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The Impact of Creative Problem Solving Model on EFL University Students' Critical Reading

A B S T R A C T

This study aims at investigating the impact of CPSM on EFL university students' critical reading at the levels of recognition and production, it also investigates the impact of CPSM on critical reading skills: interpretation, analysis, inferences, explanation and evaluation. To achieve the aims of the study and verify the hypotheses. A sample involves 60 undergraduate second year EFL students from College of Basic Education, Department of English, University of Kirkuk during the second semester of the academic year 2024-2025. The sample is divided into two equal groups of experimental and control. The experimental group receives instruction using CPSM over eight weeks, whereas the control group receives instruction using conventional method. To measure the impact of CPSM students of both groups take an achievement posttest for critical reading skills. Statistical means of analysis are applied; the findings reveal that students in the experimental group outperform those in the control group in recognizing and producing a number of critical reading skills. The study contributes to exposing CPS as an affective EFL educational approach, offering better collaborative learning environment that promotes university students skills.

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أثر نموذج حل المشكلات الابداعي على القراءة النقدية لدى طلبة الجامعة دارسي اللغة الانكليزية لغة
انكليزية أجنبية

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الخلاصة:

تهدف هذه الدراسة الى معرفة أثر نموذج حل المشكلات الإبداعي على القراءة النقدية لدى طلبة الجامعة دارسي اللغة الإنكليزية لغة أجنبية، الفرق بين مستويي التميز والانتاج، و كذلك معرفة مهاراتهم في القراءة النقدية. ولأجل تحقيق هذا الهدف والتحقق من الفرضيات، تم تصميم اختبار قبل- بعدي و طبق استخدامهما على مجموعتين متكافئتين تألفت من ٦٠ طالبا وطالبة في قسم اللغة الانكليزية، كلية التربية الاساسية، قسم اللغة الإنكليزية، جامعة كركوك خلال الفصل الدراسي ٢٠٢٤-٢٠٢٥. قسمت العينة بالتساوي الى مجموعة تجريبية ومجموعة ضابطة. حيث درست المجموعة التجريبية باستخدام نموذج حل المشكلات الإبداعي لمدة ثمان أسابيع ودرست المجموعة الضابطة باستخدام الطريقة التقليدية للمدة نفسها. وبعد الإنتهاء من التجربة تم إخضاع الطلاب لاختبار تحصيلي بعدي محكم تم تصميمه خصيصا لهذا الغرض. أظهرت النتائج أن الطلاب في المجموعة التجريبية حققوا تحسنا واضحا في معظم المهارات المتعلقة بالقراءة النقدية مقارنة بالطلاب في المجموعة الضابطة، وأن هناك فرق ذات دلالة إحصائية للتحصيل الكلي لصالح المجموعة التجريبية. أثبتت الدراسة أن نموذج أثر المشكلات الإبداعي يسهم في تحسين مهارات القراءة النقدية للطلاب عامة وفي مستوى الانتاج خاصة من خلال العمل الجماعي. تسهم هذه الدراسة في تأكيد ضرورة الاستعانة والاستفادة من هذه النماذج التعليمية الحديثة التي تساهم في تحسين مهارات الطلاب و التعامل مع المهام اللغوية.

الكلمات المفتاحية: نموذج حل المشكلات الإبداعي، القراءة النقدية، تفسير، تحليل، تأويل، شرح، و تقييم.

1. Statement of the Problem and its Significance

Learning English language through attending school classes is the most experienced and formal rout of obtaining information about language for nearly all English as Foreign Language (EFL) students. Since majority of people use English as their foreign or second language to pursue their study or to fulfill their daily needs. Modern students need to view and approach language tasks and problems in more creative ways in order to gain useful information, enjoy the ability to communicate more easily and avoid making unnecessary mistakes (Craft, 2011).

The underlying nature of education tries to improve creativity regarding different human abilities, and education aims at developing and monitoring all human capacities. Creativity is at the heart of education, and the objective of

creative education is to foster human creativity (Lee, 2001). However, the goal of educational system is to produce ‘creative problem solvers’ (Isaksen et al., 2011).

