



مجلة العلوم التربوية

## **The Effect of Computer-Mediated Corrective Feedback on Developing Intermediate EFL Students' Grammatical Competence and Motivation**

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**Abstract**

This study aimed to investigate the effect of computer-mediated corrective feedback on developing grammatical competence and motivation of EFL second-year intermediate stage students. The study used two instruments to fulfill its purpose, namely, English Grammatical Competence Test (EGCT) and Grammar Learning Motivation Questionnaire (GLMQ). The sample consisted of (90) students enrolled at Kalaheen Abnoud Intermediate School at Abnoud, Governorate of Qena who were randomly selected into two groups. The experimental group (N=45) received treatment (computer-mediated corrective feedback) whereas, the control group (N=45) received the regular grammar instruction. Results of the study revealed a remarkable improvement in English grammatical competence and motivation of the experimental group as compared with the control group. Furthermore, the results showed a positive correlation between the experimental group students' scores in grammatical competence and their scores in motivation. Based on the above mentioned results, the study concluded that computer-mediated corrective feedback held a great potential for developing students' English grammatical competence and motivation. The study ended with discussing the results reached, presenting recommendations, and suggesting some relevant issues for further research.

**Key words:** computer-mediated corrective feedback, grammatical competence, motivation, intermediate stage students.

## المستخلص:

## أثر التغذية الراجعة التصحيحية المحوسبة في تنمية الكفاية النحوية و الدافعية لدى تلاميذ المرحلة الإعدادية دارسي اللغة الإنجليزية كلغة أجنبية

هدفت الدراسة الحالية للتحقق من أثر التغذية الراجعة التصحيحية المحوسبة في تنمية الكفاية النحوية والدافعية لدى تلاميذ الصف الثاني الإعدادي دارسي اللغة الإنجليزية كلغة أجنبية. وقد استخدم الباحث أداتين للتأكد من تحقق أهداف الدراسة وهما: اختبار كفاية نحوية للغة الإنجليزية، واستبيان لقياس الدافعية نحو تعلم القواعد النحوية. و تمثلت مجموعة الدراسة من (90) تلميذاً وتلميذة بمدرسة كلاحين أبنود الإعدادية، بأبنود، محافظة قنا، حيث تم توزيعهم عشوائياً الى مجموعتين: مجموعة تجريبية(٤٥) والتي درست القواعد النحوية بأسلوب التغذية الراجعة التصحيحية المحوسبة، ومجموعه ضابطة (٤٥) والتي درست القواعد النحوية بالطريقة المعتادة. وقد كشفت نتائج الدراسة عن تحسن ملحوظ في الكفاية النحوية للغة الإنجليزية والدافعية لدى المجموعة التجريبية قياساً بالمجموعة الضابطة. علاوة على ذلك، فقد أثبتت النتائج وجود علاقة ارتباطية موجبة بين درجات تلاميذ المجموعة التجريبية في اختبار الكفاية النحوية ودرجاتهم في استبيان الدافعية. وبناءً على النتائج السالف ذكرها، فقد خلصت الدراسة الى فاعلية التغذية الراجعة التصحيحية المحوسبة في تنمية الكفاية النحوية والدافعية لدى تلاميذ الصف الثاني الإعدادي. كما انتهت الدراسة بعرض ومناقشة النتائج التي تم التوصل اليها بالإضافة الى تقديم التوصيات فضلا عن طرح بعض القضايا ذات الصلة لتناولها بالبحث العلمي مستقبلاً.

**الكلمات المفتاحية:** التغذية الراجعة التصحيحية المحوسبة، الكفاية النحوية، الدافعية، تلاميذ المرحلة الإعدادية.

## **Introduction**

Language is a vital means of communication among human beings. It helps people convey their beliefs, thoughts and needs. To communicate well, people not only have to master the four language skills but also, they need to master some elements that are necessarily involved in the process of communication including vocabulary, pronunciation and grammar. In many educational contexts, many students find grammar as a stumbling block in their English as Foreign Language (EFL) learning process.

Educationalists have argued that grammar is an important and necessary means for language teaching and learning. In this respect, Harmer (2015) reported that knowledge of grammar is important for competent language learners. Harmer added, without some understanding of grammar, students would not be able to do anything more than pronouncing separate items of language for separate functions. Along the same line, Graham (2011) highlighted that although grammar has been a controversial issue in the field of foreign language teaching for several decades, teachers must give grammar explanations inside the classroom to ensure comprehension and accuracy of the target language. Around the same context, Syam (2017) pointed out that if language learners do not have good grammatical knowledge, they will surely make many errors in speaking or in writing. Thus, Syam concluded that the knowledge of grammar for foreign learners is the basic framework to build sentences to communicate well in English.

In the EFL learning process, students sometimes make errors especially in grammar that lead to misunderstanding and, in turn, lack of grammatical competence (Bitchener et al. 2005; Ferris, 2006; Sheen, 2010; Tafazoli et al., 2014; Iskander & Heriyawati, 2015; Elwan, 2018; Al-Ghazo & Ta'amneh, 2018; Abdel-Gawad et al., 2019). Therefore, teachers do have a prominent role to correct their pupils' errors, i.e. providing them with effective corrective feedback. In fact, Corrective Feedback (CF) has a strong foundation in basic learning theories that focus on what happens inside the foreign language (FL) learner's mind through focusing on the effective role of attention and rehearsal in facilitating the process of acquisition (Kim, 2012; Almasi & Tabrizi, 2016).

Further, Boud (2007) reported that pupils should receive effective corrective feedback that can help them to be more familiar with the knowledge that they need to learn and the skills that they need to develop at a

deeper level. In addition, Boud stated that "CF should be given quickly enough so it can be useful for pupils and should be provided both frequently and in enough detail" (p. 97). Therefore, providing the students with a clear understanding of the rationale, criteria, and process of the assessment is a key to their productive engagement (Carless et al., 2011).

Similarly, Hatzipanagos and Warburton (2009) reported that effective CF should provide students with the skills required to scrutinize and maintain permanent learning. Supporting this point of view, analyzing the students' misunderstanding was undertaken by Walker (2009) who tried to find out if the CF that pupils receive improves their learning. The results of Walker's study suggested that if the received CF addresses absences in the pupils' understanding and knowledge, it contributes to long-term learning and enhances students' motivation to learn.

A major challenge to learners with low EFL proficiency is that they have limited knowledge of vocabulary and grammar that hinders the development of their learning process (Duncan, 2007). In addition, these learners need substantial support to improve their linguistic accuracy to recognize and/or produce distinctive grammatical structures as they often make errors and yet have difficulties in recognizing and correcting those errors (Bitchener et al. 2005; Ferris 2006).

Among the effective ways to prevent error fossilization is to receive CF from a teacher, revise based on the feedback, and then repeat the whole process as often as possible (Hyland, 2019). Therefore, students need to consciously pay attention to the errors they have made in order to recognize the gaps between the correct forms and their own usage (Schmidt, 1993; Sheen, 2010).

