

The Effectiveness of a Proposed Unit Based on Cognitive & Metacognitive Strategies Training in Developing Some Reading Comprehension Skills among Egyptian EFL First Year University Level Students

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Abstract:

The aim of this study was to help EFL first year Faculty of Pharmacy students at October Modern Sciences & Arts University develop the necessary inferential and critical reading comprehension skills through a proposed unit based on cognitive and metacognitive strategies training. The study followed the quasi-experimental pretest-posttest control group/ experimental group design where two intact groups were randomly assigned to the control and experimental groups. While the control group students received regular instruction, the experimental group was taught by the researcher throughout the Fall Semester of the academic year 2017- 2018 according to the proposed unit. The study tools included a checklist for determining the necessary inferential and critical reading comprehension skills, a pre- /post- reading comprehension test and the proposed unit. Results indicated that the experimental group outperformed the control group in the post- test overall reading comprehension scores as well as in each inferential and critical comprehension sub-skill. Comparing the pre-/ post- test reading comprehension performance of the experimental group indicated that there were statistically significant differences between the pre- test and post- test scores in favour of the post- test scores. Therefore, it was concluded that the proposed unit proved to be effective in developing the experimental group students' overall reading comprehension scores as well as in developing each inferential and critical comprehension sub-skill.

Key Words: inferential reading comprehension, critical reading comprehension, cognitive strategies, metacognitive strategies, EFL university level learners

Introduction

Reading is a main language skill through which EFL learners receive comprehensible input that they can use later on in speaking or writing. Through reading, learners can internalize vocabulary and language rules in a meaningful context (Crawley & Merritt, 1996 ; Honig, 2001). Reading is a lifelong learning skill (Kingen, 2000; Kawabata, 2007 and VanDewghe, 2007) that broadens EFL learners' scope and expands their knowledge in varied domains. Furthermore, reading is closely related to thinking (Honig, 2001); when L2 learners read, they actively reconstruct the original intentions of the writers in their attempt to make meaning of the text at hand. Therefore, active reading entails going beyond the literal meaning of the text to analyze it, draw conclusions, make inferences and evaluate the ideas presented in it. Moreover, active

reading encourages L2 learners to question the ideas presented in the texts and evaluate the credibility of the authors.

Due to the considerable importance of reading and reading comprehension skills, many EFL university level instructors attempt to develop varied levels of reading comprehension among their students. These include inferential, critical and creative reading comprehension. For them, it is not enough to get the literal direct meaning of the texts. Understanding the implicit unstated meaning is equally important, if not sometimes more important than the direct explicit meaning. Also, in the current age of immense internet usage and information technology, readers must be equipped with the necessary skills to evaluate, analyze and judge the texts at hand. They need to identify illogical arguments and locate stereotypes in the written discourse. They also need to relate what they read to their prior knowledge using active reading strategies.

Taking the complex nature of reading comprehension tasks into consideration, it is no longer enough to talk about the role of the bottom-up processing model, the top-down processing model, the interactive model or the Schema Theory in enhancing EFL reading comprehension skills despite their undeniable value. Recent research has powerfully highlighted the positive impact of Strategies- Based Instruction in fostering EFL reading comprehension skills in the Egyptian secondary stage context. Such studies include the studies of Abou Hadid (2000) and Ahmed (2007). One main common factor in these studies was the accumulative emphasis on the value of training EFL learners in active reading strategies to enhance their reading comprehension skills. In addition, varied scholars such as Brown (2007) and Kaula (2011) have indicated that if EFL instructors really aspire to develop the reading comprehension skills of their learners, they should educate and train them in the strategies used by good readers, whether these strategies are cognitive, metacognitive, compensatory, social or affective. Similarly, Kazemi, Mohsen & Mohammadreza (2013) recommended that effective reading comprehension instruction should empower learners by training them to use a number of text comprehension strategies in addition to an increased sense of conscious control through metacognitive awareness.

As a result, there is growing empirical evidence that highlights the value of these strategies training in developing EFL reading comprehension skills at the university level as in the studies of El-Shura (1999), Dheib- Henia (2003) and Razi (2010). Furthermore, it should be highlighted that the role of strategies training does not only enhance learners' reading comprehension skills, but it also increases their involvement in the learning process and fosters their independence as

effective EFL learners who actively take the responsibility for their learning as in the study of Ahmed (2007).

Context of the problem

As highlighted earlier, Egyptian EFL university level learners should be encouraged to practise and develop a wide range of inferential, critical and creative reading comprehension skills in addition to the usual emphasis on the literal meaning of texts. However, this is not the case in many Egyptian EFL university level classes. In non-specialist university level EFL classes, the focus is still on the literal meaning including identifying the main idea, specific stated details and the explicit organizational patterns of written discourses.

Sometimes Egyptian EFL university level learners are encouraged to guess the meaning of some new words or phrases; they are occasionally asked to identify few pronoun referents in the texts and they seldom practise drawing conclusions based on the texts at hand. Consequently, when asked to practise any of the inferential or critical reading comprehension skills, many of these EFL university level learners are reluctant to do so, and this negatively affects their overall reading comprehension.

This problem becomes more obvious when the researcher, as a supervisor of the intensive English course offered at October Modern Sciences and Arts (MSA) University, observed some of the first year Faculty of Pharmacy EFL classes. Based on this observation, it was noticed that:

(a) The teaching methods adopted by most of the EFL instructors focused on reading the texts silently, answering the literal comprehension questions that are based on the texts at hand. Sometimes, the instructors previewed some essential vocabulary or language forms prior to reading the texts. Few instructors discussed the given topics in the pre- or post-reading stages.

(b) Students were not trained by any means in active reading strategies such as predicting, summarizing, re-reading for clarification, setting a goal for reading, planning, visualizing, using context clues, questioning, asking for clarification and monitoring as well as evaluating comprehension.

(c) Due to the teaching methods adopted, students seemed to be demotivated and they were not very much involved in the reading comprehension lessons; they were answering the literal comprehension questions mechanically without the essential sense of enthusiasm that accompanies active reading comprehension.

(d) Students never practised the skills of drawing conclusions or distinguishing between facts and opinions; they rarely made inferences

and they sometimes guessed the meaning of new words or identified pronoun referents.

In order to investigate the problem more deeply, a diagnostic test was administered on 114 EFL first year Faculty of Pharmacy students who were enrolled for the intensive English course for the Fall Semester of the academic year 2017- 2018. The test was designed by the researcher and measured the learners' literal, inferential as well as critical comprehension skills. Results of this diagnostic reading comprehension test revealed that:

(a) 90% of the learners found no difficulty getting the literal meaning of the reading comprehension test texts.

(b) 70 % of the learners found considerable difficulty while guessing the meaning of unknown words, making inferences and identifying pronoun referents. They were very much annoyed when they were asked to provide answers that were implicitly stated in the texts.

(c) 85% of the learners did not understand the difference between drawing conclusion and identifying the main idea. They were saying that they are the same skills.

(d) 90% of the learners were very much confused when they were asked to fill in a fact/ opinion chart to highlight whether specific statements highlighted in the texts represent facts or the authors' opinions. To the researcher's surprise, quite a good number of them claimed that all the statements are facts, and when asked why they chose so, they stated that as long as these statements are extracted from the texts at hand, then they represent facts. Such a surprising answer might be attributed to the factual nature of pharmacy students' study where all the scientific texts they read are factual and there is little room, if any, for authors' opinions.

The problem of first year intensive English course EFL Faculty of Pharmacy students' weakness in inferential and critical reading comprehension skills was further emphasized by reviewing previous related studies in the Egyptian university level context. Despite the fact that the studies of Abou Hadid (2000) and Ahmed (2007) suggested that further studies should measure the effectiveness of active reading strategies at the university level in the Egyptian context, no study, to the researcher's best knowledge, was conducted to foster inferential and critical reading comprehension skills among Egyptian EFL Faculty of Pharmacy students. This was considered a gap in the literature; hence, the need for conducting empirical research to bridge this gap becomes more evident.

Problem of the study

The study problem was identified in Egyptian first year Faculty of Pharmacy students' poor mastery of the necessary EFL inferential and critical reading comprehension skills. This might be partly due to the lack of training in these essential reading comprehension skills. It might be also due to the factual nature of their specialty that makes them focus on literal comprehension skills rather than inferential or critical reading comprehension skills. Therefore, the current study attempted to develop the necessary EFL inferential and critical reading comprehension skills among Egyptian first year Faculty of Pharmacy students through the use of a proposed unit based on cognitive and metacognitive strategies training. In other words, this study attempted to provide answers to the following main question:

"What is the effectiveness of a proposed unit based on cognitive and metacognitive strategies training in developing some of the EFL inferential and critical reading comprehension skills among Egyptian first year Faculty of Pharmacy students?"

This main question was divided into the following sub-questions:

1. What are the necessary EFL inferential and critical reading comprehension skills for Egyptian first year Faculty of Pharmacy students?
2. What are the theoretical bases of a proposed unit based on cognitive and metacognitive strategies training for developing some EFL reading comprehension skills among Egyptian first year Faculty of Pharmacy students?
3. What steps should be undertaken for designing the unit based on cognitive and metacognitive strategies training?
4. How far is the proposed unit effective in developing first year Faculty of Pharmacy students' overall EFL reading comprehension?
5. How far is the proposed unit effective in developing first year Faculty of Pharmacy students' inferential and critical EFL reading comprehension sub-skills?