English as Foreign Language (EFL) have been claimed that large number of students lacked the ability to assess or evaluate the knowledge provided by their curriculum, which has impeded students’ ability of acquiring critical skills and in turn learning efficiently (Schoenbach et al., 2000). Furthermore, Tohman and Al Azzawi (2024) assert, that a genuine communication problem that faces students which hinder them to easily express their ideas,

To address and confront these issues teachers are required to introduce new model of instruction to their students that guides their reading and thinking skills (Zwier, 2004). Creative Problem Solving (CPS) is based on creative and critical thinking together in accordance with each other. To implement CPS model in education is to enable students to deal with variety of challenges and opportunities. As well as to improve their academic skills and practices (Treffinger & Isaksen, 2013). CPS model is a conceptual framework that supports educators in guiding students through structured stages of idea generation, solution development, and implementation, which align with the broader goal of cultivating independent, and adaptive thinkers (Nurrijal et al., 2023).

Therefore, through applying CPS as a model of instruction, current study tries to approach these challenges by equip students with CPS tools through guiding them to investigate its impact on CR.

1.1 Aims of the Study

The study aims at:

1-investigating the impact of creative problem solving model on EFL university students’ critical reading.

2-investigating the impact of creative problem solving model on EFL university students’ critical reading at the levels of recognition and production.

3-investigating the impact of creative problem solving model on EFL university students' critical reading skills: interpretation, analysis, inferences, explanation and evaluation.

1.2 Hypotheses of the Study

The study hypothesized that:

1-there are no statistically significant differences between the mean scores of experimental group who is taught using creative problem solving model and that of the control group who is taught using the conventional method in CR at the posttest.

2-there are no statistically significant differences between the mean scores of experimental group who is taught using creative problem solving model in critical reading at the levels of recognition and production in the post test.

3-there are no statistically significant differences between the mean scores of experimental group in the five critical reading's skills: interpretation, analysis, inferences, explanation and evaluation at the posttest.

1.3 Limits of the Study

This study is limited to:

1-undergraduate second year EFL students in College of Basics of Education/ Department of English / University of Kirkuk during the second semester of the academic year 2024-2025.

3-the passages (6,7,8,9,10, and 11) from the book (Developing Skills) by L. G. Alexzander, are included in the process of instruction.

1.4 Value of the Study

This study would be valuable for the following:

1-Teachers,this study provides EFL teachers with opportunity to try new methods and procedures for instruction. It also helps teachers to take a role of facilitator and guidance, and to follow non teacher centered approach. In addition to these, it

enriches teacher's background knowledge with more educational and practical practices.

2-EFL Students, the value of applying CPS model on EFL students would be more straightforward and immediate, as it offers EFL students more positive, collaborative working environment through participating in group works. CPS Enables students to dive deeply and meaningfully engage within texts while they are reading. This happens through offering opportunities to practice real world problems embodied in the authentic texts, and critically examining texts to figure out the challenges, and considering variety of perspectives.

3-Curruculum Designers, it provides curriculum designers with insights to include materials that promote students' critical and creative abilities and provides more practical practices.

4-EFL Researchers, it sheds light on CPS as model of instruction to be used to manage or explore other domains in EFL.

1.5 Definitions of Basic Terms

Key terms defined as follow:

1.5.1CPS model

CPS is a conceptual framework that supports educators in guiding students through structured stages of idea generation, solution development, and implementation, which align with the broader goal of cultivating independent, adaptive thinkers (Nurrijal et al., 2023).

Operational Definition: CPS refers to a systematic instructional framework offers useful and feasible techniques of thinking critically and creatively to identify challenges, and offering open - ended solutions for the targeted challenges which can be applied over a variety of range age and in a variety of contexts. CPS encourages students utilize both their knowledge of the content and knowledge of

the world to form proper and formative representation of the subject to be learned in addition it increases students' interaction and engagement.

1.5.2 Critical Reading

According to Hudson (2007), CR supports students to enjoy the ability to analyze, synthesize, and judge what has been read.

Operational Definition: critical reading is defined as reading skills or abilities that support EFL students to understand the text through interpreting, identify biases, purposes, analyzing, explaining, evaluating the authors' ideas, perspectives, attitudes and inferring implicit conclusions. It is a process of evaluating and decision-making about the credibility of the knowledge offered in the text.