While students need individualized CF, responding to their papers can be a challenge for EFL teachers. Particularly, if these teachers have a large number of students or if they assign frequent assignments, providing individual CF to students' errors might be time consuming. Egyptian teachers in public-school classrooms typically teach several classes of about 40-50 students each, the amount of work to be graded often limits the number of assignments teachers can offer to students.

Moreover, providing informative CF on the language use requires a certain degree of linguistic proficiency and knowledge that are conceived or possessed differently by teachers; as some of them developed their expertise without being explicitly taught grammar (Johnson, 2009). Furthermore,

although instant CF on linguistic errors has been found beneficial to FL learners (Russell & Spada, 2006), it is often not feasible to supply individualized CF in class because students have different levels of language proficiency.

In this regard, Hattie and Timperley (2007) found that the most effective forms of individualized CF in classrooms are video-, audio-, or Computer-Mediated Corrective Feedback (CMCF) that are related specifically to the learning process targets. Hattie and Timperley further added that CMCF supports self-regulation, provides further engagement with the task and helps pupils identify their errors as well as have the opportunity for additional attempts in order to independently reach the correct answer. Consequently, Hattie and Timperley reported that CMCF allows students to be motivated, enabled and actively engaged in a successful and enthusiastic learning process.

As such, it can be noticed that the technique of CF provided to EFL students is one of the curial variables on developing their grammatical competence level and their motivation towards EFL learning process. In addition, AbuSeileek and Abu Sa'aleek (2012) mentioned that CMCF can act as a tutor, assess the student's reply and record it. Further, AbuSeileek and Abu Sa'aleek highlighted that CMCF can also point out errors, provide the student with explanations and help her/him to get the correct answer. Therefore, AbuSeileek and Abu Sa'aleek concluded that CMCF offers interactive learning in an enthusiastic environment, handles a very large volume of interaction, delivers corrective feedback to the learner, accommodates different speeds of learning and imposes limits on the time available for answering questions.

Additionally, CMCF has been found fruitful in developing students' motivation and attitudes. Some studies (Caws, 2006; Ho & Savignon, 2007; Al Shwani, 2019; Lim & Phua, 2019) have focused on scrutinizing the effects of CMCF on participants' attitudes and reported that CMCF was quite helpful for the development of students' motivation and attitudes. As such, Savignon and Roithmeier (2004) found that computer-mediated peer review offers flexibility for pupils as it reduces psychological pressure on pupils who do not like to give feedback in face-to-face situations because it allows them to offer remote feedback asynchronously at the students' convenience.

In sum, it can be concluded that CMCF might be beneficial and fruitful for young EFL students as it may enhance their motivation towards

the EFL learning process in general. Thus, it might develop their overall grammatical competence level. Precisely, this study attempted to investigate the effect of CMCF on developing EFL intermediate stage students' grammatical competence and motivation towards learning English grammar.

### **Context of the Study**

The researcher's experience as an EFL teacher at the intermediate stage revealed that the majority of second-year intermediate students at Abnoud, Qena Governorate, often make grammatical errors while using English in the classroom. Most of them have a low grammatical competence level. Additionally, the lack of second-year intermediate students' EFL grammatical competence was shown in English exams results and in the results of grammatical exercises given in classrooms.

Supporting the researcher's classroom observations, interviews with six EFL intermediate stage teachers and three EFL supervisors were conducted. The interviewees stressed that second-year students had lack of grammatical competence. The interviewed teachers and supervisors also indicated that second-year intermediate students' lack of grammatical competence might be attributed to the techniques used for providing students with corrective feedback. Furthermore, the interviewees suggested that, in keeping with trends in the TEFL field, there is a bad need for recent techniques of corrective feedback that can supply students with useful information through different ways about the nature of grammatical errors that they make. Consequently, students are helped to develop their grammatical competence.

Besides, the problem of students' lack of grammatical competence was discussed with 15 second-year students at a governmental intermediate school at Abnoud, Qena Governorate. Students pointed out that they face problems when trying to recognize or/and produce correct and proper English grammatical structures/rules. The students reported that their lack of grammatical competence might be attributed to the traditional techniques of CF that they are provided with. Therefore, the students stressed that they need a novel CF technique that can be more fruitful, motivating and can help them to strengthen their grammatical competence level. In light of some researches (Tafazoli et al., 2014; Iskander & Heriyawati, 2015; Al Omoush & Abu Al Sha'r, 2016; Elwan, 2018; Sioco & De Vera, 2018; Ta'amneh & Al-Ghazo, 2018; Abdel-Gawad et al., 2019; Valizadeh & Soltanpour, 2020;

Mardian & Nafissi, 2022), it is concluded that there is a lack of students' grammatical competence.

Based on the results of the pilot study, the necessity to try new CF techniques has been emerged to help in developing second-year intermediate stage students' EFL grammatical competence and their motivation towards learning English grammar.

### **Statement of the Problem**

Problem of this study can be stated as follows: most second-year intermediate stage students lack grammatical competence, i.e. they are unable to recognize and/or produce correct and proper English grammatical structures and have a low level of motivation towards learning English grammar.

### **Questions of the Study**

This study attempted to answer the following questions:

1. What is the effect of computer-mediated corrective feedback on developing EFL second-year intermediate students' grammatical competence?
2. What is the effect of computer-mediated corrective feedback on developing EFL second-year intermediate students' motivation towards learning English grammar?
3. What is the correlation between the participants' motivation towards learning English grammar and their grammatical competence?

### **Hypotheses of the Study**

- 1- There is a statistically significant difference at 0.01 level between the mean scores of the experimental group and the control group on the posttest of the grammar test, in favor of the experimental group.
- 2- There is a statistically significant difference at 0.01 level between the mean scores of the experimental group on the pretest and posttest of the grammar test, favoring the post administration.
- 3- There is a statistically significant difference at 0.01 level between the mean scores of the experimental group and the control group on the latter administration of the motivation questionnaire, in favor of the experimental group.
- 4- There is a statistically significant difference at 0.01 level between the mean scores of the experimental group on the motivation questionnaire before and after the experiment, in favor of the latter.



5- There is a positive correlation between the experimental group mean scores in the motivation questionnaire for English grammar learning and their mean scores on the posttest of the grammar test.

### **Purposes of the Study**

This study aimed at:

1. Measuring the effect of using computer-mediated corrective feedback on developing the students' grammatical competence level.
2. Investigating the effect of using computer-mediated corrective feedback on developing the students' motivation towards learning English grammar.
3. Identifying the correlation between the participants' motivation for learning English grammar and their grammatical competence.