The study hypotheses

The study hypotheses were as follows:

(a) Hypotheses comparing the experimental and control group mean scores on the post- test:

1. There is a statistically significant difference between the mean scores of the experimental group exposed to the proposed unit based on cognitive and metacognitive strategies training and the control group receiving regular instruction on the post- test in overall reading comprehension in favour of the experimental group.
2. There are statistically significant differences between the mean scores of the experimental group and the control group on the post- test in each reading comprehension sub- skill (inferential and critical) in favour of the experimental group.

(b) Hypotheses comparing the experimental group mean scores before and after the treatment:

3. There is a statistically significant difference between the mean scores of the experimental group on the pre- test and the post- test in overall reading comprehension in favour of the post- test.
4. There are statistically significant differences between the mean scores of the experimental group on the pre- test and the post- test in each reading comprehension sub- skill (inferential and critical) in favour of the post- test.

Objectives of the study

The main purposes of the current study were:

1. Identifying the EFL inferential and critical reading comprehension skills necessary for Egyptian first year Faculty of Pharmacy students.
2. Identifying appropriate techniques for designing a proposed unit based on cognitive and metacognitive strategies training for developing the EFL reading comprehension skills of first year Faculty of Pharmacy students.
3. Constructing a proposed unit based on cognitive and metacognitive strategies training to develop some reading comprehension skills among first year Faculty of Pharmacy students.

4. Measuring the effectiveness of the proposed unit in developing first year Faculty of Pharmacy students' inferential and critical EFL reading comprehension skills.

Delimitations of the study

This study was confined to:

1. Two intact Faculty of Pharmacy EFL classes at October Modern Sciences & Arts University in Giza governorate.
2. A limited duration for implementing the proposed unit based on cognitive and metacognitive strategies training (three months- 2 hours per week).
3. Developing only the inferential reading comprehension skills of (a) guessing the meaning of unknown words or phrases, (b) identifying pronoun referents and (c) making inferences as well as both the critical reading comprehension skills of (a) drawing conclusions and (b) distinguishing between facts & opinions among the experimental group students.

Definition of terms

Cognitive strategies refer to the mental or behavioral activities that increase the possibility of text comprehension such as predicting, rereading, summarizing, activating prior background knowledge, visualizing and adjusting reading speed (Serran, 2002; Van Keer & Verhaeghe, 2005; Takala, 2006; Kawabata, 2007).

These are defined operationally in this study as the experimental group students' ability to use the strategies of predicting, summarizing, activating prior knowledge, re-reading certain sections of the text, questioning, using varied clues to guess the meanings of unknown words, using different graphic organizers, highlighting, inferring meaning, asking clarifying/ self-generated questions and locating evidence in the texts for the inferences made.

Metacognitive strategies are activities that involve learners in a process of thinking about their own thinking through planning for the reading task, self-monitoring, paying selective attention, self-evaluating and regulating activities that focus on the product and the process of reading. They also help successful readers with their selection of proper cognitive strategies that enhance comprehension (Serran, 2002, Clark, 2003; Clark & Graves, 2005, Van Keer & Verhaeghe, 2005; Takala, 2006).

These are defined operationally in this study as the experimental group students' use of planning for reading, selective attention, monitoring comprehension, considering interpretations and self-

evaluation to develop the necessary inferential and critical reading comprehension skills.

Reading comprehension is the active process of making meaning of written texts where the reader interacts with the texts using a combination of active reading strategies (Kingen, 2000; Weedman, 2003; Holden, 2004; Takala, 2006; Kawabata, 2007; Brown, 2007)

It is defined operationally in this study as the experimental group students' ability to successfully process and make meaning of the reading texts included in the current unit with the help of varied cognitive and metacognitive strategies. In other words, students are required to show mastery of the following reading comprehension sub- skills:

(a). Inferential Comprehension:

1. Guessing the meaning of unknown words or phrases in the written text.
2. Making inferences.
3. Identifying pronoun referents

(b). Critical Comprehension:

4. Distinguishing between facts and opinions in the written texts.
5. Drawing conclusions.

Variables of the study

Independent variable: This refers to the treatment used in the study (the proposed unit based on cognitive and metacognitive strategies training implemented with the experimental group versus the regular instruction received by the control group).

Dependent variable: This refers to the experimental group students' performance in inferential and critical reading comprehension levels and sub- skills.

Theoretical framework

Definitions of reading comprehension

Due to the importance of reading, many scholars stressed its role as a main receptive language skill and as a process where EFL learners actively reconstruct the author's ideas and points of view. For instance, Brown (2007) emphasizes the idea that reading comprehension is a thinking process where both the top-down and bottom-up processing of written texts are interacting together with help of Schema Theory. This entails activating learners' previous knowledge and building the necessary knowledge to facilitate readers' assimilation and processing of the written texts.

Other scholars including Alexander & Jetton (2000), Duke & Pearson (2002), Sweet & Snow, (2003), Alfassi (2004), Antoniou & Souvignier (2007) and Kawabata (2007) define reading comprehension as the active process of making meaning of the text at hand by relating the written text to readers' prior knowledge and by using varied strategies flexibly to enhance and achieve comprehension. Such a definition emphasizes the active role of the EFL learners in order to reach deeper levels of comprehension and stresses the Student-Centred Approach where learners have to exert efforts and dedicate sufficient time to get not only the literal meaning of the texts but more importantly the inferential and critical comprehension of them.

Reading comprehension levels & skills

Being a complex constructive meaning-making process where various elements interweave to identify the original intentions of writers, reading comprehension has varied levels. These are literal, inferential, critical and creative comprehension of texts. Of these levels, literal comprehension is the basic level where EFL learners attempt to get the primary, direct stated meaning of the texts. As readers go further to investigate the text at a deeper level, inferential comprehension necessitates that they get the implicit, unstated meaning by making inferences based on evidence from the text at hand. Then comes a higher level of comprehension, i.e. critical comprehension where EFL learners read a text to analyze and evaluate it. As for creative comprehension, which is considered the highest level of reading comprehension, it represents the reader's ability to move beyond the written texts to formulate new thoughts and novel conclusions (Heilman, Blair & Rupley, 1986; Christopher & Deborah, 1994; Ediger, 2003; Holden, 2004; Richards et al. 2007).

To further explore these comprehension levels, many scholars such as Heilman, Blair & Rupley, (1986), Grellet (1994) and Brown (2007) have identified the following reading comprehension sub-skills for each level of comprehension.

(a). Literal comprehension sub-skills:

- Identifying the stated main idea of the text
- Identifying specific stated details and information
- Distinguishing between the stated main ideas and the supporting details or examples
- Identifying the organizational pattern of the texts such as the chronological order of events or the explicit cause - effect relations

(b). Inferential comprehension sub-skills:

- Guessing the meanings of unknown words or phrases
- Making inferences
- Identifying pronoun referents
- Making predictions
- Making comparisons

(c). Critical comprehension sub-skills:

- Distinguishing between facts and opinions
- Drawing conclusions
- Detecting faulty and illogical arguments and finding possible inconsistencies within a given written discourse
- Recognizing loaded words that may cause readers to apply labels, stereotypes and biases without conscious thought
- Judging the credibility of the writer

(d). Creative comprehension sub-skills:

- Suggesting a new title for the written text
- Inventing a new course of action/ event in a narrative text (such as a new beginning, climax, and/or ending).
- Suggesting an original solution to a presented problem in the text at hand

Strategies- Based Instruction & characteristics of good readers

Due to the vital role of reading comprehension in everyday life as well in academic settings, many scholars- who wanted EFL learners to improve their ability to deeply comprehend texts- started to think that studying the strategies adopted by good readers can help struggling readers overcome their comprehension limitations and become better readers. Among these scholars, Block (1986), Barnett (1988), Sariçoban (2002), Serran (2002), Van Keer & Verhaeghe (2005), Takala (2006), Brown (2007) Kawabata (2007) and VanDewghe (2007) highlighted that proficient readers use a number of cognitive and metacognitive strategies to facilitate their reading comprehension tasks. Among the cognitive strategies were predicting, summarizing, re-reading to check comprehension, visualizing, using graphic organizers and questioning.

Competent readers usually use a number of effective metacognitive strategies such as planning for reading, self- monitoring to ensure comprehension and self- evaluation. It was found that such strategies

help efficient readers monitor and regulate themselves during the reading comprehension process. More importantly, it was concluded that training EFL learners in these active reading strategies helps them to become more involved in the learning process, thus encouraging them to gradually become more independent readers who take charge of their own learning (Ahmed, 2007 ; Brown, 2007 ; Aghale & Zhang, 2012).

By contrast, struggling readers are often unaware of the suitable cognitive and metacognitive strategies they can use to deeply comprehend written texts. Therefore, poor readers are mostly passive and unwilling to exert efforts in the constructive and highly interactive reading comprehension process (Weedman & Weedman, 2001; Serran, 2002; Takala, 2006; Vaughn & Edmonds, 2006; Antoniou & Souvignier, 2007; Borgia & Owles, 2007; Manning, 2007).

The role of Cognitive & metacognitive strategies in developing EFL reading comprehension

Cognitive strategies refer to mental or behavioral activities that can foster comprehension. These include predicting, questioning, summarizing, visualizing, using context clues and accompanying graphics, rereading, activating prior knowledge, using visual representations/ graphic organizers of the written text at hand and adjusting reading speed (Serran, 2002; Van Keer & Verhaeghe, 2005; Takala, 2006 ; Kawabata, 2007). As for metacognitive strategies, they refer to the activities used by the EFL learners to plan, monitor, regulate and evaluate their reading comprehension process and product. Moreover, metacognitive strategies assist EFL readers in their selection of suitable cognitive strategies according to the text difficulty level, situational constraints, readers' cognitive abilities (Serran, 2002; Clark, 2003; Clark & Graves, 2005; Van Keer & Verhaeghe, 2005; Takala, 2006; Maghsudi & Talebi, 2009).