2.0 Theoretical Background

2.1 Creative Problem solving

Alex Osborn was first established the Creative Education Foundation (CEF), creative problem solving as model and 'brainstorming' as a term first proposed in 1940s. Sid Parnes with Osborn worked together and introduced the CPS process which is a tested verified approach as well as a reliable technique to handle any problem in a creative and innovative way (The Creative Education Foundation, 2015).

Parnes (1997) described CPS process as an approach to empower teachers and students to work side by side in order to address the difficulties of teaching a heterogeneous community of students. CPS was considered a means that helped in solving the situation through a collaborative work between teachers and students to reach the best solution. Moreover Mitchell and Kowalik (1999) viewed CPS as a framework, a system, or a way to how approach problems in creative and imaginative way to gain effective outcomes.

Some scholars have seen CPS as “a conceptual model that focuses on using higher-order thinking skills in order to overcome authentic problems during learning. CPS process offers a structured methodology to enhance every student’s solid critical, creative, and innovative thinking skill” (Nurrijal et al., 2023, p.80). While Zhou (2017) explained that CPS regarded as a systematic, structured set of techniques for thinking creatively which challenge those people who hold the belief that creativity cannot be taught but it was an inherent trait of the individuals. Hence, there is an agreement among scholar about CPS as a systematic, structured framework that offers a set of viable strategies and techniques to equip students with critical and creative skills to face challenges and decide on the suitable solutions.

2.2 Importance of Creative Problem Solving in Education

The constantly evolving world in the 21st century requires skills for workspace and for education which rote and surface learning of rich content are not suitable tools any more. Efficient students with professional skills are required, for instance what and how to think, what and how to learn, and how to approach unfamiliar situations, tasks or challenges (Jacobs, 2010).

There was a major point that scholars such as Torrance (1980), Scott et al. (2004), and Puccio and Mather (2017) agreed upon about the genuine positive outcomes gained from the instruction of skills of creativity through CPS activities. The importance of CPS model and creativity were highlighted because participated in making students to deal more efficiently, independently and resourcefully with large number of challenges and tasks (Treffinger et al., 2007). Particularly in problem solving learning activities, when teachers acted as coaches or facilitators in collaborative learning groups. This was recognized as an important factor in developing students’ self-efficacy and cognitive enthusiastic (Shea & Bidjirano, 2010). Puccio (1994) explained that CPS model has been used in a variety of

contexts. It has been implemented in education from primary to college grades. Vast number of resources have been published to teach and train students with different stages of CPS, its particular approaches, strategies and the techniques involved within each stage.

CPS requires collaboration among students to achieve positive results. Ismail (2019) stated that large number of EFL university students lack the necessary abilities needed to improve their academic abilities, as they mainly lack cooperative learning strategies generally.

2.5 Components of Creative Problem Solving 6.1 Framework Model 2000

According to Caswell (2006) CPS was an approach that offered a practical outline of real life problems. CPS as well as offered a verified circular structure that was composed of four elements: understanding the problem, creating ideas, setting up for the action and outlining the approach (Treffinger et al., 2006). Isaksen et al. (2000) outlined the CPS version 6.1 as a model that involved four main stages and eight components as follows:.

1-Understanding The Challenge: Understanding the challenge involves a comprehensive examination of the goal, opportunity or problem, then defining, planning or narrowing the focus to establish the course of action. It is possible to use one or all the of components in this stage when the user wants to investigate and concentrate thoughts on the direction he intends to pursue. The components of this stage are: constructing opportunities, exploring data, and framing problems.

2-Generating Ideas: This is a single component stage, encompasses producing new ideas. Generating ideas is seen as “creative” which should not be equated with “brainstorming”. This single stage component is regarded as very significant part in the CPS process and brainstorming is regarded as a remarkable tool among other tools that are used to produce ideas: generating ideas

3-Preparring for Action: This component embraces exploring routes to put

potential options into feasible solutions and setting for effective execution. This part of the model focuses on improving and strengthening the solutions to ensure the opportunities of success: developing solutions, building acceptance,

4-Planning Your Approach: The final stage of CPS model is planning the approach which entails monitoring the ongoing thoughts, to make sure that the problem solver is on the intended direction of his goal. Furthermore it supports in configuring and adjusting the procedures for successful application of CPS: appraising tasks and designing process.

2.6 Creative Problem Solving and Bloom Taxonomy Revised

The very early version of Bloom Taxonomy (1956) established the learning behaviours, while the revised version of the taxonomy by Anderson and Krathwohl (2001) changed categories from nouns to verbs, which associated aspects of cognition aimed at developing students' cognitive skills.

