m=8.08$ ) and t-value was 15.42. In addition, the experimental group outperformed than the control group in all these skills. Thus, the first hypothesis is completely verified.

### - Analyzing the Results for Testing the Second Hypothesis

The second hypothesis stated that: there is a statistically significant difference, at the significance level of  $p \leq 0.05$ , in critical reading test, between the mean scores of the experimental group in the pre-measurement and the mean scores in the post measurement in favor of the latter.

To verify the hypothesis, the researcher used parametric statistics in analyzing the data. In this respect, the researcher used T-test of paired samples for testing the significance of differences between the mean scores of the experimental group students in the pre-measurement and their mean scores in the post-measurement. For more explanation, Table 8. showed the significance of

differences between the mean scores of the experimental group in the pre- and post- measurements.

**Table8.**

*Comparing the EFL Critical Reading Performance of the Experimental Group in the Pre-and Post-Measurement*

Skills	Measurement	Mean	SD	t-test	
				t	DF
Making Inferences	Pre-measurement	1.27	0.98	8.93**	29
	Post-measurement	4.20	1.61		
Drawing Conclusions to the text	Pre-measurement	1.40	0.93	10.35**	29
	Post-measurement	4.33	1.67		
Distinguishing facts from opinion	Pre-measurement	1.80	0.92	9.43**	29
	Post-measurement	4.35	1.27		
Generating arguments based on evidence	Pre-measurement	1.40	0.62	17.60**	29
	Post-measurement	4.57	0.97		
Summarizing information in a text	Pre-measurement	1.67	0.66	13.61**	29
	Post-measurement	4.47	0.90		
Critical Reading Test	Pre-measurement	7.53	2.03	19.69**	29
	Post-measurement	21.92	4.43		

\*\* Significant at 0.01 level

Table8. showed that there were statistically significant differences, at the significance level of  $p \leq 0.001$ , in the critical reading skills, between the mean scores of the experimental group students in the pre-measurement and their mean scores in the post-measurement in favor of the latter. A close look at the table reveals that the mean scores are 7.53 and 21.92 and t value is 19.69. These results mean that the experimental group was outperformed in the post-measurement in critical reading skills compared to the pre-measurement. Thus, the fourth hypothesis was completely verified. This result stressed that the proposed program, used in the present

study, is effective in developing the critical reading skills among the students of the experimental group.

Therefore, this result stresses the effectiveness of the proposed program, which was used an online deep learning approach, in developing the critical reading skills among the students of the experimental group. Thus, the hypothesis was completely verified. This indicates that the proposed program was successful in developing the critical reading skills and improving the critical reading of the experimental group students on the post-measurement as compared to their overall performance on the pre-measurement.

## **5. Conclusions**

The research findings showed that using a program based on an online inquiry cycle-based jigsaw motivated the participants to read critically through working collaboratively on Edmodo site and enable them to search for new information and link them to prior knowledge and their own experiences. Moreover, it made the research more effective, developed the students' meta-cognitive and analytic skills, and stimulated more enthusiasm and motivation. The concept of a program based on an online inquiry cycle-based jigsaw was clear for student teachers as they worked together in groups, learned through using five inquiry processes: ask meaningful questions, investigate by searching in online resources, create new knowledge, discuss by exchanging ideas, and reflect their performances and reactions. As well, the student teachers produced high-quality learning outcomes by creating some graphic organizers on each passage as a whole and participating in presenting the online talk show episodes. Therefore, the current study revealed how far the student teachers could deepen their understanding; focus on underlying meanings; develop their independent and systematic thinking, and logical reasoning skills; and link theoretical concepts to daily experiences, and an evidence to an argument.

In this respect, a program based on an online inquiry cycle-based jigsaw employed learner-centered teaching; helped the learners build a sense of leadership, ownership, and responsibility



towards their learning. It also presented a unique opportunity to combine two effective instructional techniques (jigsaw, and inquiry Cycle) together using some modern technologies such as Edmodo platform. Thus, student teachers could have more access to a variety of online resources, transfer of knowledge, engage themselves actively, improve their own performance, foster experiential practices, and excite their interests. Hence, it can be tentatively said that online inquiry cycle-based jigsaw is more effective than traditional methods in achieving such valuable outcomes.

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