### **Significance of the Study**

Significance of the study could be presented in the following points:

1. Findings of the study may be functional for EFL teachers, researchers and EFL methodologists.
2. Findings of this study might clarify the effect/s of using computer-mediated corrective feedback as a means to develop the students' grammatical competence and to increase their motivation towards learning English grammar.
3. The English Grammar Test (EGCT) and the Grammar Learning Motivation Questionnaire that were designed in this study may be useful and fruitful for both EFL teachers and researchers.
4. Providing EFL teachers and educators in Egypt with a computer-mediated corrective feedback software that might be beneficial to them.
5. To the researcher's best knowledge, the scarcity of research addressing the use of CMCF in the Egyptian EFL intermediate schools enhances the significance of the study.

### **Delimitations of the Study**

The present study was delimited to the following:

1. A group of second-year students learning EFL, enrolled at Kalaheen Abnoud Intermediate School at Abnoud, Governorate of Qena, where the researcher works.
2. Computer-mediated corrective feedback software.
3. The grammatical areas included in the students' textbook (New Hello, First term).

4. The experiment will be conducted in the first term (academic year 2021– 2022).

### **Methodology of the Study**

This section briefly introduces the study design, variables and participants. Further, it summarizes the instruments used for collecting data as well as materials of the study.

### **Design of the Study**

This study adopted one of the quasi-experimental designs namely, "The Pretest-Posttest Nonequivalent-Groups Design ". Two classes were randomly selected; one class was assigned as an experimental group and the other class was assigned as a control group by flipping a coin.

### **Variables of the Study**

Variables of this study are the following:

- **Independent variable:** computer-mediated corrective feedback.
- **Dependent variables;**
  1. Students' grammatical competence.
  2. Students' motivation towards English grammar learning.

### **Participants of the Study**

Participants of the study were a sample of second-year students enrolled at Kalaheen Abnoud Intermediate School at Abnoud, Governorate of Qena. Two classes were randomly selected. Participants were about 90 students, 45 students for each class. Participants were 14 to 15 years old. They were males and females. They have studied EFL for seven years before participating in the experiment.

### **Instruments of the Study**

To conduct the study, the following instruments were prepared by the researcher:

- An English Grammatical Competence Test to assess the participants' grammatical competence level before and after conducting the treatment.
- A questionnaire to measure the participants' motivation towards English grammar learning before and after conducting the treatment.

## English Grammatical Competence Test (EGCT)

### *Test Description*

The EGCT was designed to assess second-year intermediate EFL stage students' competence in grammar. It comprises a total of (43 items), categorized into two main parts; grammatical competence (25 items) and vocabulary competence (18 items).

### *Test Validity*

To substantiate the test validity, the obtained data from the test pilot administration were subjected to statistical analysis to determine the test validity. As the final form of the test consisted of two main parts, namely: Grammatical Competence (8 micro-competences of 25 items) and Vocabulary Competence (6 micro-competences of 18 items).

The following tables portray the findings of the internal consistency analysis through calculating the coefficient of correlation between of the micro-competences with their macro-competences (Table. 1), and the coefficient of correlation between of the macro-competences with the whole test (Table.2).

**Table.1**

*The coefficient of correlation between each micro-competence with their macro-competences*

Macro-competences	Micro-competences NO.	Correlation	Macro-competences	Micro-competences NO.	Correlation
Grammatical Competence	1	0.414*	Vocabulary Competence	1	0.732**
	2	0.410*		2	0.682**
	3	0.520**		3	0.766**
	4	0.821**		4	0.644**
	5	0.839**		5	0.775**
	6	0.747**		6	0.688*
	7	0.773**			
	8	0.690**			

*\*\*correlation is significant at 0.01 level*

*\* correlation is significant at 0.05 level*

Table.2

*The coefficient of correlation between each macro-competence with the whole test*

	Macro-Competences	Correlation
Test	Grammatical Competence	0.794*
	Vocabulary Competence	0.951**

*\*\*correlation is significant at 0.01 level \* correlation is significant at 0.05 level*

As shown in tables (1) and (2), the coefficient of correlation between each micro-competence with their macro-competences and the coefficient of correlation between macro-competence with the whole test is statistically significant at 0.05 level and 0.01 level which confirms the test validity and the consistency of its micro-competences and macro-competences.

### **Test Reliability**

To ensure the reliability of the EGCT, Cronbach's Alpha was adopted by the researcher as it was seen suitable for the nature of the test. Accordingly, Alpha Cronbach coefficient of the test micro-competences (see table. 3) as well as of the test macro-competences, and of the total reliability of the whole test (see table. 4) was presented as follows:

Table.3

*Alpha Cronbach coefficient of the test micro-competences*

Macro-competences	Micro-Competences NO.	Alpha Cronbach Coefficient	Macro-competences	Micro-Competences NO.	Alpha Cronbach coefficient
Grammatical Competence	1	0.864**	Vocabulary Competence	1	0.802**
	2	0.866**		2	0.821**
	3	0.854**		3	0.829**
	4	0.816**		4	0.771**
	5	0.804**		5	0.818**
	6	0.832**		6	0.810*
	7	0.838**			
	8	0.836**			

*\*\*correlation is significant at 0.01 level*

Table.4

*The Alpha Cronbach coefficient of the test macro-competences and the whole test*

Macro-Competences	Alpha Cronbach Coefficient
Grammatical Competence	0.932**
Vocabulary Competence	0.724**
The Test Total Reliability	0.919**

**\*\*correlation is significant at 0.01 level**

Based on the results shown in tables (3) and (4), it can be concluded that Alpha Cronbach coefficient is statistically significant at 0.01 level. Consequently, the EGCT is valid and highly reliable.

#### **Grammar Learning Motivation Questionnaire (GLMQ)**

##### ***Description of the Questionnaire***

The GLMQ was designed to measure EFL second-year intermediate stage students' motivation towards learning English grammar. The GLMQ comprises four main parts under each of which many sub-items. The four main parts are self-efficacy (11 items), self-confidence (7 items), expectancy of success (8 items), and beliefs towards learning grammar (10 items). Thus, the GLMQ has total of (36) items. In regard of positive and negative items, the GLMQ is divided into (25) positive items and (11) negative ones.

The study respondents were asked to respond to each sub-items in the GLMQ as each item was followed by a five-point Likert response scale, alternatives labeled: strongly agree, agree, undecided, disagree and strongly disagree. Moreover, the GLMQ instructions were clear, brief and written in English. Further, in order to avoid any possible ambiguities of the GLMQ items, it was translated into Arabic as well as its instructions.

##### ***Reliability the Questionnaire***

For questioning the GLMQ reliability, the Test-retest Method was used. The GLMQ was administered to a group of second-year intermediate school students enrolled at Kalaheen Abnoud Intermediate School at Abnoud, Governorate of Qena (N=35) other than assigned to the treatment during the second term of the academic year (2021-2022 A.D.). Then, the GLMQ was administered again after two weeks. The coefficient of correlation between the two administrations was computed using Pearson Formula. Findings are

reported in table. 5 below indicate that the Pearson correlation coefficient between the two administrations was (0.816) which is significant at (0.01) level. Therefore, the GLMQ is highly reliable.