Wilson (2016) explained that the key differences between the two versions are: The first difference was related to the “knowledge” level of the model which increased to four: factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge.

The second difference was related to the other remaining levels (comprehension, application, analysis, synthesis, and evaluation) of the cognitive abilities. The intellectual skills which required to manipulate that knowledge are: remembering, understanding, applying, analyzing, evaluating, creating.

The genuine contribution of Anderson and Krathwohl (2001) revised taxonomy was how these two levels (levels of knowledge and levels of cognitive abilities) would interact and integrate in the instruction of EFL/ESL. Bloom's Taxonomy tried to categorize the cognitive abilities and the learning objectives. CPS model provided the opportunity for teachers to develop the higher-order thinking skills of

their students through applying Bloom's Taxonomy in a variety of ways regarding language learning (Nuñez, 2022). The four major elements of CPS harmonically align with Bloom taxonomy revised, as shown in table 1. It can be concluded that CPS model prepared the methods, and Bloom taxonomy revised offered the cognitive framework to help students in EFL context to read and write across curriculum.

Table 1

The Connection between CPS and Bloom Taxonomy

Creative Problem Solving CPS 2000	Bloom Taxonomy Revised 2001	Bloom Taxonomy 1956	Connection
Understanding the Challenge	Remember & comprehend	Knowledge & Understanding	Collecting information to identify the challenge.
Understanding Challenges & Generating Ideas	Create	Synthesis	Articulating ideas that are new and authentic.
Preparing for action	Analyze & Evaluate	Analysis & Evaluation	Examining and planning out the ideas then choosing the most feasible and viable one.
Planning the approach	Apply	Application	Applying the plan.

2.7 Concept of Critical Reading

The concept of CR explained by Smith (1963) as the highest level of reading comprehension among the hierarchy of reading abilities that might be subsumed under the reading comprehension skills. This hierarchy entailed three levels of reading: literal reading, interpretive reading, critical reading.

However, reading must not be regarded as passive skill, as readers digest and save author's thoughts, words and perspectives Holden (2004). Whereas CR should cover three dimensions of perception of "what, why, and how" in any text.

Therefore, it was regarded as necessary academic skill that required by almost all EFL students (Wallace & Wray, 2006).

١.5.3 Din's Skills of Critical Reading

Critical reading defined by Din (2020) as a process of reacting critically to what was read. This process required building a sort of association between reader's own standard values and the reading materials. Din presented good description of seven of the most necessary CR's skills that students should acquire. The researcher adopted five main skills of them that best aligned with the study's aims, and they are described in details as followed:

1-Interpretation: the process of transforming and changing an input from particular form to another, for instance translating input from one language to another. This action would help students to understand the meaning as well as convey that meaning correctly while producing language (Gass & Varonis, 1994). The Britannica Dictionary defined interpretation as the result of the explanation of something.

2-Analysis: analysis related to a coherent and systematic discussion of something which the reader studies its components—it could be a piece of art, a nation, a community, a virus, and economic or political event; to obtain a better understanding. An analysis could be part of a study or an entire study by itself. In any process of analysis two aspects suggested to be crucial: choosing a particular focus in the study along with the appropriate tool to investigate that particular part (Behrens & Rosen, 2007).

3-Inference: Whereas inference making defined by Grellet (2006) as utilizing logical, syntactical and cultural clues to find out the meaning of ambiguous elements in any text. Schoot et al. (2016) were of the belief that constant training in inference making would enhance students' deep understanding of the text, and also enhance the transformation of learning.

4-Expalnation: Ricœur summarized that “explanation is when we suspend the referential relation of the text to the environment of the world and subjectivity of

author and reader” (1971, p.38). The interaction between both concepts of explanation and interpretation was highlighted by this scholar. This reciprocal relationship resulted from the independent nature of the text which can be distinguished from speech.

5-Evalution: making an evaluation for a text or an argument involved considering the reliability of the materials it involved; arguments characterized by including conclusions(claims) and warranting (justification). Warranting itself based on author’s experience, research, or drawn on other’s evidence (Wallace & Wray, 2016). According to Dressel (1962), evaluation had a pervasive role in education generally and in reading skills specifically. When an individual possessed the ability to read, it was regarded as an indicator about a merit or quality of his/her education. Evaluation in its true meaning referred to making the most correct judgment.

