



عنوان البحث:
Developing Secondary Stage Students' EFL
Critical Reading Using 4MAT



University of Sadat City
Faculty of Education
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Developing Secondary Stage Students' EFL Critical Reading Using 4MAT

**Research derived from a dissertation submitted as a complement to
obtaining a master's degree in education**

" Curriculum & Instruction Department"

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مستخلص البحث باللغة العربية:

عنوان البحث: تنمية مهارات القراءة النقدية لدى طلاب المرحلة الثانوية مستخدماً استراتيجيات التفضيلات الأربعة

هدفت الدراسة الحالية إلى التعرف على أثر استخدام استراتيجيات التفضيلات الأربعة 4MAT في تنمية مهارات القراءة النقدية في اللغة الإنجليزية كلغة أجنبية لدى طلاب المرحلة الثانوية بمدرسة الشهيد احمد السيرسي الثانوية بشيبن الكوم ، محافظة المنوفية. عدد الطلاب المشاركون في الدراسة 60 طالباً. تم تقسيمهم إلى مجموعتين: مجموعة تجريبية (عدد = 30) ومجموعة ضابطة (عدد = 30). درست طالبات المجموعة التجريبية مجموعة من النصوص القرائية في اللغة الإنجليزية باستخدام استراتيجيات التفضيلات الأربعة، بينما درست طالبات المجموعة الضابطة النصوص نفسها بالطريقة الاعتيادية، ولتحقيق أهداف الدراسة، أعدت الباحثة اختبار تحصيلي من نوع اختيار من متعدد لقياس مستوى القراءة النقدية لدى مجموعتي الدراسة، وبعد تطبيق الاختبار على مجموعتي الدراسة (قبلي – بعدي) على مجموعتي الدراسة، أظهرت النتائج وجود فروق ذات دلالة إحصائية عند مستوى الدلالة ($\alpha = 0.05$) بين درجات طالبات مجموعتي الدراسة على اختبار القراءة النقدية لصالح طالبات المجموعة التجريبية التي درست باستخدام التفضيلات الأربعة، كما بينت النتائج أن لاستراتيجية التفضيلات الأربعة أثر واضح في بقاء أثر التعلم السابق، وانتقاله إلى الصف، كون هذه الاستراتيجية تركز على التعلم الذاتي للطالبة، وتجعلها محور التعلم، مما ساهم في تنمية مهارات القراءة النقدية لدى طالبات المجموعة التجريبية في مادة اللغة الإنجليزية. وأوصت الدراسة باستخدام استراتيجيات التفضيلات الأربعة في تدريس اللغة الإنجليزية ومهاراته المختلفة، وفي مراحل التعليم الأخرى المختلفة. الكلمات المفتاحية: إستراتيجية التفضيلات الأربعة – مهارات القراءة النقدية- طلاب المرحلة الثانوية.



مستخلص البحث باللغة الانجليزية:

Title: "Developing Secondary Stage Students' EFL Critical Reading Using 4MAT"

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Abstract

The current study aimed at investigating the effect of using 4MAT strategy on developing EFL critical reading skills among secondary school students at Elshahid Ahmad Elsersy Secondary School in Shibin Elkom, Menofia Governorate. The participants of the study were 60 students. They were divided into two groups: an experimental group (N=30) and a control one (N=30). The instrument of the study consisted of a pre and post- test in critical reading. The participants of the experimental group were taught using the 4MAT strategy and those of the control group received regular instruction. The treatment took place during the second semester of the academic year 2021-2022. The data obtained were statistically analyzed, and the findings revealed that using 4MAT Strategy was effective in developing EFL critical reading among first-year secondary school students at Elshaid Ahmad Elsersy Secondary School in Shibin Elkom, Menofia Governorate.

Keywords: 4MAT Strategy, critical reading and EFL secondary stage students



• .1. Introduction

Learning language is vitally important and challenging to individuals, as it is a means of communication. Through language, they can communicate, share their meaning, opinions, and experiences. To communicate efficiently, learners need the four language skills including listening, speaking, reading, and writing. Of all these skills, reading has paramount importance in teaching English, as it is considered one of the receptive skills in addition to being a life skill. People who have no chance to read literature, journals, and books, they will not know about other cultures and ways of life. In this sense, reading is the window through which the other's culture can be seen and more general or specific knowledge can be gained.