**Table.5**

*The Reliability Coefficient of the GLMQ (Test-retest Method)*

Part	Correlation
<i>Part One : Self-efficacy</i>	<b>0.811**</b>
<i>Part Two: Self-confidence</i>	<b>0.718**</b>
<i>Part Three: Expectancy of Success</i>	<b>0.893**</b>
<i>Part Four: Beliefs towards Learning Grammar</i>	<b>0.724**</b>
<i>Reliability of the whole GLMQ</i>	<b>0.816**</b>

**\*\*correlation is significant at 0.01 level**

***Validity of the Questionnaire***

To ensure the GLMQ validity, the intrinsic validity method was obtained by using the following formula:

$$\text{Intrinsic Validity} = \sqrt{\text{Reliability Item}}$$

$$\text{Intrinsic Validity of the GLMQ} = \sqrt{0.816} = 0.90.$$

This result revealed that the GLMQ is highly valid.

**Materials of the Study**

To carry out the current study, the researcher prepared the following materials:

- Computer-mediated corrective feedback software to be used in teaching grammar as well as correcting the experimental group's grammatical errors.
- A teacher guide that describe the steps to be followed when using computer-mediated corrective feedback for developing students' grammatical competence and grammar learning motivation.

**Computer-Mediated Corrective Feedback Software (CMCFS)**

***Description of the Computer-Mediated Corrective Feedback Software***

The CMCFS was designed to develop second-year intermediate students' grammatical competence level as well as their motivation towards learning English grammar. It was designed by three-software specialist

designers using multimedia and auto-play. For the list of the designers, see (Appendix J).

The CMCFS consists of two main parts: Units and Tests. The first part contains two sub-parts, namely: (i) Language and (ii) Exercises. Language includes grammatical rules explanations in which students are having the opportunity of being taught well-compiled grammatical structures through using motivating and interesting activities. As for the exercises, students are provided with four models of different types of grammatical exercises for each unit. In the second part, students are supplied with different test samples regarding the six units.

The CMCFS has the possibility to supply students with a second chance to retry answering both exercises and tests if they do not get 80 % of the full mark without shown their scores of the first try. After that, their second try scores and the answer key of each incorrect answer will be presented on the computer screen. But if they get 80 % or more, they will be moved to the next exercise or the next test automatically. For some samples that show how the CMCFS provide students with corrective feedback, see (Appendix K).

Also, the software has the ability to store information regarding the progress of each student i.e., the possibility of making portfolio for each student. Thus, the teacher will have the chance of treating his/her students' weaknesses as well as sharpening their strengths.

### **Contents of the Computer-Mediated Corrective Feedback Software**

The CMCFS contents can be described in the following points:

- It is based on the student's textbook, (New Hello, English for Preparatory Schools, Year Two, 2<sup>nd</sup> Term).
- The software consists of six units, each of which can be taught in three classes a week. So the CMCFS administration lasted for 18 classes.
- Each unit contains specific grammatical rules and structures.
- Each unit includes two types of explanations: written explanation and grammatical structure-based photos.
- Each unit has a total of (4) models of exercises, each of which has (4) different types of questions.

- The software also contains (4) models of tests which are based on the six units.

### ***Establishing Computer-Mediated Corrective Feedback Software Audience***

The students and the teacher (the researcher) are the audience to follow the development of the students' grammatical competence level as well as their motivation towards learning English grammar. Under the teacher's guidance, the students are given the responsibility of acquiring new grammatical rules and structures in the computer laboratory.

#### ***Identifying Instructional Goal/Specifying Learning Objectives***

#### **Instructional Goal**

The CMCFS is designed in order to develop the grammatical competence level of a sample of EFL of second-year intermediate stage students in addition to their motivation towards learning English grammar. This instructional goal is branched into specific learning objectives:

#### **1.10.1.4.2 Learning Objectives**

By the end of using the CMCFS, the students should be able to:

- Identify the parts of speech.
- Recognize proper English grammatical structures.
- Produce accurate English grammatical structures in a given situation.
- Apply subject/verb agreement, prepositions, quantifiers, and conjunctions correctly.
- Apply correct sentence word order.
- Use glossaries and online dictionaries for checking vocabulary meanings.
- Use a suitable type of sentence (e.g., statement, interrogative, imperative, and exclamation) to convey meaning.
- Use grammatical rules in meaningful contexts.
- Use grammatically correct sentences to convey meaning.
- Use words in meaningful sentences.
- Use proper and suitable words in the target situation.
- Convey vocabulary meaning correctly and clearly.
- Use various vocabulary that are suitable to the target topic and/or situation.



- Guess meaning of vocabulary from context.
- Enhance their self-efficacy.
- Sharpen their self-confidence.
- Develop their expectancy of success.
- Improve their beliefs towards learning grammar.

### **Piloting of the Computer-Mediated Corrective Feedback Software**

The CMCFS was piloted on a random sample of students (n=35), other than those assigned to the experiment. The pilot study was conducted to (1) determine the validity of the software; (2) evaluate appropriateness of the CMCFS; (3) estimate the time allocated to complete the experiment using the software. For this purpose, unit 7: “Technology and the future” was presented to the sample as a pilot study to overcome any obstacles and/or any challenges. Explaining the sample unit took 3 classes. Accordingly, the time needed for using the CMCFS in the experiment was computed to be 18 classes.

### **Validity of the Computer-Mediated Corrective Feedback Software**

The CMCFS was submitted to a jury of experts (n=7) for verifying its content validity (see Appendix L). The jury members examined the CMCFS and provided their inputs, suggestions, and comments regarding the software goals, learning objectives, and contents.

The jury members' comments revealed that the objectives were clearly stated as well as the content was clear, appropriate, and relevant to the intended instructional goal. They also mentioned that the screen design was appropriate and suitable for the chosen sample. In general, they stated that the whole content and the design were varied, consistent, interesting, motivating, and well-sequenced. Further, the jury members provided some comments and suggestions of a great value which were taken into consideration in making the final version of the software.

### **Teacher’s Guide for using the Software**

The researcher prepared a teacher’s guide in order to help teachers and researchers to use the Computer-Mediated Corrective Feedback Software (CMCFS), showing the hardware requirements, the process of installing the

CMCFS, and the steps followed in using the CMCFS. For the teacher's guide, see (Appendix N).

## Results of the Study

### Results Concerning Effects of the Treatment on Developing Participants' Grammatical Competence

#### *Results Concerning the First Hypothesis*

To answer the first research question the subsequent hypothesis stating "there is a statistically significant difference at 0.01 level between the mean scores of the experimental group and the control group on the posttest of the grammar test, in favor of the experimental group", was anticipated. To test the above-mentioned hypothesis, the independent *t*-test was used to analyze both groups mean scores in the EGCT post-administration. Hence, the mean scores, standard deviations, *t*-value and *t* significance of the control group and that of experimental group on the post-administration of the EGCT, regarding grammatical competence, vocabulary competence and the total score of the EGCT, are presented in table (6) below.