2.2Previous studies

2.2.1Alhusaini and Al-Salih (2015)

This study examined the impact of creative problem solving (CPS) on EFL students’ writing at Al-Imam University. Their study involved 600 students split into experimental (CPS) and control (traditional) groups, measured by pre- and post-tests. Results showed the CPS group significantly improved in idea generation, interaction, and reduced writing anxiety compared to the control group.

2.2.2Aini et al. (2024)

This study explored how Creative Problem-Solving (CPS) supports teacher-student interaction in EFL classrooms using the Initiation-Response-Feedback model. The study involved 46 fifth-semester students in Indonesia, with data collected through interviews and classroom observations. Findings showed pre-service teachers initially struggled with CPS, especially telecollaboration, but improved with lecturer guidance and feedback. CPS enhanced collaboration,

critical thinking, creativity, and classroom interaction, helping students refine ideas and engage with real-life problems.

3.0 Methodology

3.1 Experimental Design

Experimental design is regarded as the most crucial part in any study as it pays a pivotal role in testing the already suggested hypotheses. Experimental design believed to be a “ method of research in the social sciences (such as sociology or psychology) in which a controlled experimental factor is subjected to special treatment for purposes of comparison with a factor kept constant” (Merriam-Webster, 2025, p. 38). In current study, a Quasi-Experimental Design was implemented, specifically Pretest-Posttest Design”. In this study, students are randomly allotted to experimental group EG and control group CG, so that to eliminate the bias in selection that may affect the internal validity of the test. In order to avoid this threat, a pretest is conducted to ensure the equivalence between the two groups of dependent variables prior starting the experiment. Thus, these procedures will eliminate any bias in selection and help to move forward with the study (Ari et al., 2010). The experimental design of the study was illustrated in table 2.

Table 2

The Experimental Design of the Study

Groups	Pretest	Treatment	Post test
Experimental	Achievement Test	Teaching using Creative Problem Solving Model	Achievement Test
Control		Teaching using conventional method	

3.2 Population and Sampling of the Study

Best and Kahn (2006), defined population as a group of people that shared same

features or attributes that the researchers were interested. Creswell stated that population is “a group of individuals who have the same characteristics” (2005,p.56). Population or universe is “the entire set of individuals to which the findings of the survey are to be extrapolated” (Levy & Lemeshow, 2013, p. 147). Population of the current study involved EFL Iraqi University students in the second year, Department of English Language in College Basics of Education at Universities in Iraq. The population of the current study involves EFL University students in the second year, Department of English Language in College of Basic Education at University of Kirkuk, and the population consisted of 115 students as shown in table 4.

Sample described a specific subgroup taken from the population (Fry et al., 2000). It is the selected subset of the target population that determined to participate in the research study (Israel, 2008). The sample consisted of 60 students, second year students of two sections A and B. Randomly section A has been selected as experimental group EG and Section B as control group CG; each group consists of 30 students as shown in table 4. Another 20 students is selected from the population with a rate of 10 students from each group to serve as the pilot study and these students were excluded from the study. The sample represented 65% of the population.

Table 4
The Population, the Sample, and the Pilot Study

Population	Section	Groups	No. of Student	No. of Sample	No. of Pilot Study	Perc. %
115	A	EG	55	30	10	69%
	B	CG	60	30	10	
Total			115	60	20	

3.3 Construction of the Study Posttest

Based on the aims of the study an achievement posttest constructed to collect the required data.

3.3.1 Construction of the Achievement Posttest

An appropriate achievement posttest that is based on the aims of the study is necessary in order to genuinely measure students' achievement. Freeman (1984), stated that the aim of an achievement test is to assess student's skills, knowledge, and comprehension in a particular subject or a number of subjects. Brown and Lee (2015), defined the achievement test as an effective tool to decide whether the objectives of a particular course have been met and that the students have acquired the necessary knowledge and skills during the course of instruction. The focus of this test is to measure what students have acquired and mastered during the teaching process and it is not concerning student's potentiality of learning.