Abu Shamla (2010, p22) pointed out that reading is the mental representation of meaning and the cognitive process of interpreting a written language message. Reading is generally seen as a creative and constructive process which has four distinctive and fundamental characteristics: It is purposeful, selective, anticipatory and based on comprehension (Chen, 2019). Comprehension is a highly complex cognitive process involving the interaction between the reader and the text to create meaning. National Reading Panel (2000) pointed out that reading comprehension has come to be viewed as the 'essence of reading' essentially not only to academic learning but to lifelong learning. It is the process of simultaneously extracting and constructing meaning through interaction and involvement with written language". Reading comprehension depends on the reader's experience and knowledge about the language, sentence structure and repetition of the reading text and its difficulty and length. Reading comprehension skills are important for students to become effective readers. These skills allow reading proficiently and learning effectively (Grabe & Stoller, 2002). Most EFL learners may face comprehension problems while reading a text but proficient readers would face the problems by applying effective reading strategies to solve the comprehension challenges (Tobing, 2013).

Critical reading is a key skill that EFL students need the most to expedite and promote the learning process. This is primarily because reading plays a pivotal role in developing English in general and is the principal activity through which students learn in English in their academic education. The strong relationship between the



ability to read critically, academic success, and the need for critical thinking in the workplace or daily lives have been observed by researchers (Ennis, 2018).

Hence, teachers need to cede some of their control to students to enable them to hone critical reading skills in a systematic framework (Paul & Elder, 2005). Critical reading requires students to think more actively and deeply to understand a text and analyze it, i.e., to read between the lines and beyond the lines rather than focusing on just reading the lines. Group work is an effective strategy that gives students active roles to play when they read and, therefore, cultivates their critical reading skills. Beside improving reading comprehension, students who work in groups develop certain collaborative skills such as being more sensitive and able to make more effective decisions due to high-level participation and interaction (Gonzales & Torres, 2016).

The current study aim is to use 4MAT to develop secondary stage students' critical reading skills. The rationale for using 4MAT strategy is that it is one of the various strategies that relate to learners' learning style, It also addresses students' interests and satisfies their needs.

4MAT the concept of learning styles into educational strategies and is based on the constructivist approach. The strategy makes use of the four learning styles examined by Kolb (1984) of the brain hemispheres (Uyangor, 2012). It applies what is known about learning styles and brain functioning. It constitutes a combination of various previous strategies of learning styles, which is further expanded (Nikolaou, 2010) .

4MAT strategy provides the learners with four major learning styles. (e.g. Imaginative Learners, Analytic Learners, Common Sense Learners, and Dynamic Learners). 4MAT strategy consists of eight steps /cycles of instruction. These steps are 1) Create and experience, 2) Examine 3) Imagine 4.)Define, 5) Try, 6) Extend 7) Refine, and 8) Integration (Şeker & Övez, 2018). Moreover, 4MAT strategy gives places to both the right and the left brain activities for each of the four learning styles (Tezcan & Guvenc, 2017).

- **1.2. Context of the Problem**

Out of the researcher's experience as a teacher of English, it has been noticed that first year secondary students cannot understand the text they read and they encounter problems in critical reading comprehension skill as they lack the ability to think



critically. This is supported by several studies some of which are Sari (2017) and Madani (2016). The former observed that EFL learners face several problems in the reading process due to the lack of using appropriate learning strategies and training in reading skills. The latter noticed that EFL learners have problems in reading because they do not have the ability to read inferentially or critically.

In addition, the researcher conducted a pilot study on 20 first-year secondary students to test their critical reading skills. The students were asked to read two passages and answer multiple choice and some open ended questions based on the passages. The results indicated that students find difficulties in critical reading skills, where 70% of the students were less than the average level, so that the research seeks to improve the critical reading skills by using 4MAT strategy.

1.2.1. The result of the pilot study

The findings of the pilot study (see Table 1) were consistent with the aforementioned previous literature. The results of the pilot study provided additional evidence that the students have a problem with their writing skills. This could be due to a lack of opportunities to learn those skills in the classroom.