Effective readers must be equipped with a wide array of reading comprehension strategies in order to aid understanding (Serran, 2002; Van Keer & Verhaeghe, 2005 ; Takala, 2006). They need to approach the reading comprehension task with a clear purpose in their mind (Serran, 2002). They need to pay selective attention to focus on relevant and more important information in the texts. In addition, recent studies have highlighted the positive impact of training EFL learners in cognitive and metacognitive strategies on their reading comprehension skills (Abou Hadid, 2000; Bremer et al. 2002; Serran, 2002; Dheib- Henia, 2003; Dreyer and Nel, 2003; Clark & Graves, 2005; Takala, 2006; Todd, 2006; Antoniou & Souvignier, 2007; Borgia & Owles, 2007; Kawabata, 2007; Manning, 2007 ; Sen, 2009; Razi, 2010; Maasum & Maarof, 2012; Semtin & Maniam, 2015).

Steps of cognitive & metacognitive strategies training

To train EFL readers in effective reading comprehension strategies, they have to go through five main steps according to the model highlighted by Duke and Pearson (2002). According to this model, the steps of strategy training are as follows:

1. EFL teachers give explicit description of every strategy as well as when and how to use it.
2. Teachers and / or students model the strategy in action.
3. Teachers and students collaboratively use the strategy in action.
4. Students are asked to practise the strategy on their own with the help of the instructor's guidance. This guided practice should result in the gradual release of responsibility.
5. Students use the taught strategy independently during silent reading.

According to this model, EFL readers learn to coordinate varied cognitive and metacognitive strategies to achieve adequate comprehension of the written text. In this model, teachers move gradually from a situation where they shoulder all responsibilities in the modeling stage or demonstrating stage to a participation mode where teachers and EFL readers participate collaboratively in the reading task and finally to a situation where students use the strategies independently to fully comprehend the text at hand (Duke & Pearson, 2002, p.209)

Review of literature

Various studies were conducted to identify the cognitive and metacognitive strategies employed by EFL learners in different contexts and with different age groups. In addition, many studies trained EFL learners in the use of cognitive and metacognitive strategies to promote their reading comprehension ability.

Abou Hadid (2000) conducted a study to identify the role of training Egyptian EFL secondary school students in cognitive and metacognitive strategies in developing their receptive skills. This study followed the quasi- experimental pretest- posttest control group/ experimental group design. While the experimental group students received training through the cognitive and metacognitive strategies, the control group students received regular instruction. The study finding confirmed the positive significant impact of cognitive and metacognitive strategies training in developing the experimental group students' reading and listening comprehension skills.

Sarıçoban (2002) attempted to discover the reading strategies of good EFL readers as compared to the strategies employed by poor EFL readers. The study participants were university level ELT department students. In order to achieve the study aim, a reading strategies inventory was used. Also, in order to distinguish good and bad readers, a reading test was administered. The study results revealed that there were significant differences between the strategies employed by proficient and struggling readers. Based on the study results, it was recommended that EFL teachers encourage their learners to read texts for their overall meaning before going into details. It was also recommended to help at-risk readers to acquire the strategies employed by successful readers.

Dheib- Henia (2003) evaluated the effectiveness of metacognitive strategy training in developing ESP university level learners' reading comprehension of specialized biology research articles. The study sample consisted of 62 biology students from two science institutions. The study sample received metacognitive strategy training. Results of the reading comprehension post- test revealed that the metacognitive strategy training improved the participants' familiarity with and proficiency in reading biology research articles. These quantitative results were further confirmed through the qualitative evidence obtained from the retrospection protocols of twelve of the study participants.

Dreyer and Nel (2003) conducted a study to identify the effectiveness of strategic reading training in enhancing ESL university level learners' reading comprehension skills in South Africa. The study subjects were 131 students and they were divided into a control and an experimental group. While the experimental group received strategic reading training within a technology- enhanced ESL learning context, the control group received regular instruction for a semester. The study results proved that the experimental group students outperformed the control group students on the reading comprehension post-test. Therefore, it was concluded that strategic reading training can foster ESL reading comprehension skills among university level learners.

Ahmed (2007) examined the effectiveness of a proposed program based on Reciprocal Teaching in developing some EFL literal, inferential, critical and creative reading comprehension skills of Egyptian first year secondary school students in Sharkeya governorate. Reciprocal Teaching combines the four cognitive strategies of prediction, summarizing, questioning and clarifying in an integrated fashion. This study followed the quasi- experimental pretest- posttest control group/ experimental group design. While the experimental group students received training through the proposed program based on Reciprocal Teaching, the control group students received regular instruction. The study results indicated

the experimental group students outperformed the control group students in overall reading comprehension as well as in every reading comprehension sub-skill. Therefore, it was recommended to train Egyptian EFL learners in the effective use of the cognitive strategies prediction, questioning, clarifying and summarizing strategies to foster their reading comprehension skills.

Sen (2009) conducted a study to identify the impact of metacognitive strategies training on the reading comprehension skills of fifth grade primary EFL Turkish learners. The study participants were divided into a control and an experimental group with 95 students in each group. While the experimental group received training for 8 weeks in developing reading objectives, preparing a reading plan and metacognitive reading strategies, the control group received regular instruction. The study findings indicated that there was a statistically significant difference between both groups on the post-test in favour of the post-test with regards to the skills of finding the main idea and guessing the end of a text. It was recommended that EFL students should be taught how to plan for reading in the pre-reading stage, how to monitor comprehension during reading and how to evaluate their reading comprehension in the post-reading stage.

Razi (2010) investigated the impact of a metacognitive reading training programme on the reading achievement of EFL preparatory year and first year university level learners who were enrolled at the English Language Teaching Department at Çanakkale Onsekiz Mart University (ÇOMU). The study results indicated that training the learners in the appropriate use of metacognitive reading strategies had a positive impact on their reading comprehension skills and helped them to become more efficient readers.

Kasimi (2012) examined the cognitive and metacognitive reading strategies employed by Iranian and Turkish EFL learners. The study participants were university level learners studying at the English Language Teaching Departments of 4 Turkish universities and 3 Iranian universities. The study also investigated the gender and cultural differences among the groups in terms of using cognitive and metacognitive strategies. The study results indicated that there is a significant and mutual relationship between the use of both cognitive and metacognitive reading strategies. In other words, it was found out that readers' choice of specific cognitive strategies affects their choice of metacognitive strategies and vice versa. It was also found that there were no statistically significant differences between males and females with regard to their reading strategy use. However, there were statistically

significant differences between Iranian and Turkish learners in terms of their reading strategy use, and these differences were attributed to cultural and societal values as well as the different educational systems in both countries.

Maasum & Maarof (2012) investigated the metacognitive reading strategies used by a group of forty one EFL undergraduate students at a public university in Malaysia. To achieve the study aim, a questionnaire was administered on the study sample. It consisted of thirty items categorized into three major types: global reading strategies, support strategies and problem- solving strategies. The study findings indicated that the participants used a wide array of metacognitive strategies to achieve reading comprehension. In addition, the study findings indicated that they were aware of the strategies they employed to facilitate their meaning making processes of the texts at hand. Based on the study findings, it was recommended to replicate such a study with a new or larger sample size in varied EFL teaching contexts.

Al Odwan (2012) conducted a study to identify the effect of training Jordanian EFL secondary stage learners in Directed Reading Thinking Activity (DRTA) through Cooperative Learning on developing their reading comprehension skills. Through DRTA, EFL learners practise the cognitive strategies of making predictions, activating their prior knowledge, relating the reading text new information to their previous knowledge and looking for evidence in the reading text to confirm their predictions. They also practised the metacognitive reading strategies of setting goals for their reading and monitoring comprehension. The study results revealed that the experimental group (22 students) significantly outperformed the control group (20 students) in reading comprehension test scores. It was recommended to adopt the proposed instructional strategy as it encourages learners to become active readers in a cooperative classroom atmosphere.

Mehrdad, Ahghar & Ahghar (2012) conducted a study in Iran to investigate whether training EFL university level learners in cognitive and metacognitive strategies would enhance their reading comprehension skills across three EFL competence levels. The study participants were one hundred and eighty BA students, and their major was English language. They all studied at Azad University. The study sample took the Test of Michigan to divide them according to their scores on the test into three proficiency levels. Then, the participants at each proficiency level were sub-divided into two equal groups, and they were randomly assigned into the control and experimental groups. Participants in the experimental groups received cognitive and metacognitive strategies training whereas the control groups received vocabulary and structure

instruction. At the end of the experiment, all the students took the reading comprehension post- tests according to their proficiency levels. Analysis of the test results revealed that training elementary and advanced level learners in cognitive and metacognitive strategies had no effect on their reading comprehension skills. However, it was proved that training intermediate level EFL learners in cognitive and metacognitive strategies had a significant impact on their reading comprehension.

Semtin & Maniam (2015) investigated the types of cognitive and metacognitive strategies used by Malaysian secondary school students to improve their ESL reading comprehension. In their study, they used a mixed method that involved the use of a questionnaire and an interview. Analysis of the data collected in this study revealed that students used varied cognitive and metacognitive strategies to help them become more proficient independent readers. Among the cognitive strategies used were inferring, summarizing, skimming, note-taking, and guessing, prediction, using prior knowledge to facilitate comprehension and rereading difficult parts in the reading text. As for the metacognitive strategies, they relied on the strategies of selective attention, setting plans on how to complete the reading tasks, monitoring comprehension and self-evaluation where they try to find out their reading comprehension weaknesses and ways of improving their reading efficiency. They also used self- evaluation to identify the effectiveness of the strategies they used during the reading tasks. Based on the study findings, it was concluded that ESL teachers should train their students in varied active reading strategies to foster their reading comprehension skills.