Table 3

Categories of the Achievements Posttest of Critical Reading

Question No.	Question Format	Category	Level	Scores
Q1	True/ False	Objective	Rec.	20
Q2	MCQ			10
Q3	Binary Choice			10
Q4	Writing	Subjective	Pro.	20
Q5	Writing			20
Q6	Writing			20
Total				100

4.0 Analysis of Data and Discussion of the Results

4.1 Analysis of the Collected Data and Results

After scoring the achievement posttest, the results were analysed statistically to figure out whether there are any statistically significant differences between the mean scores of the experimental group which is taught using CPS model, and the control group which is taught using the conventional method of instruction.

4.1.1 Results of the First Hypothesis

In order to achieve the first aim of current study, the following hypothesis is verified ***“There are no statistically significant differences between the mean***

scores of experimental group which is taught using CPS model and that of the control group which is taught using the conventional method in the post test”.

Finding results of the statistical analysis by using t-test for two independent groups have shown that the mean score of the EG is 40.96 with a SD of 6.03, and the mean score of the CG is 33.40 with a S.D of 2.34. The absolute value of calculated t-test 6.400 is higher than the tabulated t-test value 2.00 with a df of 58 at the level of significance 0.05. This means that there are statistically significant differences between the mean scores of the two groups regarding CR in favour of EG. Therefore, and based on these results, the first hypothesis was rejected and an alternative hypothesis is stated ***“There are statistically significant differences between the mean scores of experimental group which is taught using CPS model and that of the control group which is taught using the conventional method of the posttest”***, as shown in Table 5.

Table 5

Mean Score and Standard Deviation of the Critical Reading and Content Knowledge in the Two Groups' Achievement Posttest

Variables	Groups	N.	Mean	S.D.	T-Value		DF	Level of Sig.
					Calculated	Tabulated		
CR	Experimental	30	40.96	6.03	6.400	2.00	58	0.05
	Control	30	33.40	2.34				

4.1.2 Results of the Second Hypothesis

In order to achieve the second aim, the following hypothesis is verified ***“There are no statistically significant differences between the mean scores of experimental group in critical reading and content knowledge at the recognition and production levels of the post test ”.***

The finding results of the statistical analysis by using independent sample t-test, show that the mean score of CR at the recognition level is 17.33 with SD of 2.12, and that of the production level is 15.85 and 1.05 for the mean score and SD

respectively. Comparing the value of the calculated t-test 3.558 which is higher than the tabulated t-test value 1.70 with a df of 29 at the level of significance 0.05. This means that there are statistically significant differences between the mean scores at the two levels. Indicating a that there is a statistically significant difference between the two levels of students performance. Concluding that students performed significantly better in CR at the recognition level of the posttest in comparison to the production level. Thus, the second hypothesis was rejected and an alternative hypothesis stated “***There are statistically significant differences between the mean scores of experimental group in critical reading and content knowledge at the recognition and production levels of the post test***”, as shown in table 6.

Table 6

Mean Scores, Standard Deviation, and t-Value of the Experimental Group Students at the Recognition and Production Levels in the Achievement Posttest

Variable	Levels	No	Mean	S.D.	T-Value		DF	Level of Sig.
					Calculated	Tabulated		
CR	Recognition	27	17.33	2.12	3.558	1.70	29	0.05
	Production		15.85	1.05				

4.1.3 Results of the Third Hypothesis

To achieve the third aim, the following hypothesis is tested “***There are no statistically significant differences between the mean scores of experimental group in critical reading’s skills: interpretation, analysis, inferences, explanation and evaluation in the post test***”. One Way Analysis of Variance was used in order to verify the third hypothesis. A comparison of the mean scores, SDs, and 95% confidence intervals of the CR across different skills was achieved to offer full insight about students’ performance on the achievement posttest. ANOVA analysis results showed that the calculated F-test value of 15.152 is higher than the tabulated value of 2.39, with df of 4 between groups and 295 within groups at the

level of significance 0.05. This indicated that there was a difference therefore the third hypothesis is rejected as show in table.

Table 24

ANOVA Results for the Groups of the Study in Critical Reading Posttest

Groups	Sum of Squares	df	Mean Square	F - test		Sig.
				Calculated	Tabulated	
Between Groups	87.020	4	21.755	15.152	2.39	.000
Within Groups	423.550	295	1.436			
Total	510.570	299				

4.2 Discussion of the Results

It is obvious from the result of the first verified hypothesis that there are statistically significant differences between the EG and CG's posttest in CR in favour of the EG. Indicating the positive impact of CPS model in developing the CR in EFL university students in comparison with the conventional method. A detailed discussion, explanation and justifications are provided in relation with each hypothesis accompanied by previous studies.