Table: (1) Results of the Critical Reading Test

Critical Reading	Maximum score	Mean	Percentage
Drawing conclusions from the author's words.	5	2.3	46%
Judging the accuracy of the given information	5	2	40%
Expressing a personal opinion	5	2.1	42%
Identifying characters or incidents	5	2.3	42%
Agreeing/disagreeing with the given information	5	2	40%
Differentiating between facts and opinions	20	8.4	46%
Reacting to author's use of language.	20	8.4	46%

- **1.3. Statement of the Problem**



The study problem was represented in the weakness of secondary school students in EFL critical reading. The researcher found that students lack the requisite EFL reading skills.

• 1.4. Questions

The present study tried to find answers to the following main question:

What is the effect of 4MAT on developing some reading comprehension skills of first year secondary students?

Out of the main question, the following sub questions are derived;

1. What are the essential reading comprehension skills which EFL 1st secondary students should possess?
2. What is the effect of 4MAT strategy on developing critical comprehension skills of 1st year secondary student?

• 1.5. Significance of the Study

The current study is useful for the students, teachers, and researchers as follows:

1.5.1 Students:

- By giving them the opportunity to work together to complete the given task and develop their critical reading comprehension skills through 4MAT strategy.

1.5.2 EFL teachers:

- By drawing their attention to the effect of using 4MAT on enhancing critical reading comprehension skills.

1.5.3 Curriculum designers:

- By drawing their attention to the effect of 4MAT on critical reading comprehension and incorporating it in the EFL Curriculum.

• 1.6. Delimitation of the Study

• The research is delimited to:

1. Sixty first year secondary students from ElShahid Ahmad Elsersy Secondary School for female, Shibin Elkom, Menoufia Governorate.



2. Some reading comprehension skills that are contained in the Critical levels, namely, expressing a personal opinion, drawing conclusion from the author interpretation of controversial issues and reacting to the author's use of language.

3. The second semester of the academic year 2021/2022.

- **1.7. Study Variables**

1. The independent variable: the 4MAT Strategy.
2. The dependent variable: the EFL Critical reading Comprehension Skills.

- **1.8. Instrument and Materials of the Study**

In the current study, the following instruments were designed and used:

1. A checklist of reading comprehension skills.
2. A reading comprehension pre-post test.
3. A teacher's guide.
4. Students' working sheets

- **1.9. Terminology**

The present study handled the following definitions:

4MAT was developed on the basis of constructivism, and it presents opportunities for students to understand the particulate nature of matter, such as modeling, visualization, theoretical knowledge, application, exhibiting individual creativity, the integration of these opportunities and knowledge transfer by interaction with activities (Aktas& Bilgin, 2015; Benchachinda, 2012).

According to Nicoll- Senft and Seedier (2010) stated that 4MAT identifies four interrelated learning styles based on a continuum of how learners perceive and process new information. A learner's individual learning style results from where he/she naturally falls on such a continuum. McCarthy has identified these learning styles as imaginative learners, analytic learners, common sense learners and dynamic learners.

Furthermore, it is a form of active models in teaching and learning processes. It is dependent on addressing patterns of learners where they are exposed to a variety of



experiences with increased opportunities for self- discovery, thinking and learning. (Ergin&Atasoy, 2013)

Operational definition: In the present study, 4MAT was operationally defined: as a strategy that consisted of eight steps that combines four learning styles and students' preferences for right-brain or left-brain modes of learning. It is frameworks for learning that helps educators deliver information in more dynamic and engaging ways that help 1st secondary students develop their critical reading comprehension skills.

Critical Reading comprehension

The term is operationally defined as the ability of 1st secondary students to read critically that helps them read with various levels of critical comprehension skills.

Review of Literature

This research as divided into two main sections; the first section tackles the theoretical background of the 4MAT strategy while the second section deals with the theoretical background of EFL Critical Reading Comprehension Skills.

1. 4 Modes Application Techniques Strategy (4MAT)

4MAT strategy is derived from the fundamental principles of several long-standing theories of personal development such as those of Kolb, Lotas, Jung, Piaget, Greorc etc. It supposes that the human brain functions roughly the same way from one person to another, but that each person learns differently. Each individual is unique in his genetic makeup and past experience. Such differences among individuals cause differences in cognitive, emotional and kinesthetic responses to the same teaching method . Thus , a teaching method can help some pupils learn, while being ineffective for some others (Tezcan & Guvenc, 2017). This strategy therefore suggests varying and differing pedagogical strategies in order to reach all types of learners.