Abu-Snoubar (2017) investigated Jordanian EFL university level learners' use of metacognitive reading strategies at Al-Balqa Applied University. The study participants were 86 students; they were 37 males and 49 females. They were majoring in different specializations including English Language & Literature, Agriculture, Law, Mathematics, Physics, Engineering, Business, Chemistry and Medicine. Their age ranged between 18 and 22 years old. This study used the Survey of Reading Strategies (SORS) designed by Mokhtari & Sheory (2002) as the study tool. This questionnaire classified metacognitive strategies into three categories: global reading strategies, problem solving strategies and support reading strategies. Analysis of the questionnaire data revealed that the study participants used problem-solving strategies most frequently. Then, they used support strategies, and the least frequently used strategies were the global reading strategies. Based on the study findings, it was recommended that further studies should be conducted with regards to the impact of gender and major on reading strategies use.

Methodology of the study

In conducting the current study, the researcher made use of both the Descriptive Method and the Quasi- experimental Method. The Descriptive Method was used while reviewing pertinent literature and specifying the inferential and critical comprehension skills necessary for first year Faculty of Pharmacy students. It was also employed while identifying the general design of the proposed unit and the reading comprehension test. The Quasi- experimental Method was used while conducting the experiment, administering the reading comprehension test, analyzing the data and interpreting the results.

The study participants

A group of sixty- four first year Faculty of Pharmacy students at October Modern Sciences and Arts University were randomly selected in the Fall Semester of the academic year 2017-2018 (thirty- two students in the experimental group and thirty- two students in the control group). Random assignment of individual students was not possible, so two intact classes were randomly selected and then randomly assigned to a control and an experimental group. Students' age in both groups ranged from eighteen to nineteen years old.

The experimental group students were taught by the researcher throughout the implementation of the study experiment for three months (two hours per week). However, while the experimental group received training through a proposed unit based on cognitive and metacognitive strategies training for developing their EFL inferential and critical reading comprehension skills, students in the control group received regular instruction by the regular classroom instructor.

A comparison between the control and the experimental groups on the pre- test was conducted using t- tests for independent samples to examine if there were any statistically significant differences between the two groups before implementing the proposed unit. Results of these t- tests indicated that that there were no statistically significant differences between the two groups on the pre- test whether in overall reading comprehension or in each reading comprehension sub- skill. This means that the two groups were approximately at the same level of reading comprehension at the beginning of the experiment. It was also noticed that the mean scores of both groups were low.

Research design

The present study is mainly experimental. The quasi-experimental design called the non -equivalent group design was employed. This design is identical to the pretest- posttest control group/ experimental

group design in all aspects except that intact groups rather than randomly assigned ones are used, creating a control problem in terms of selection bias. This makes the use of a pre-test necessary for this particular design.

Tools of the study

The present study made use of three main tools:

- ❖ A reading comprehension skills checklist;
- ❖ A pre- /post- reading comprehension test to measure the students' reading comprehension skills; and
- ❖ A proposed unit based on cognitive and metacognitive strategies designed by the researcher to train experimental group students in the specified reading comprehension skills.

These tools can be explained as follows:

A. The reading comprehension skills checklist

This checklist was employed to determine the most important inferential and critical EFL reading comprehension skills to be developed at the university level. To ensure the checklist validity, it was submitted to a panel of jury specialized in the field of EFL curricula and methods of teaching to determine (a) the degree of importance of each skill, (b) appropriateness of the skills suggested to Egyptian EFL first year Faculty of Pharmacy students as well as (c) the relationship of each skill to either inferential or critical comprehension levels. The jury was composed of six staff members of EFL curricula and teaching methods from different faculties of Education in Egypt. The panel of jury recommended that the current study should focus on the previously highlighted three inferential and two critical reading comprehension skills as they were seen necessary and suitable for the target population of the current study.

B. The pre-/ post- reading comprehension test

This test was constructed and administered to the two groups by the researcher. It was used prior to the unit implementation to make sure that students of both groups were at the same reading comprehension level before starting the experiment, and hence the progress achieved by the experimental group could be attributed to the unit they have been exposed to. As a post-test, it was used to investigate the effectiveness of the proposed unit based on cognitive and metacognitive strategies training in developing the selected inferential and critical reading comprehension skills.

To measure the test content validity, the first version of the test was given to a panel of jury consisting of seven EFL professors, assistant professors, and lecturers to evaluate each item in terms of content appropriateness and level of comprehension measured. Moreover, they were asked to evaluate the test as a whole in terms of: **(a)** correctness, **(b)** number of items and **(c)** suitability of the reading texts and the test items to the linguistic level of EFL first year Faculty of Pharmacy students.

The panel of jury indicated that test proved to be a valid one as it measured what it was intended to measure in most cases. To enhance the test validity, they added, modified and omitted some test items. The final form of the test consisted of 24 multiple choice questions and three fact/ opinion charts including 6 statements to be marked as either facts or opinions. The test was marked out of thirty as each item of the test carried one mark; it was scored by the researcher by using the additive marking system.

In addition to content validity, the researcher estimated the test intrinsic validity using the following formula.

$$\text{Intrinsic Validity} = \sqrt{\text{reliability coefficient}} = 0.89$$

This value is considered high for the test validity.

● **Piloting the test**

Before administering the test on the study sample, the test was piloted. The pilot study of the test aimed at timing the reading comprehension test and determining item analysis results including **(a)** item difficulty and **(b)** item discrimination. Therefore, thirty- seven students were selected for the pilot study. These students were randomly selected from one EFL first year Pharmacy classes at Modern Sciences and Arts University. Students of the pilot study belonged neither to the experimental nor to the control groups. They were excluded from the whole experiment.

In order to establish the reliability of the reading comprehension test included in the current study, it was administered to a randomly selected group of thirty- seven students. Those students were excluded from the whole experiment. After two weeks, the test was administered

one more time to the same thirty- seven students. Then, the Pearson correlation coefficient between the test/ re- test results was calculated. Hence, the reliability coefficient was estimated using the following formula:

$$RAA = \frac{2R}{1+R}$$

Where: RAA = the reliability coefficient

R = The correlation coefficient between the test/ re- test results

The reliability coefficient was 0.85, which is relatively high. Therefore, the test could be considered a reliable one for the purpose of the current study.

Test scoring

Students' answers to the pre-/ post- reading comprehension test were hand- scored by the researcher. Test scoring did not require another rater because all the test items whether multiple choice or fact/ opinion questions were controlled. For both types of questions, one score was given for each correct answer, while a zero was given for double, wrong or left answers. The total test score was thirty. For the test specifications, see table (1).

Table (1)
Test specification with regard to each inferential and critical reading comprehension skill

Items	Reading Comprehension Skills	Question Types		Number of Items for Each Skill	Scores Assigned to Each Skill
		M.C.Qs	Fact/ opinion charts		
Inferential Comprehension	1. Guessing the meaning of unknown words or phrases in the written text	6		2, 4, 12, 14, 22, 24	6
	2. Identifying pronoun referents	6		3, 5, 13, 15, 23, 25	6
	3. Making inferences	6		1, 7, 11, 17, 21, 27	6
Critical Comprehension	4. Distinguishing between facts and opinions.		6	9,10, 19, 20, 29, 30	6
	5. Drawing conclusions	6		6, 8, 16, 18, 26, 28	6
	Total	24	6	30	30

Table (2)

Test specification with regards to reading comprehension levels and overall reading comprehension

Level	Total number of test items	Total scores of test items
Inferential reading comprehension	18	18
Critical reading comprehension	12	12
Overall reading comprehension	30	30

C. The Proposed unit

The following is a description of the steps the researcher went through to design the current unit.

Aim of the unit

This unit aimed at developing the inferential and critical reading comprehension skills necessary for EFL first year Faculty of Pharmacy students. This was achieved through training the experimental group students in active cognitive and metacognitive reading strategies to be used before, during and after reading.

Assumptions of the unit

This unit was based on the following assumptions:

1. Reading comprehension is an active constructive process of making meaning where learners employ a number of effective strategies to enhance their comprehension at a deeper level.
2. Inferential and critical comprehension of texts is essential for EFL university level learners. Thus, focusing only on the literal meaning of texts would deprive these students of their rights to gain more insightful understanding of the texts by exploring their implicit meanings and evaluating them.
3. Combining both cognitive and metacognitive strategies can foster EFL university level learners' reading comprehension skills.
4. Cognitive strategies enable learners to activate their prior knowledge, make predictions, visualize elements of the written text, make inferences, use varied clues, summarize, ask clarifying questions and re-read difficult parts of the texts to check comprehension.
5. Metacognitive strategies help university level learners plan, monitor, regulate and evaluate their reading comprehension. They include setting a goal for reading, planning the reading task,

selective attention to more important and relevant information in the reading texts, self-evaluating the reading comprehension weaknesses and finding out possible ways to overcome them in addition to self-evaluating the effectiveness of the strategies used to achieve reading comprehension.

6. Training EFL university level in cognitive and metacognitive strategies should start with the EFL instructor explaining each strategy in addition to explaining how and when to use it. This should be followed by the teacher modeling each strategy in front of the students and the students participating together with the teacher in applying the strategy. Later, students should gradually rely on themselves until they reach the stage of independent use of each strategy during silent reading.

Learning objectives of the unit

By the end of this unit, students were expected to develop the five identified inferential and critical reading comprehension sub- skills.