**Table: 6**

*t*-value for grammatical competence, vocabulary competence and the total score of the EGCT of both groups in the post-test of the EGCT

Variable	Group	N	Mean	Std. Deviation	<i>t</i> -value	Sig. (2 tailed)
<i>Grammatical Competence</i>	Experimental	45	38.82	1.88	49.80	0.000***
	Control	45	7.82	3.72		
<i>Vocabulary Competence</i>	Experimental	45	16.17	1.41	31	0.000***
	Control	45	5.4	1.85		
The Total Score of the EGCT	Experimental	45	55	2.14	54	0.000***
	Control	45	13.2	4.72		

\*\*P<0.01

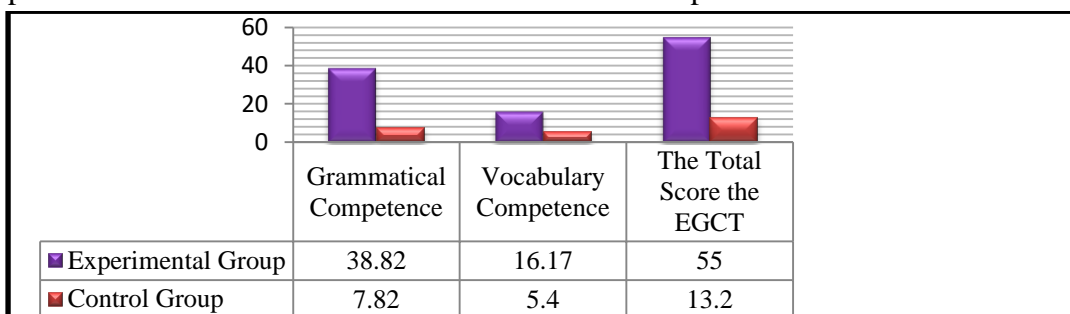
#### Data displayed in Table (6) revealed that:

1. The mean scores of the experimental and the control groups in the post-test of the first part of EGCT were 38.82 and 7.82, respectively. It also showed that the *t*-value was 49.80, which is significant (sig. =0.000 2 tailed =P<0.01). This yielded that the experimental group outperformed the control group in the first part of the EGCT (grammatical competence).

2. The mean scores of the experimental group and the control one in the post-test of the EGCT regarding its second part were 16.17 and 5.4, respectively. It also indicated that the t-value was 31, which is significant (sig. =0.000 2 tailed =P<0.01). This revealed that the experimental group performed better than the control group in the second part of the EGCT (vocabulary competence).

3. The mean scores of the control group and the experimental group and in the post-test of the EGCT regarding its total score were 13.2 and 55, respectively. It also indicated that the t-value was 54, which is significant (sig. =0.000 2 tailed =P<0.01). This reflected that the experimental group excelled the control group regarding the total score of the EGCT.

In light of these results, the first hypothesis: “there is a statistically significant difference at 0.01 level between the mean scores of the experimental group and the control group on the posttest of the grammar test, in favor of the experimental group”, was accepted. Figure (1), below, shows graphically the differences between the mean scores of the two groups in the posttest of the EGCT which also demonstrates the improvement.



**Figure: 1**

***Comparison between the mean scores of both the control and experimental groups in the post-test of the EGCT***

Therefore, according to the results drawn in Table (6) and illustrated in Figure (1), using CMC had a considerable effect on developing second-year intermediate stage students' grammatical competence level. Accordingly, a clear answer was provided to the first research question: What is the effect of computer-mediated corrective feedback on developing EFL second-year intermediate students' grammatical competence?

### ***Results Concerning the Second Hypothesis***

Also, to provide a potential answer for the first research question the subsequent hypothesis expressing "there is a statistically significant difference at 0.01 level between the mean scores of the experimental group on the pretest and posttest of the grammar test, favoring the post-administration" was formulated. According to the nature of the presented hypothesis, a paired sample *t*-test was employed. Precisely, a comparison between the pre and posttests mean scores of the experimental group was made to figure out if there are any significant differences in their grammatical competence before and after the treatment. Aspects of the comparison were the experimental group mean scores of the first part of the EGCT (grammatical competence), the second part of the EGCT (vocabulary competence), and the total score of the EGCT. Thus, the mean scores, standard deviation, *t*-value and *t* significance of English grammar of the experimental group on the pre and post administration of the EGCT are displayed in Table (7) below.

**Table: 7**

*t*-value for the Total Score the EGCT and its Two Parts of the Experimental Group in the Pre Post-administration (EGCT)

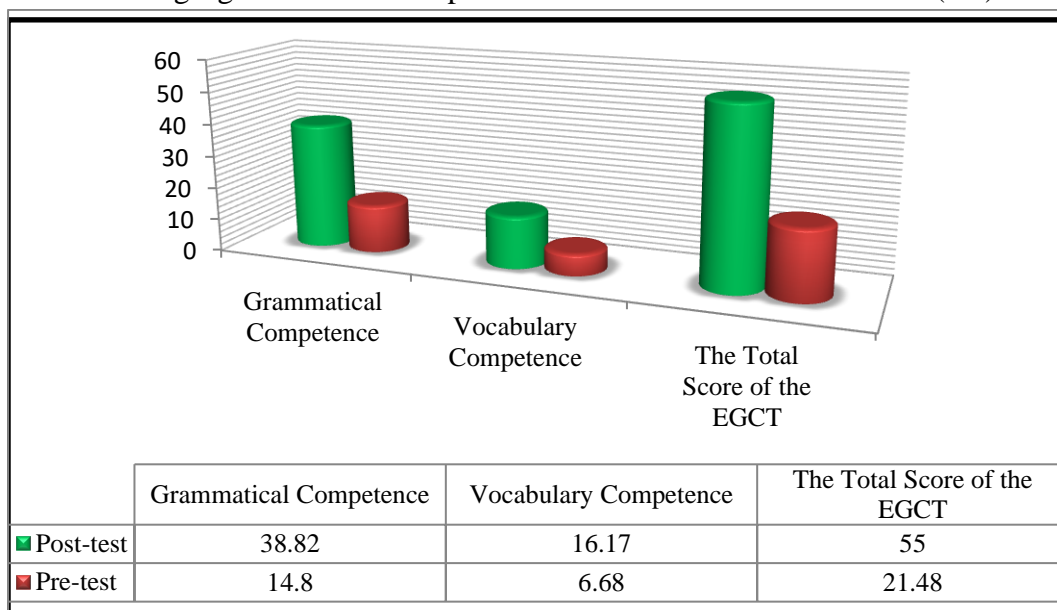
Variable	Administration	No. of Cases	Mean	Std. Deviation	<i>t</i> -value	Sig. (2 tailed)
<b><i>Part One Grammatical Competence</i></b>	Pre	45	14.80	3.20	43.82	0.000***
	Post	45	38.82	1.88		
<b><i>Part Two Vocabulary Competence</i></b>	Pre	45	6.68	1.51	26.32	0.000***
	Post	45	16.17	1.41		
<b>The Total Score of the EGCT</b>	Pre	45	21.48	3.60	50	0.000***
	Post	45	55	2.14		