One of the individual differences that affect learning is learning styles which can be defined as the best method of learning for each learner. In order to ensure equity in learning for all students, much attention has focused on learning styles and their impact on the teaching and learning process. When students were taught through their preferred learning style, they show improvement in their attitudes towards subject, better recognition for diversity, significant enhancement of academic achievement, and more self – commitment for homework (Irfan ;Alnaufadi & Brisha, 2016).



The 4MAT strategy was originated by Bernice McCarthy in the 1970s. It transforms the concept of learning styles into educational strategies and is based on the constructivist approach. It makes use of the four learning styles examined by Kolb (1984). According to experimental learning theory, learning is a four-step process. This process proceeds in circles and makes the learner gain new experiences, and the gained experiences lead the learner to the next learning process. Building upon Kolb's original conceptualization of learning styles, 4MAT strategy also integrates learning styles with brain-based processing strategies.

The Importance of 4MAT Strategy

Uyangor (2012) pointed out that 4MAT provides a structure for planning which helps the teacher focus on the critical content. Teachers need to decide what is critical for every student to know and to be able to do. The brainstorming component of 4MAT also encourages teachers to decide what content can be eliminated for some or added for others. It encourages them to think about how the delivery of the content can be adapted to students building n right- and left-mode activities, using multiple intelligences and modalities. It also encourages them to look at overlying themes or concepts.

2.1.2 Types of Learning Styles According to 4MAT

According to Ruangtrakun and Chaiyasan, (2019), 4MAT revealed the four different learning styles of the learners, but they do not exclude that all learners are able to function in all four learning style areas, having the tendency of preference in one learning style. Thus, if teachers provide experiences in all four learning style areas during the teaching process, they help all learners learn easier and effectively and, at the same time, they increase learners learning style range. These types are classified as follows:

1. **Imaginative Learners:** learn best through personal experience. They benefit from opportunities to find meaning in what they are learning and enjoy discussion of their beliefs, feelings, and opinions with others. They are reflective in nature and learn primarily through needs of others. The roles that teachers play with those learners are represented in that they are facilitators, emphasizing personal connections to the content via whole class discussions, group sharing, and listening .Their priority in the classroom is individual student development.



2. **Analytic Learners:** learn in a logical and organized manner by examining details and specifics. As students, they often excel in a traditional classroom setting. They like reflecting on new ideas and connecting new learning to other information they know to be true. They like formulating theories and models and strive for precision and prefer teachers that do so as well. As teachers, they are scholars, emphasizing the content through well-organized and logical lectures, note taking, and outside readings.
3. **Common Sense Learners:** learn by doing. When presented with new information, learners immediately focus on practical applications. They are active learners, preferring to get right to work in the classroom. They dislike assignments that do not have an obvious purpose or application. They learn best when provided with hands-on, experiential learning opportunities. As teachers, they are coaches focusing on providing students with opportunities to practice new skills.
4. **Dynamic Learners** are active learners. They enjoy taking risks and learning primarily through self discovery. They like to connect their learning to things that matter in their lives. They enjoy synthesizing information and applying their learning in new ways. As teachers, they challenge their students by creating real life learning experiences in their classrooms and believe that content of the syllabus should be flexible and geared to individual students' interests. This is shown graphically in this figure.

2.1.6 Using 4MAT Strategy in EFL Classrooms

According to Uyangor (2012), before starting to design the instructional material, the designer will need to do the following.

1. Defining the learners' outcomes in terms of both content and skills.
2. Making sure about what the learners will learn and what they will be able to do after the training.
3. Creating a mind map to the content and looking for how the content is connected:
The designer must begin by mind mapping the essence of the content, the details that support the main ideas and the relationships among them. This part of the designing procedure describes step 4 (inform) of the 4MAT learning cycle. Important questions for the designer are the following:
 - I. How can designer deliver the information to the learners?
 - II. Will there be interaction? Will the distance instructional material interact with the learners and ask them to react to what they are learning?



4. Defining the concept:

The designer is searching for a common ground that connects all the learners to the instructional material. The concept holds together the content of the training design. The decision regarding which concept to use depends on the context, which is defined by the learners, their backgrounds and the present situation. The designer begins by reviewing the content and looking for an idea that encompasses all the content. Effective concepts: are cores, essence ideas from bridges that link learners establish relationships between topics.