Content of the unit

The content of this unit consisted of ten reading comprehension passages. They were carefully selected by the researcher to address EFL university level students' interests and to suit their linguistic proficiency level. Therefore, they were also selected after ensuring that their readability level is suitable for first year upper intermediate level university students. The readability scores of the ten reading comprehension texts ranged from 9.0 to 9.9 according to Dale & Chall formula (1995). *In addition, while selecting these reading passages, the researcher took into account the following criteria:*

- a. They should build on students' background knowledge and introduced them to new and relevant ideas.
- b. They helped them understand the way other people with different backgrounds, problems or attitudes feel or think.
- c. They challenged students' intelligence without making unreasonable demands on their knowledge of English as a foreign language.
- d. They did not include many new difficult words that hinder students' understanding. In addition to this, new words included in the reading passages could be easily understood by means of varied clues.
- e. They could lend themselves to many reading comprehension

activities suitable for students' linguistic proficiency level, interests and background knowledge.

- f. They are neither too short nor too long, thus offering students the opportunity to practise varied reading comprehension skills without making them feel bored.
- g. They are suitable for students' background knowledge and culture. In addition, they are relevant to young people's interests and everyday life situations.

The titles of the reading lessons and the accompanying videos used to activate learners' prior knowledge are highlighted in the following table.

Table (3)

Titles of the unit reading comprehension passages and their accompanying You Tube videos watched in the pre- reading stage

Lesson No.	The Title of the Reading Text	Accompanying YouTube videos used in the Pre- Reading stage
1.	Staycations	<ul style="list-style-type: none"> • How to have a vacation at Home • Staycation vs. Vacation
2.	Globalization of the Food Market	<ul style="list-style-type: none"> • Ten Companies that Control the World's Food • 15 Million People will Need Food Aid by 2016- BBC News
3.	Social Networking	<ul style="list-style-type: none"> • Look Up from Your Phone • The Positive and Negative aspects of Social Networks
4.	A Life Revealed	<ul style="list-style-type: none"> • A World in Crisis • Desperate journeys- Afghan Refugee Children Suffer from Malnutrition
5.	Solving the Water Problem	<ul style="list-style-type: none"> • Water Crisis: Problem and Solutions • 10 Best Solutions to Solve the Water Problem
6.	Internet Shopping	<ul style="list-style-type: none"> • Steps of Safe Online Shopping • Food Online Shopping
7.	Cruel to Be Kind	<ul style="list-style-type: none"> • Strict Parenting • The Tiger Mother Speaks
8.	Cell Phones Save Lives	<ul style="list-style-type: none"> • 10 Ways Your Phone Will Save Your Life • The Advantages and Disadvantages of Using Cell Phones

Lesson No.	The Title of the Reading Text	Accompanying YouTube videos used in the Pre- Reading stage
9.	Knowledge Conservation	<ul style="list-style-type: none"> • Rain Forest Medicine • Ecuador Rain Forest
10.	Health News for Body and Mind	<ul style="list-style-type: none"> • How to Be Healthy and Fit • How to Become a Very Healthy Person

Reading comprehension activities

Throughout the proposed unit, the experimental group students were required to practise varied reading comprehension activities to develop their inferential and critical reading comprehension skills. Among these activities were using the reading passage title, headings and accompanying pictures to predict what the text would be about, filling in prediction- confirmation charts with evidence that confirmed learners' predictions, skimming the texts to get their main ideas, scanning them to get specific details. Once the researcher ensured that the students got the literal meaning of the texts, the students were asked to answer multiple choice questions and fill in definition maps to help them guess the meanings of unknown words using contextual, semantic, syntactic, phonological and morphological clues.

Students were also asked to make varied inferences based on evidence in the reading texts. They were asked to read and re-read certain sections of the reading passages to identify pronoun referents. This was done with the help of multiple choice questions, true or false exercises and completion questions.

Students were also involved in filling in semantic maps, story maps, Theme Comparison charts and KWL charts to help them activate their prior knowledge and connect their previous knowledge to the newly learnt information in the texts at hand. After completing these graphic organizers in the post- reading phase, they were able to analyze and evaluate the text to draw sound conclusions.

After highlighting the difference between facts and opinions, students were asked to fill in fact/ opinion charts where statements were extracted from the reading texts and students had to decide whether they were facts or represented the author's opinions.

Duration of the treatment

After designing the proposed unit and its teaching strategy, it was subjected to a panel of jury and modified according to their suggestions. Then, the researcher randomly selected 15 first year EFL Faculty of Pharmacy students and implemented two selected lessons with them. Based on this pilot study of the proposed unit, it was indicated that the lessons were suitable for the students' age, background knowledge and linguistic proficiency levels. The pilot study students maintained that the lessons were motivating and interesting and the reading comprehension activities they were involved in were quite useful and engaging. It was also evident that each lesson required 120 minutes (two hours) to be properly taught. The implementation of the proposed unit lasted for three months during the Fall Semester of the 2017- 2018 academic year. The experimentation started on September 20th. , 2017 and ended on December, 22nd, 2017.

The proposed teaching strategy followed throughout the reading comprehension lessons

The researcher followed a proposed teaching strategy throughout the unit implementation with the experimental group students.

Assumptions of this strategy were as follows:

(a) Prior to reading, building and activating students' prior knowledge is necessary for the active reconstruction of the original intentions of writers. This can be done using a combination of activities including prediction, brainstorming, watching and discussing relevant videos, advance organizers, graphic organizers (such as semantic/ story maps and KWL charts);

(b) The 'top- down' and the 'bottom- up' processing models are interactive and complementary for the successful comprehension of written discourses;

(c) Reading comprehension should be primarily taught as a process of making meaning that proceeds from whole to parts. In this sense, attention is focused on teaching reading comprehension skills in context when they become relevant or when they occur naturally in the written texts; and

(d) Training EFL university level students in the effective use of cognitive and metacognitive strategies can facilitate and foster their reading comprehension.

This teaching strategy aimed at developing the experimental group students' previously mentioned inferential and critical reading comprehension skills. It is important to highlight that the experimental group students attended an introductory session where the researcher explained to them the difference between cognitive & metacognitive

strategies as well as how and when to use them to enhance their reading comprehension skills. Also, throughout the proposed unit the teacher encouraged the students to use varied cognitive and metacognitive strategies to develop their inferential and critical reading comprehension skills. See the following table highlighting each sub-skill and the strategies the learners were trained in to develop the necessary reading comprehension sub-skills.

Table (4)
The reading Comprehension sub-skills and the strategies employed to foster these skills

The Reading Comprehension Sub- Skill	The Cognitive Strategy Employed	The Metacognitive Strategy Employed
1. Guessing the meaning of unknown words or phrases	- Using semantic, syntactic, morphological, contextual and phonological clues - Filling in definition maps	- Selective attention
2. Identifying pronoun referents	- Highlighting - Re-reading	- Selective attention - Monitoring comprehension
3. Making inferences	- Using prior knowledge - Inferring meaning - Locating evidence in the text for the inferences made - Asking clarifying questions	- Monitoring comprehension
4. Distinguishing between facts and opinions.	- Asking self- generated questions - Filling in fact/ opinion charts -Relating the new information to background knowledge	Monitoring comprehension

The Reading Comprehension Sub- Skill	The Cognitive Strategy Employed	The Metacognitive Strategy Employed
5. Drawing conclusions	- Asking self- generated questions -Summarizing - Filling in graphic organizers (such as semantic maps, story maps, Theme Comparison charts & KWL charts) in the post- reading phase	- Considering interpretations - Evaluating understanding

According to this teaching strategy, each reading comprehension lesson was divided into three phases. *These phases were as follows:*

I. Pre-reading phase

II. During- reading phase

III. Post- reading phase

These phases could be explained as follows:

I. Pre-reading phase:

a. The teacher prepared students for the reading task through activating their prior knowledge about the topic, context and cultural aspects of the written text. This was achieved through encouraging students' active participation in pre- reading activities beginning with predicting the content of the written text using the title and accompanying pictures. Thus, the teacher elicited students' predictions saying: ***“What do you think a text with a title / an illustration like this will be about?”*** Then, the teacher wrote down students' predictions on the board without commenting on them and told students that they would see later on whether their predictions were confirmed or refuted when time came for them to read the text.

b. When necessary, the teacher used an advance organizer (namely, vocabulary pre- teaching techniques) including contextualization, pictures, giving synonyms and/ or dictionary definitions for difficult words that occasionally occurred in the titles of given texts to make sure that students have fully understood these titles, to encourage them to predict the content of the texts at hand and to facilitate their reading comprehension later on.

c. Then, the teacher helped students further activate and build their background knowledge about the content of the written text, its context and culture through practising varied combinations of other background-

activation techniques whether in pairs, in small groups or individually including brainstorming, watching relevant videos before reading the text and completing a relevant graphic organizer (including a semantic/ a story map, a Theme Comparison chart or the first two columns of a KWL chart). The teacher drew students' attention to the fact that they were going to extend their graphic organizers or complete the third column of the KWL charts in the post-reading phase based on the information they would obtain during reading the text.

d. The teacher helped students set goals for their reading tasks and plan their reading process to successfully make meaning of the text at hand. She drew the students' attention to the fact that proficient readers usually plan their reading tasks, take notes, try to visualize elements of the written texts and pay selective attention to more relevant and important information in the text.