\*\*P<0.01

The results displayed in the above table quantify that there is a statistically significant difference between the mean scores gained by the experimental group members (pre and post-test) in the grammatical competence level as measured by the English Grammatical Competence Test. The results also indicate that the experimental group members scored 38.82,

16.17, 55, in grammatical competence, vocabulary competence and the total score of the EGCT, respectively, in the post-test. On the other hand, the same members got 14.80, 6.68, 21.48, in grammatical competence, vocabulary competence and the total score of the EGCT, respectively, in the pre-test. Accordingly, the experimental group mean scores on (grammatical competence, vocabulary competence and the total score of the EGCT) in the post-administration were higher than those gained in the pre-administration.

Moreover, *t*-value for grammatical competence, vocabulary competence and the EGCT total score on the post-administration were more significant than *t*-value of the pre-administration. Based on these results, the second hypothesis: there is a statistically significant difference at 0.01 level between the mean scores of the experimental group on the pretest and posttest of the grammar test, favoring the post administration”, was accepted. The following figure illustrates in pure sense the results shown in Table (4.3).



**Figure: 2**

*Comparison between the mean scores of the experimental group (Pre- post administration of EGCT)*

### **Results Concerning the Effect Size of Computer-Mediated Corrective Feedback on Developing the Mean Scores of the Experimental Group in the Post-administration of the EGCT**

Given that there was a statistically significant difference between the mean scores obtained by the experimental group members in their

grammatical competence level (pre and posttest), the researcher was interested in discovering the effect size; how much variance in grammatical competence, vocabulary competence and the total score of the EGCT was a result of the independent variable (CMCF). To do so,  $t$ -value,  $df$ , " $\eta^2$ " value and the effect size of CMCF would be demonstrated in Table (8).

**Table: 8**

*The effect size of CMCF on the Mean Scores of the Experimental Group in the Post-test of the EGCT*

Independent Variable	Dependent Variable	$t$ -value	$df$	$\eta^2$	The effect size	The effect
Computer-Mediated Corrective Feedback	Grammatical Competence	43.82	44	0.97	97%	Large
	Vocabulary Competence	26.32	44	0.94	94%	Large
	The Total Score of the EGCT	50	44	0.98	98%	Large

Note: (N=45 &  $df = 44$ )

Results presented in table (4.3) indicated that:

1. The effect size (how much variance in the grammatical competence in the post-administration was a result of the independent variable) was 0.97, indicating that 97% of the improvement in the grammatical competence of the experimental group was due to the use of CMCF.
2. The value of Eta Square ( $\eta^2$ ) for the vocabulary competence was 0.94, which means that 94% of variance occurring in the experimental group vocabulary competence was due to the use of CMCF.
3. The effect size (how much variance in the total score of the EGCT in the post-test was a result of the independent variable) was 0.98, disclosing that 98% of the development in the total score of the EGCT was attributed to the use of CMCF.

Thus, in light of the results drawn above, using CMCF had a large noticeable effect on developing second-year intermediate stage students' grammatical competence. Accordingly, a clear-cut answer was provided for the first question of the study; What is the effect of computer-mediated corrective feedback on developing EFL second-year intermediate students' grammatical competence?

## Results Concerning the Effects of the Treatment on Developing Participants' Motivation

Motivation is some kind of internal drive which supports second-year intermediate students' wishes, wants and efforts to develop their grammatical competence level. To measure the students' motivation, a Grammar Learning Motivation Questionnaire (GLMQ) was administered as (pre/posttest) to the participants. The second question of the current study aimed at determining the effect of computer-mediated corrective feedback on developing EFL second-year intermediate stage students' motivation towards learning English grammar. In an attempt to answer this question, the third and fourth hypotheses of the study were tested using descriptive and inferential statistics.

### *Results Concerning the Third Hypothesis*

To provide an answer to the second research question the following hypothesis reporting "there is a statistically significant difference at 0.01 level between the mean scores of the experimental group and the control group on the latter administration of the motivation questionnaire for English grammar learning, in favor of the experimental group", was formulated. In order to test this hypothesis, the independent *t*-test was used to analyze the mean scores of the control and experimental groups in the post-administration of GLMQ. Therefore, the control group and the experimental group mean scores, standard deviations, *t*-value and *t* significance on the GLMQ post-administration regarding grammatical competence, vocabulary competence and the GLMQ total score, are presented in the following table.

**Table: 9**

*t*-value of the GLMQ post-administration for the control group and the experimental group

Variable	Group	N	Mean	Std. Deviation	<i>t</i> -value	Sig. (2 tailed)
<i>Self-efficacy</i>	Control	45	24.62	2.08	43.3	0.000***
	Experimental	45	41.33	1.56		
<i>Self-confidence</i>	Control	45	15.93	1.58	32.10	0.000***
	Experimental	45	25.84	1.33		
<i>Expectancy of Success</i>	Control	45	17.51	1.61	44.48	0.000***
	Experimental	45	30.48	1.10		
<i>Beliefs</i>	Control	45	26.04	2.55		

Variable	Group	N	Mean	Std. Deviation	t-value	Sig. (2 tailed)
<i>towards Learning Grammar</i>	Experimental	45	33.53	1.96	15.58	0.000***
	Control	45	84.11	3.36		
<i>Total Score of the GLMQ</i>	Experimental	45	131.2	3.36	56.7	0.000***
	Control	45	84.11	3.36		

\*\*P<0.01

### The above results specified that:

1) The mean scores of the control group and the experimental group in the post-administration of the GLMQ regarding self-efficacy were 24.62 and 41.33, respectively. Moreover, the results of *t*-value yielded (43.3) which is significant (sig. =0.000 2 tailed =P<0.01). This yielded that the experimental group members had higher self-efficacy level than those of the control group.

2) The mean scores of the experimental group and the control group in the GLMQ post-administration concerning self-confidence were 25.84 and 15.93, respectively. Additionally, the results of *t*-value yielded (32.10) which is significant (sig. =0.000 2 tailed =P<0.01). This indicated that the experimental group students had more self-confidence than their counterparts of the control group.

3) The mean scores of the control group and the experimental group in the post-administration of the GLMQ regarding expectancy of success were 17.51 and 30.48, respectively. Moreover, the results of *t*-value yielded (44.48) which is significant (sig. =0.000 2 tailed =P<0.01). This revealed that the experimental group members were better at success expectancy than those of the control group.