1-First Hypothesis- There are Statistically Significant Differences between the Mean Scores of the EG and CG. Based on these results, the EG performed better, as evidenced by its higher mean score of 73.50 and that of the control group is 60.70, this implies the positive impact of CPS model on EG regarding both variables because students demonstrated more engagement and developed their skills of CR. To speak more accurately, the components of CPS align with the students' CR skills, this alignment offers them opportunity of deeper understanding of the challenges embedded in the passages.

2-Second hypothesis-Identifying CR at the Levels of Recognition and Production: Results reveal that there are statistically significant differences as the mean score value of CR in recognition level is 17.33 and 15.85 at production level. A number of possible explanations can those be provided; on one hand we can say

that CPS's components particularly those understanding stage challenges and in particular the component of exploring data was effective and fruitful in helpful to students in recognizing CR's skills. Exploring various data sources from different perspectives and concentrating on the most significant factors of the task or situation. On the other hand at the production level of the posttest, results also imply that CPS provides students with opportunity generate original, well-structured answers. It is obvious that CPS has played significant role in transferring the skills of problem solving to academic performance production at high levels.

3-The Third Hypothesis –Identifying CR's Skills: accounting on the results, there are statistically significant differences in identifying CR's skills. The mean score between groups is 21.755 and within groups is 1.436. The calculated F-test value is 15.152, is higher than the tabulated t-test value which is 2.39 indicating significant differences among EFL university students' achievement in the five skills of CR. The results of Scheffe' statistical method which was used to detect the source of differences among students' performance concerning CR skills. It has showed a performance stratification initiated with interpretation in highest value of mean, followed by analysis then inference. There are a number of factors to justify such result, most possibly due to the difference in students' perception. As well as the coherence and communicative effectiveness of the passages or text, that is to say the text efficiency that may align with the learning style and metacognitive strategies employed by students after they exposed to CPS tools to enhance CR skills. However, the superiority of interpretation skills over other skills might due to what scholars such as Ricœur (1971); Behrens and Rosen (2007), stated that interpretation, should consider a variety of factors such as the reader's subjectivity, and cultural contexts. But analysis and inference require systematic discussion of something in which the reader has to study its components.

5.0 Conclusions, Recommendations

This chapter presents a summary of the conclusions based on the results the obtained from the study, it also sums up a number of recommendations based on the findings of the study.

5.1 Conclusions

The following conclusions have been drawn based on the results obtained from the experimental study:

5.1 Conclusions

The following conclusions have been drawn based on the results obtained from the experimental study:

1-CPS model effectively enhances CR in university students learning EFL because results showed EG achieved higher scores than CG.

2-CPSM has positive impact on CK in university students learning EFL since results showed EG performed better than CG.

3-Both levels of recognition and production in CR and CK in university students learning EFL are enhanced with results favouring production.

4-Certain CR skills are promoted in university students learning EFL as results demonstrated that interpretation, analysis and inference scored higher than other skills in EG.

5-Some criteria of CK are promoted in university students learning EFL, as the results showed higher mean scores in identifying key ideas and factual details in EG.

5.2 Recommendations

In terms of the results and conclusions illustrated above, a number of recommendations are proposed:

1-Educators and instructors need to recommend CPSM to be followed and applied in a variety of educational sectors that closely related to students as it regarded as one of the 21st century crucial skills.

2-Based on the findings and results of the study, CPSM has a pedagogical implication on teaching and learning EFL, so a recommendation is made to the policy makers and syllabus designers to update the curricula and activities in school and university textbooks in a way that develops students' skills in critical reading, critical thinking, and creative thinking to provide young students the required and go a line with the characteristics of the new era.

3-Teachers of English language are advised to integrate CPSM into the instructional process as one of the effective methods in teaching across variety of subjects, that improve students' skills, such as interpretations, inferences, evaluation, identifying key ideas, recalling factual details which in turn improve students' achievement.

4-Teachers are advised to train how to follow CPSM's procedures as it enhances students, critical reading, and creative thinking, which in turn develop their abilities and skills as individuals.

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