II. During-reading phase:

a. Students read the written text silently to see whether their predictions about the text were confirmed or not. They also read carefully to find more information about the content of the text to **(1)** develop their graphic organizers (including semantic/ story maps and a Theme Comparison Chart) or **(2)** to find answers to their own questions regarding what they wanted to know and to write these answers in the third column of KWL charts in the post-reading phase.

b. Students used active reading and monitoring strategies including their use of relevant prior knowledge of the content and cultural aspects of the text and the syntactic, semantic as well as phonological cues included in that text to guess the meaning of unknown words or expressions and to make meaning of the whole text.

c. The teacher encouraged students to make meaning of the written text at hand as a whole. In addition, she raised students' awareness of the necessary inferential and critical reading comprehension sub-skills and helped them practise these sub-skills in context using a combination of during-reading activities for each reading comprehension level and sub-skill as follows:

◆ **Inferential Comprehension:**

❖ **Guessing the meaning of unknown words or phrases**

Students **(a)** completed different definition maps, and/ or **(b)** answered multiple choice questions, then circled the word(s) from the sentences that helped them figure out the meaning of unknown words or phrases. They employed the cognitive strategies of using contextual, phonological, morphological, semantic and syntactic clues. In addition, they paid selective attention to the difficult words/ phrases and re-read the

sentences where these difficult words and phrases were located to guess their meanings.

❖ **Identifying pronoun referents**

Students worked in groups or in pairs to answer MCQs, completion questions, true/ false exercises and open- ended questions to identify pronoun referents in the reading passage at hand. To achieve this objective, they used the cognitive strategies of highlighting and re-reading the sentence immediately before the pronoun investigated. They also used the metacognitive strategies of selective attention and monitoring comprehension.

❖ **Making inferences**

Students worked in groups or in pairs to (a) answer open- ended and multiple- choice questions, and to (b) judge the correctness of given sets of inferences based on the written texts. To achieve this objective, they used the cognitive strategies of inferring meaning, using prior knowledge, asking clarifying questions and re-reading to locate evidence in the written text to support the inferences made. They also used the metacognitive strategy of monitoring comprehension.

III. Post- reading phase:

a. The teacher encouraged students' deeper comprehension and processing of the written texts, raised their awareness of the necessary inferential and critical listening comprehension sub-skills, and fostered their active practice of the specified critical comprehension sub-skills in context using some of the following post- reading activities.

◆ **Critical Comprehension:**

❖ **Drawing conclusions**

Initially, the teacher asked students to complete the graphic organizer they started in the pre- reading phase to incorporate the newly learned information they acquired from the reading text. She also asked them to employ the cognitive strategy of summarizing to focus on the most important information and details in the written text. This was done to prepare them for the skill of drawing conclusions. Then, the teacher discussed some conclusions with her students showing them how they needed to reflect on the information included in the written texts and on their background information to draw sound conclusions. Moreover, students discussed together each conclusion and provided evidence from the text supporting each conclusion.

Students, also, examined the validity of sets of given conclusions based on the written texts and provided evidence from these texts confirming sound conclusions. To foster this skill, students also

employed the cognitive strategy of asking self-generated questions like *'What lesson does this text teach us?'* or *'What can be concluded about this character based on the reading text?'* They also used the metacognitive strategies of considering interpretations and evaluating understanding.

❖ **Distinguishing between facts and opinions**

Students filled in fact/ opinion charts based on the written texts by relating their prior knowledge to the information included in the reading texts. They also employed the cognitive strategy of asking self-generated questions like *'Is this something no one can deny?'* or *'Does this represent a point of view that can easily change from one person to another?'* They also employed the strategy of monitoring comprehension to distinguish between facts and opinions in the reading texts.

At the end of each reading comprehension lesson, students filled in the following self-evaluation form to assess their strengths and weaknesses and evaluate the effectiveness of the strategies used in that lesson. After that, they discussed their self-evaluation with their peers and classroom teacher to foster their reading comprehension skills.

The Reading Skills & Strategies Self-Evaluation Form

<ol style="list-style-type: none">1. I can easily2. I still find it difficult to3. I find the strategy of most helpful to.....4. I am not sure how to use the strategy of to.....5. I still need more training and practice in the strategy/ skill of

According to the proposed teaching strategy, training students in cognitive and metacognitive strategies went through the steps highlighted in the model recommended by Duke and Pearson (2002) where the teacher's role varied according to the step of strategies training. She explained the strategies, modeled them with the students, allowed students to participate with her in strategy use, then guided them and finally helped them to become independent users of these strategies. She was a model, a guide, a scaffolder and a facilitator; students were active

participants in their own learning before, during and after reading. In addition, by the end of each reading comprehension lesson, formative evaluation of students' reading comprehension sub-skills allowed them to answer multiple choice questions as well as open-ended questions and to complete fact/ opinion charts.

Instructional aids and equipment

The following aids were used during the implementation of the current proposed unit:

1. The whiteboard
2. The photos and videos used in the pre-reading stage to activate students background knowledge and help them make predictions on the text at hand
3. The reading texts followed by the reading comprehension activities including MCQs, completion and true/ false questions as well as definition maps
4. The work sheets including relevant graphic organizers such as semantic maps, story maps, KWL charts , Theme Comparison charts and fact/ opinion charts
5. The self-evaluation form used to identify learners' reading comprehension strengths and weaknesses and to see how effective they used the varied cognitive & metacognitive strategies to comprehend the texts at hand at a deeper level

Procedure followed with the control group

Students in the control group received regular instruction by the regular classroom instructor. This instruction was based on previewing difficult new words and some new structures introduced in the reading text, reading the passage silently and answering the literal comprehension questions that followed each passage. The regular classroom teacher rarely encouraged the students to guess the meaning of unknown words, identify pronoun referents or to make inferences. Critical reading comprehension skills were not practised at all according to regular instruction.

Evaluation

Formative evaluation took place throughout the proposed unit implementation. At the end of each reading comprehension lesson, the experimental group students were given MCQs, open-ended questions, completion and true or false exercises to assess their progress and provide them with the necessary feedback on their performance. They were also asked to fill in fact/ opinion charts.

At the end of the treatment, summative evaluation took place where both the control and experimental group students took the reading comprehension post-test. The aim of this summative evaluation was to measure the effectiveness of the proposed unit in developing the experimental group students' inferential and critical reading comprehension skills as compared to the control group students.

Statistical Treatment

The researcher used Independent- Samples and Paired- Samples t-tests in order to examine the validity of the study four hypotheses. Moreover, in order to measure the effectiveness of the proposed unit in developing the experimental group students' reading comprehension skills, the effect size was calculated according to the following formula suggested by Dunlap (1994):

$$D = \frac{2T}{\sqrt{D.F}}$$

Where D = the calculated effect size, T= the estimated t value and $\sqrt{D.F.}$ = the square root of degrees of freedom.

The referential framework for identifying the effect size of t-values is as follows:

Effect size (d value)	Interpretation
From 0.2 till less than 0.5	Small
From 0.5 till less than 0.8	Medium
0.8 or more	Large

Results

Hypothesis One: There is a statistically significant difference between the mean scores of the experimental group exposed to the proposed unit based on cognitive and metacognitive strategies training and the control group receiving regular instruction on the post- test in overall reading comprehension in favour of the experimental group.

In order to verify the validity of this hypothesis, a t- test for independent samples was used to compare the mean scores of the two groups on the post- test. The results of the t- test proved to be statistically consistent with the hypothesis. See table 5.

Table (5)

T- Test results of the post- test comparing the control and the experimental groups in overall reading comprehension

Group	N	M	S.D.	D.F.	t value	Significance Level	Effect Size
Control	32	13.59	2.31	62	16.23	Significant at 0.01 Level	4.12
Experimental	32	23.06	2.36				Large

Table (5) showed that the estimated t value (16.23) was statistically significant at 0.01 level. Thus, it can be safely said that there was a statistically significant difference between the experimental and control groups on the post- test in overall reading comprehension in favour of the experimental group.

As shown in table (5), the calculated effect size value of the proposed unit on the experimental group students' overall reading comprehension was (4.12). Therefore, it can be said that the proposed unit had a large effect on experimental group students' overall reading comprehension on the post-test as compared to that of the control group students receiving regular instruction.

Hypothesis Two: There are statistically significant differences between the mean scores of the experimental group and the control group on the post- test in each reading comprehension sub- skill (inferential and critical) in favour of the experimental group.

T-tests for independent samples were conducted in order to compare the post-test mean scores of the experimental and control groups in overall inferential and critical reading comprehension and their sub-skills. The results of the t- tests proved to be statistically consistent with the above stated hypothesis. Therefore, the second hypothesis was accepted. The following tables show this statistical significance at 0.01 level in favour of the experimental group students. The statistical analysis of the results also demonstrated a large effect size on the experimental group students' overall inferential and critical comprehension levels as well as their sub-skills. See tables (6), (7), (8) and (9).

Table (6)

T- Tests results of the post- test comparing the control and the experimental groups in overall inferential reading comprehension

Group	N	M	S.D.	D.F.	t value	Significance Level	Effect Size
Control	2	.19	.35	2	5.09	Significant at 0.01 Level	.83
Experimental	2	3.75	.59				Large

Table (7)

T- Test results of the post- test comparing the experimental and the control groups in each inferential reading comprehension sub- skill

Inferential Reading Comprehension Sub-Skills	Experimental Group Post- test		Control Group Post- test		.F.	t value	Significance Level	Effect Size
		.D.		.D.				
Guessing the meaning of unknown words or phrases in the written text	.81	.69	.88	.42	2	3.52	Significant at 0.01 Level	.44 Large
Making inferences	.38	.61	.59	.50	2	2.80	Significant at 0.01 Level	.25 Large
Identifying pronoun referents	.50	.80	.72	.85	2	.61	Significant at 0.01 Level	.19 Large

Table (8)

T- test results of the post-test comparing the control and the experimental groups in overall critical reading comprehension

Group	N	M	S.D.	D.F.	T value	Significance Level	Effect Size
Control	32	5.41	1.24	62	13.39	Significant at 0.01 Level	3.40 Large
Experimental	32	9.25	1.05				

Table (9)

T- Test results of the post- test comparing the experimental and the control groups in each critical reading comprehension sub- skill

Critical Reading Comprehension Sub-Skills	Experimental Group Post- test		Control Group Post- test		D.F.	T value	Significance Level	Effect Size
	M	S.D.	M	S.D.				
1. Distinguishing between facts and opinions	4.75	0.67	2.69	0.69	62	12.09	Significant at 0.01 Level	3.07
								Large
2. Drawing conclusions	4.41	0.71	2.72	0.63	62	10.01	Significant at 0.01 Level	2.54
								Large

Hypothesis Three: There is a statistically significant difference between the mean scores of the experimental group on the pre-test and the post- test in overall reading comprehension in favour of the post- test.