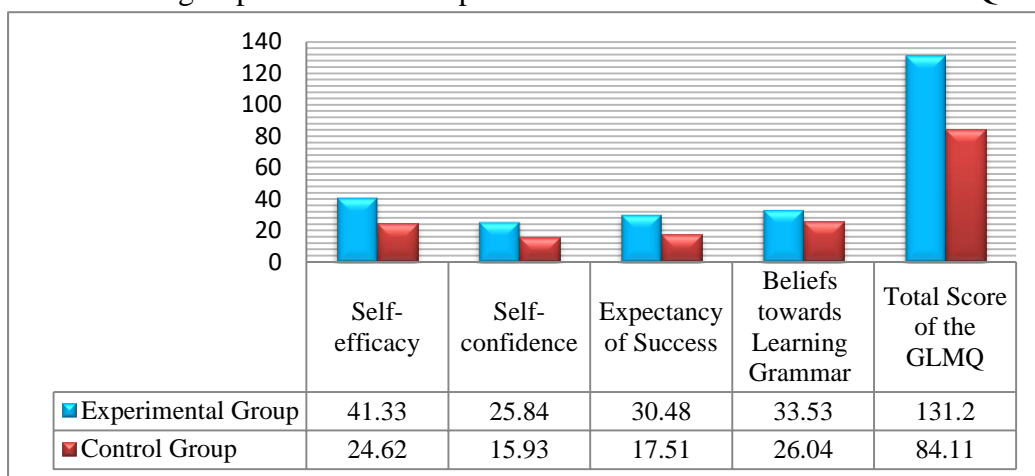
4) The mean scores of the experimental group and the control group in the GLMQ post-administration concerning beliefs towards learning grammar were 33.53 and 26.04, respectively. Additionally, the results of *t*-value yielded (15.58) which is significant (sig. =0.000 2 tailed =P<0.01). This showed that the experimental group students had positive beliefs towards grammar learning than those of the control group.

5) The mean scores of the control group and the experimental group in the post-administration of the GLMQ, regarding the total score of the



GLMQ were 14.11 and 131.2, respectively. Furthermore, the results of *t*-value yielded (56.7) which is significant (sig. =0.000 2 tailed =P<0.01). This revealed that the experimental group members were highly motivated to learn English grammar than those of the control group.

According to these results, the third hypothesis "there is a statistically significant difference at 0.01 level between the mean scores of the experimental group and the control group on the latter administration of the motivation questionnaire for English grammar learning, in favor of the experimental group", was confirmed. Furthermore, the figure below shows graphically that there were observable differences between the mean scores of both groups in the post-administration of the GLMQ.



**Figure: 3**

**Comparison between the mean scores of both control and experimental groups in the post-administration of GLMQ**

***Results Concerning the Fourth Hypothesis***

To reach a potential answer for the second research question the subsequent hypothesis was processed to compare the effectiveness of CMCF in developing the experimental group motivation before and after the treatment claiming “there is a statistically significant difference at 0.01 level between the mean scores of the experimental group on the motivation questionnaire for English grammar learning before and after the experiment, in favor of the latter”.

To test the above hypothesis, a paired sample *t*-test was employed. Precisely, a comparison between the pre and posttests mean scores of the experimental group on the GLMQ was made to figure out the significant differences in their level of motivation towards learning grammar before and after the treatment. Aspects of the comparison were the experimental group mean scores of self-efficacy, self-confidence, expectancy of success, and beliefs towards learning grammar as well as the total score of the GLMQ in the pre and post administration of GLMQ. Accordingly, the mean scores, standard deviation, *t*-value and *t* significance of the experimental group mean scores are presented in the following table.

**Table: 10**  
*t*-value for the Experimental Group in the Pre Post-administration (GLMQ)

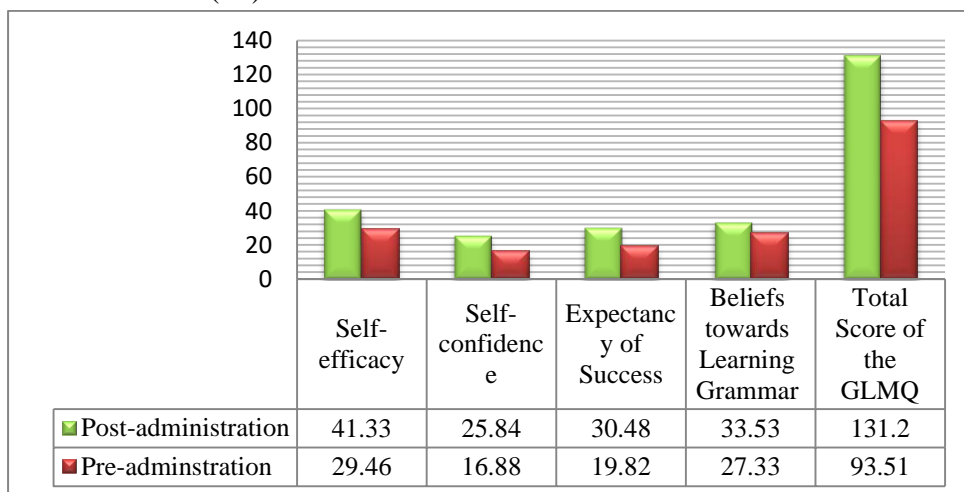
Variable	Administration	No. of Cases	Mean	Std. Deviation	<i>t</i> -value	Sig. (2 tailed)
<i>Self-efficacy</i>	Pre	45	29.46	1.79	33.58	0.000***
	Post	45	41.33	1.56		
<i>Self-confidence</i>	Pre	45	16.88	1.19	33	0.000***
	Post	45	25.48	1.33		
<i>Expectancy of Success</i>	Pre	45	19.82	1.61	35.37	0.000***
	Post	45	30.48	1.10		
<i>Beliefs towards Learning Grammar</i>	Pre	45	27.33	1.75	15.58	0.000***
	Post	45	33.53	1.96		
<i>Total Score of the GLMQ</i>	Pre	45	93.51	3.22	57.33	0.000***
	Post	45	131.2	3.36		

\*\*P<0.01

The results presented in the above table indicate that the mean scores of the experimental group on (self-efficacy, self-confidence, expectancy of success, beliefs towards learning grammar, and the total score of the GLMQ) in the post-administration were higher than those obtained in the pre-administration. Also, the results reveal that the experimental group students scored 29.46, 16.88, 19.82, 27.33, 93.51 in self-efficacy, self-confidence,

expectancy of success , beliefs towards learning grammar ,and the total score of the GLMQ, respectively, in the pre-administration. On the contrary, the same students got 41.33, 25.84, 30.48, 33.53, 131.2 in self-efficacy, self-confidence, expectancy of success , beliefs towards learning grammar ,and the total score of the GLMQ, respectively, in the post- administration.