To determine the relative extent of change fostered by the implementation of the proposed unit from the pre-test to the post-test for the experimental group, a paired samples t-test was used. See table (10).

Table (10)

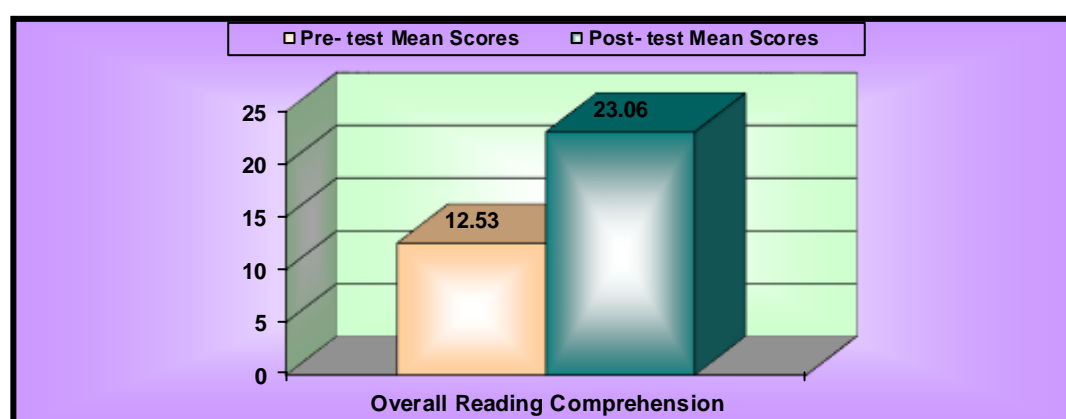
T- Test results comparing the pre- test vs. post- test means for the experimental group in overall reading comprehension

Test	N	M	S.D.	D.F.	T value	Significance Level	Effect Size
Pre-test	32	12.53	2.79	31	36.64	Significant at 0.01 Level	13.16
Post-test		23.06	2.36				Large

Table (10) indicates that there was a statistically significant difference at 0.01 level in overall reading comprehension between the mean scores of the experimental group on the pre-test and the post-test in favor of the post-test since the estimated t- value was (36.64). Thus, it can be safely said that the t-test results proved to be statistically consistent with the hypothesis. Therefore, the third hypothesis was confirmed. In addition, the estimated effect size value (13.16) indicated that the unit had

a large effect on the experimental group students' overall reading comprehension skills on the post- test as compared to their overall reading comprehension on the pre- test.

The following figure illustrates the experimental group students' significant growth in overall reading comprehension after the proposed unit application as compared to their overall reading comprehension performance on the pre- test:



Comparison of the pre- test vs. post- test means for the experimental group in overall reading comprehension

Hypothesis Four: There are statistically significant differences between the mean scores of the experimental group on the pre-test and the post- test in each reading comprehension sub-skill (inferential and critical) in favour of the post- test.

In order to verify the validity of this hypothesis, paired samples t- tests were used. The t- test results proved that there were statistically significant differences between the mean scores of the experimental group on the pre-test and the post-test in overall inferential and critical comprehension levels and their sub- skills. In other words, the results of the t- tests proved to be statistically consistent with the above stated hypothesis. Therefore, the fourth hypothesis was accepted.

The following tables (11), (12), (13) and (14) show this statistical significance at 0.01 level. in addition, the calculated effect size values proved that the proposed unit had a large effect on the experimental group students' performance in overall inferential and critical comprehension levels and their sub- skills. It should be also noted that the proposed unit had the largest calculated effect size (14.89) on the experimental group students' performance on the post –test with regard to overall critical comprehension. This, in turn, proves that training EFL university level learners in cognitive and metacognitive strategies can significantly foster their ability to

comprehend and reconstruct the original intentions of writers at a deeper and more advanced level.

Table (11)

T- Test results comparing the pre- test vs. post- test means for the experimental group in overall inferential reading comprehension

Test	N	M	S.D.	D.F.	T value	Significance Level	Effect Size
Pre- test	32	7.44	1.65	31	37	Significant at 0.01 Level	13.29
Post- test		13.75	1.59				Large

Table (12)

T- Test results comparing the pre- test vs. post- test means for the experimental group in each inferential reading comprehension sub-skill

Inferential Reading Comprehension Sub-Skills	Experimental Group Pre- test		Experimental Group Post- test		D. F.	T value	Significance Level	Effect Size
	M	S.D.	M	S.D.				
1. Guessing the meaning of unknown words or phrases in the written text	2.66	0.60	4.81	0.69	31	15.10	Significant at 0.01 Level	5.42 Large
2. Making inferences	2.31	0.64	4.38	0.61	31	23.15	Significant at 0.01 Level	8.31 Large
3. Identifying pronoun referents	2.47	0.92	4.50	0.80	31	13.35	Significant at 0.01 Level	4.97 Large

Table (13)

T- Test results comparing the pre- test vs. post- test means for the experimental group in overall critical reading comprehension

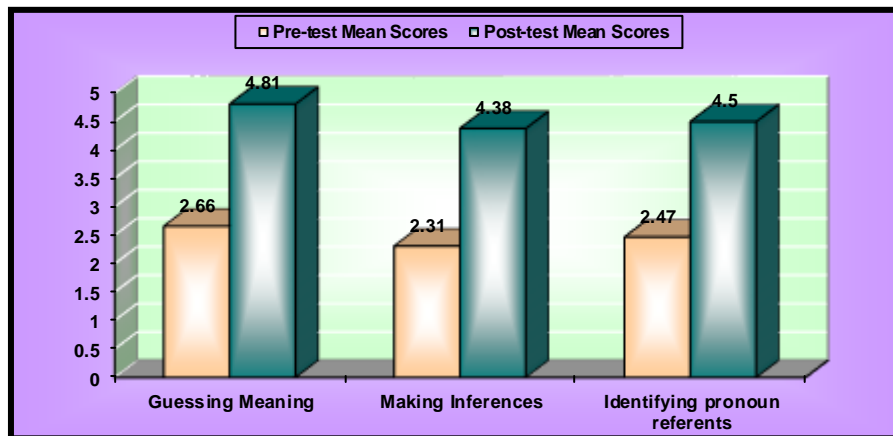
Test	N	M	S.D.	D.F.	T value	Significance Level	Effect Size
Pre- test	31	5.06	1.28	31	41.47	Significant at 0.01 Level	14.89
Post- test		13.75	1.59				Large

Table (14)

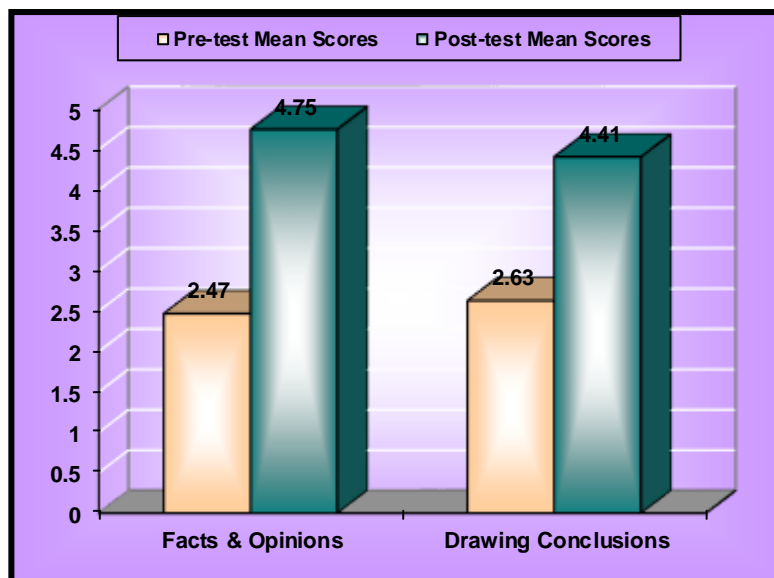
T- Test results comparing the pre- test vs. post- test means for the experimental group in each critical reading comprehension sub- skill

Critical Reading Comprehension Sub-Skills	Experimental Group Pre- test		Experimental Group Post- test		D F	T value	Significance Level	Effect Size
	M	S.D.	M	S.D.				
1. Distinguishing between facts and opinions	2.47	0.72	4.75	0.67	31	17.71	Significant at 0.01 Level	6.36 Large
2. Drawing conclusions	2.63	0.66	4.41	0.71	31	13.42	Significant at 0.01 Level	4.82 Large

The following two figures illustrate the experimental group students' significant growth in each inferential and critical reading comprehension sub-skill after the proposed unit application as compared to their performance on the pre- test:



Comparison of the pre- test vs. post- test means for the experimental group in each inferential reading comprehension sub-skill



Comparison of the pre- test vs. post- test means for the experimental group in each critical reading comprehension sub-skill

To sum up, support was gained for the four hypotheses of the study. The experimental group out-performed the control group on the post-test in overall reading comprehension performance as well as in each reading comprehension sub-skill separately. Furthermore, the experimental group students achieved tangible progress in their reading comprehension after the implementation of the proposed unit as compared to their reading comprehension before the unit application.

Discussion

The post- test results revealed that the proposed unit based on cognitive and metacognitive strategies training was effective in developing the experimental group students' inferential and critical reading comprehension skills. There was tangible evidence that training the students in these strategies helped them to plan for their reading tasks, pay selective attention to certain aspects of the reading texts, monitor their comprehension and self- evaluate their reading comprehension abilities. This is consistent with the results of other studies such as the studies of Dheib- Henia (2003), Dreyer and Nel (2003), Razi (2010) and Maasum & Maarof (2012).

As the experimental group students gradually learnt the cognitive and metacognitive strategies that are used by successful readers, they became more competent readers by the end of the proposed unit implementation. These strategies were more like a guiding road map that indeed paved the way for more conscious efforts to acquire and develop the necessary inferential and critical reading comprehension skills. With the passage of time as the students practised using varied cognitive & metacognitive strategies they became more independent and more confident in their abilities to make meaning of the texts at a deeper level. These strategies functioned as helpful tools that enabled them to divide the complex task of getting the implicit meaning of the text and evaluating it into manageable attainable objectives. This was highlighted by scholars such as Van Keer & Verhaeghe (2005), Takala (2006) and Brown (2007), and proven by the studies of Sariçoban (2002) and Semtin & Maniam (2015).

The fact that the strategies training started with the teacher modeling each strategy in addition to explaining how and when to use them enabled the experimental group students to gradually master the usage of these strategies until they were able to use them independently. This is pertinent to the model suggested by Duke and Pearson (2002) for adequate reading strategies training. Furthermore, ensuring that the texts were interesting to the students and practising varied activities to develop the intended reading comprehension sub-skills maintained the students' interest and involvement in the unit lessons. This is supported by the results of Serran (2002) and Ahmed (2007).

The intensive visual and audio-visual support offered before reading the texts through accompanying pictures and videos not only

helped the experimental group students to predict the content of the reading text but it also activated their background knowledge of the reading topics, thus facilitating their deeper processing and comprehension of the texts at hand. This is consistent with the results of Takala (2006) and Ahmed (2007). Also, it should be highlighted that confining the current study to five reading comprehension sub-skills only that were practised throughout the unit ten lessons helped the students to focus more on acquiring these skills and their facilitating strategies.

Filling in the self- evaluation form that was presented at the end of each reading comprehension lesson enabled the experimental group students to identify their weaknesses as well as strengths and to set goals for improving their overall reading comprehension as well as specific reading comprehension sub-skills. In addition, the friendly relaxed classroom atmosphere- where the teacher's support was offered only when needed- helped the students to become more involved in processing the unit texts deeply and more efficiently.

Formative evaluation exercises that were included at the end of each lesson enabled both the teacher and the students to assess students' progress and performance with regard to each of the intended reading comprehension sub-skills. These exercises also enabled the teacher as well as the students to identify the sub-skills that needed more attention and practice.

As far as inferential reading comprehension skills are concerned, the experimental group students achieved noticeable progress in all the identified skills. The use of varied contextual, phonological, morphological, syntactic and semantic clues enhanced the students' ability to **guess the meanings of unknown words**. Also paying selective attention to these unknown words, filling in definition maps and answering varied MCQs fostered this skill among the students.

The experimental group students' ability to **make inferences** substantially developed as they constantly used the effective cognitive strategies of using prior knowledge, inferring meaning, locating evidence in the text for the inferences made and asking clarifying questions. The metacognitive strategy of monitoring comprehension helped them to make sure that the inferences made are correct based on the available evidence in the texts. Besides, the varied during- reading activities helped them to get the non-literal implicit meanings of the texts more easily and efficiently. Such activities encouraged the students to work in groups or in pairs to answer open- ended as well as multiple- choice questions, and to judge the correctness of given sets of inferences based on the written texts.

The inferential reading comprehension skill of **identifying pronoun referents** was noticeably developed as the students confidently used the cognitive strategies of highlighting and re-reading the sentence that is located before the pronoun in the given text as well as the metacognitive strategies of selective attention and monitoring comprehension. Also, the during-reading activities of answering MCQs, completion questions, true/ false exercises and open-ended questions- that were practised throughout the unit implementation- effectively enhanced that skill among the experimental group students.

Results also revealed that the experimental group students outperformed the control group students in overall critical reading comprehension and its sub-skills. When it comes for the skill of **distinguishing between facts and opinions**, students of both groups were quite confused concerning the difference between a fact and an opinion before the proposed unit implementation. After the treatment, the experimental group students achieved remarkable progress in that skill. This can be attributed to the fact that they were intensively trained in such a skill throughout the unit implementation. Also, mastering the cognitive strategies of asking self-generated questions, and relating new information to background knowledge had its positive impact on developing that skill among the experimental group students. In addition, the metacognitive strategy of monitoring comprehension enabled them to distinguish between a fact- that no one can deny- and an opinion- that can differ from one person to another. Practising the post-reading activities of filling in fact/ opinion charts also enhanced that skill among those students.

With regard to the critical comprehension sub-skill of **drawing conclusions**, the proposed unit had a large effect size on developing that skill among the experimental group students. Prior to the unit implementation, students of both the control and experimental group were unable to identify the difference between a text main idea and the conclusion(s) that can be drawn based on making meaning of that text. Throughout the unit implementation, the experimental group students were able to realize that a conclusion is related more to the lesson that the readers learn based on the reading text. It is also the judgment that a reader makes after analyzing and evaluating the ideas presented in the text.

Mastering the cognitive strategies of asking self-generated questions, summarizing and filling in varied graphic organizers in the post-reading phase fostered the skill of drawing conclusions among the experimental group students. Also, utilizing the metacognitive strategies

of considering interpretation and evaluating understanding enhanced that skill among those students. Throughout the unit lessons, the teacher discussed some conclusions with her students showing them how they needed to reflect on the information included in the written texts and on their background information to draw sound conclusions. Moreover, students discussed together each conclusion and provided evidence from the text supporting each conclusion. They also practised examining the validity of sets of given conclusions based on the written texts and provided evidence from these texts confirming sound conclusions.

Conclusions

Based on the results of the current study, the following conclusions can be made:

1. The present study provided evidence for the effectiveness of the proposed unit based on cognitive and metacognitive strategies training in developing EFL first year Faculty of Pharmacy students' inferential and critical reading comprehension skills.
2. There is also evidence that training EFL university level students in these strategies according to the gradual steps (starting with the teacher's modeling followed by shared then guided practice until students reach the step of independent strategies use) had a positive impact on enhancing the experimental group students' reading comprehension skills.
3. Adding the enriching support of carefully selected pictures and videos prior to reading comprehension not only fostered EFL learners' ability to predict the content of the reading texts and activate their background knowledge but they also increased students' motivation and involvement. This multimodal aspect of the proposed reading comprehension lessons engaged the students more and enabled them to develop more interest in and enthusiasm for reconstructing the authors' intended meanings.
4. The current study results provided further support to the notion that successful EFL readers use a wide array of cognitive and metacognitive strategies to successfully make meaning of the reading texts at hand.
5. Using interesting reading materials that address students' interests increases their engagement in the reading lesson and enhances their comprehension skills.
6. Raising EFL university level learners' consciousness of the reading comprehension skills they needed to acquire as well as the facilitating cognitive and metacognitive strategies that enhance these skills helped them achieve tangible progress in these skills.

Recommendations

In the light of the present study significant results, the following recommendations are made:

1. Instruction of inferential and critical reading comprehension sub-skills should be given more attention in Egyptian EFL university level classes. More time and efforts should be exerted to develop these essential sub- skills.
2. Reading comprehension instruction should be integrated with other language skills throughout the learning process using varied pre-, during and post- reading activities that require students to listen, write and talk about the reading texts.
3. EFL learners should be trained in the use of cognitive and metacognitive strategies to facilitate their reading comprehension tasks.
4. Reading texts should be varied, motivating, interesting and suitable to students' linguistic proficiency levels. In addition, visual and audio-visual support should be incorporated into reading comprehension courses to facilitate learners' active reconstruction of the original intentions of writers.
5. Student- teachers and teachers should be aware of the reading comprehension sub-skills necessary for each stage so that they can develop and evaluate these skills properly among their students. In addition, students should be aware of these skills and the useful strategies that enable them to master these skills.
6. EFL Teachers' role as guides, facilitators and scaffolders should be further emphasized in reading comprehension instruction contexts.
7. Students should be given more opportunities to practise reading comprehension skills in a friendly, supportive, anxiety- free learning environment. This environment should stress the importance of helping EFL learners to gradually become more independent users of active reading strategies.
8. Supportive informative feedback should be offered throughout the learning process, not only to help students identify their weaknesses in reading and ways of overcoming them but also to encourage their strengths and consequently increase their motivation and involvement in reading.

Suggestions for further studies

1. Further research is needed to explore the effectiveness of other units and programs based on cognitive and metacognitive strategies training in developing EFL university level students' essay and research writing skills.
2. Further research is needed to investigate the effectiveness of similar units in developing students' reading comprehension skills in the preparatory stage.
3. More studies are needed with different student populations in other areas with the purpose of investigating the effectiveness of similar units based on cognitive and metacognitive strategies training in developing their listening comprehension and speaking skills.
4. Further research is needed to explore the effectiveness of other units or programs based on socio-affective and compensatory strategies in helping struggling readers overcome their difficulties and develop better reading comprehension skills in the preparatory, secondary and university stages.

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