Moreover, in light of the results of *t*-test, it was revealed that there were statistically significant differences at 0.01 level between the experimental group mean scores in the pre and post administration of the GLMQ in favor of the post-administration. Based on these results, the fourth hypothesis was accepted demonstrating that there is a statistically significant difference at 0.01 level between the mean scores of the experimental group on the motivation questionnaire for English grammar learning before and after the experiment, in favor of the latter. The figure below delineates the results shown in Table (10).



**Figure: 4**

*Comparison between the mean scores of the experimental group (Pre and Post administration of GLMQ)*

### **Results Concerning the Correlation between the Participants' (Experimental Group) Motivation towards Learning English Grammar and their Grammatical Competence level in the Post-administration of the EGCT**

To answer the third research question the subsequent hypothesis reporting "there is a positive correlation between the experimental group mean scores in the motivation questionnaire for English grammar learning

and their mean scores on the posttest of the grammar test", was formulated. To test the above hypothesis, Person's coefficient of correlation was used to determine if there any statistically significant correlation between the participants' (the experimental group) motivation and their grammatical competence level and in the post-administration of both the EGCT and GLMQ.

In effect, the mean scores, standard deviations, r-value, and r-significance of English grammar learning motivation and grammatical competence of the experimental group are displayed in table (11) below.

**Table: 11**

***The coefficient of correlation between the participants' (the experimental group) mean scores in the GLMQ and their mean scores in the EGCT in both post-administrations***

Variable	Mean	Std. deviation	Person's Correlation	Sig. (2 tailed)
<b>GLMQ</b>	131.2	3.36	0,338*	0.000**
<b>EGCT</b>	55	2.14		

**\* Correlation is Significant at 0.05 level**

Results presented in Table (11) indicated that there was statistically significant correlation at 0,05 level between the mean scores of the experimental group in the GLMQ and their mean scores in the EGCT on both post-administrations. Results also yielded that the obtained r-value is (0.338) which is significant at 0.05 level. This level of Person's coefficient of correlation reveals that the correlation is positive. Accordingly, this means that there is a positive correlation between the experimental group grammar learning motivation and their grammatical competence level, i.e., the higher the students (experimental group) scored in the GLMQ, the higher they scored in the EGCT. In other words, the higher motivation level they had, the higher grammatical competence level they reached.

Based on these results, the fifth hypothesis: "there is positive correlations between the experimental group mean scores in the motivation questionnaire for English grammar learning and their mean scores on the posttest of the grammar test", was confirmed. Additionally, these results provided an answer for the third question of the study: What is the correlation

between the participants' motivation towards learning English grammar and their grammatical competence?

### **Findings of the Study**

Findings of the current study were summarized as follows:

1. Statistically significant differences at 0.01 level were noticed between the experimental group and the control group in the posttest of the EGCT regarding grammatical competence, vocabulary competence and the total score of the EGCT, favoring the experimental group (t-values were 49.80, 31 and 54, respectively).
2. Statistically significant differences at 0.01 level were noted between the mean scores of the experimental group in the pre and posttest of the EGCT with regard to grammatical competence, vocabulary competence and the total score of the EGCT, in favor of the latter (t-values were 43.82, 26.32 and 50, respectively).
3. CMCF had a large noticeable effect on developing the participants' (experimental group) grammatical competence, vocabulary competence and the EGCT total score ( $\eta^2$ -values were 0.97, 0.94 and 0.98, respectively).
4. Statistically significant differences at 0.01 level were found between the experimental and the control groups in the post-administration of the GLMQ regarding self-efficacy, self-confidence, expectancy of success, beliefs towards learning grammar and the total score of the GLMQ, favoring the experimental group (t-values were 43.3, 32.10, 44.48, 15.58 and 56.7, respectively).
5. Statistically significant differences at 0.01 level were noticed between the mean scores of the experimental group in the pre and post administration of the GLMQ with regard to self-efficacy, self-confidence, expectancy of success, beliefs towards learning grammar and the total score of the GLMQ, in favor of the post-administration (t-values were 33.58, 33, 35.37, 15.58 and 57.33, respectively).
6. CMCF had a large considerable effect on developing the subjects' (experimental group) self-efficacy, self-confidence, expectancy of success, beliefs towards learning grammar and the total score of the GLMQ ( $\eta^2$ -values were 0.95, 0.92, 0.95, 0.84 and 0.97, respectively).

7. A statistically significant positive correlation was found between the CMCF students' motivation and their grammatical competence level, as measured by the posttest (r-value was 0.338).

## Conclusions

Based on the findings of the current study, the following conclusions could be drawn:

1. Using CMCF could be highly supportive for learning grammar and enhancing motivation.
2. CMCF was an effective technique for developing the students' grammatical competence level.
3. CMCF was a fruitful means for creating a fertile enthusiastic learning environment that helped better in supporting the students' motivation towards learning English grammar.
4. Using CMCF was found to be very helpful for developing the students' self-efficacy, self-confidence, expectancy of success and beliefs towards learning grammar.
5. CMCF had a large effect on developing the students' grammatical competence level.
6. The CMCF software features such as (the design, the way of presenting explanations grammar, the way of providing the students with CF, sounds, etc.) enabled the students to use the grammar rules/structures effortlessly; hence, they reached a higher level of grammatical competence.
7. CMCF was a feasible technique that could be used in teaching English grammar.
8. CMCF provided the students with a comfortable learning atmosphere that allowed them to feel relaxed, tension-free, motivated and thus enjoy their grammar learning.
9. A positive correlation was found between the students' motivation and their grammatical competence upon the use of CMCF technique.

## Recommendations

In light of the findings and the conclusions of the current study, the following recommendations are offered:

1. It is recommended for EFL teachers to take advantage of using CMCF in English grammar classes.

2. Using technology should be integrated into teaching techniques, methods and/or approaches in order to facilitate EFL teaching and learning process.
3. Emphasis should be given to students' motivation which is considered as a corner stone in developing their language skills and their grammatical competence, in particular.
4. Curriculum designers are recommended to pay attention to the benefits of CMCF while preparing courses materials.

### **Suggestions for Further Research**

1. More studies can be carried out to determine the effect of CMCF on other language areas such as vocabulary and writing.
2. Conducting further studies to investigate of CMCF on developing grammatical competence and motivation among students at other educational stages: primary and secondary.
3. Investigating the effect of more recent educational software on developing students' grammatical competence and motivation.
4. Further research is required to explore students' attitudes towards CMCF in EFL teaching and learning process.
5. Replication of the current study in different regions of Egypt, or perhaps with different age groups/levels.
6. Further research is suggested to investigate the challenging and obstacles of implementing CMCF in EFL contexts in Egypt.
7. A comparative study can be undertaken to compare the effect of CMCF versus a traditional type of CF such as peer CF.

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