Related Studies to the 4MAT Approach

To the researcher's knowledge, three studies were reviewed. They were Tipayasuparat (2010), Silironga (2015) and Saleh (2019). Tipayasuparat (2010) developed a reading instructional strategy using the 4MAT System to enhance reading comprehension, vocabulary acquisition and attitude towards learning .Participants of the study were 60 second-year English majors of Faculty of Liberal Arts, Rangsit University, who were enrolled in the course: "Reading I" during the second semester of the academic year 2010. The data collecting instruments were a reading comprehension test, a vocabulary ability test and a reading attitude questionnaire. Results showed that the proposed instructional strategy enhanced students reading comprehension, vocabulary ability and promoted positive attitudes towards reading.

Şeker and Övez (2018) examined the effectiveness of the 4MAT teaching model and the interdisciplinary concept model in developing the students' level of attainment of achievement. Participants of the study were 65 primary school students .A learning style inventory and an achievement test were used to collect data. Results showed that the attainment level of students and their mean scores significantly favored the experimental group. Also, the proposed strategy helped the experimental group students develop their critical thinking skills in comparison to the control group students.

Reading

Reading is a daily life skill needed to develop our thoughts and abilities to understand nearly every aspect of human life. It is a dynamic global skill that requires competency development among non-English-speaking countries to be able to communicate, transform human activities,



values, meaningful ideas and knowledge in support of global education. For many decades, reading strategies aroused the curiosity of many researches due to its supreme importance. Research focused on areas that relate to exploring reading strategies, and its implementation in the reading classroom.

2.2 Nature of Reading comprehension

The skill of reading continues to be granted a unique stand as a universal skill. The importance of reading stems from its benefits for learners who can deepen their knowledge of language use in real-life situations. First, reading as a receptive skill lays the foundation for the development of other skills, including speaking and writing which are considered productive skills. It has a positive effect on students' vocabulary knowledge, spelling and writing (Naderi, & Akrami, (2018). Second, reading is the target skill that helps to consolidate the learning process that has taken place. It may help to increase the knowledge of the target language through exposure to new active vocabulary, grammatical and structures, and social contexts. Comprehension skills are necessary to understand both written and spoken language. If a reader is unable to comprehend the text read, he or she will miss the information. Habibian and Roslan (2014) argued that lack of reading comprehension skill leads to the failure in understanding information and ultimately results in poor academic performance.

In the development of second-language reading research, educators advocate that the crucial significance of reading skills in academic contexts has resulted in considerable research on reading in second language. For second language learners, reading is the main path to internalize information, to understand other cultures, and to explore the world of English-speaking countries (Marzuki, 2020).

2.2.1 Importance of reading comprehension

Reading comprehension is one of one the basic skills in EFL classrooms. It is the core of the curriculum in the foreign language learning for several reasons (Medina, 2012; Behjat, 2011; Afida, 2008). These are as follows.

- 1) It is functions as a means of increasing pupil's knowledge of the language being learnt.
- 2) It is one of the most commonly used language skills in everyday life as a witness by use of the internet.
- 3) It gives a big contribution to learners to perform their communication skill better.



- 4) It helps the pupil to find meaning in what is read.
- 5) It helps pupils construct meaning by focusing on the relevant features of a text and to relate those features to their prior experiences.
- 6) It gives a big contribution to learners to perform their communication skill better.

2.2.2 Factors influencing reading comprehension

Chamot (2009) identified four factors that influence reading comprehension. They are follows:

1. The reader's prior knowledge is organized into schemata or frameworks of ideas and events. The type of prior knowledge that readers bring to a text can be linguistic or subject matter knowledge. Readers who have a greater degree of prior knowledge on a topic are able to comprehend a more difficult passage. Linguistic knowledge includes not only vocabulary, grammar, and decoding skills but also an understanding of the discourse features of different genres (Chew & Cerbin, 2021).
2. *Text Structure*: A Second factor that influences the level to which a reader can comprehend a text is the way in which the text is structured. Texts, whether literary or expository, have an organizational structure as well as a surface structure of words in sentences (Chamot, 2009).
3. *Strategic processing*: The third factor contributing to skilled reading comprehension is the variety of ways as readers are able to process different types of texts. Readers who understand their own process of learning and who can exercise control over their own actions while reading comprehend texts better. For example, good readers monitor their level of comprehension as they are reading (a metacognitive strategy), and when they realize that they do not understand something in the text, they may select task-based strategies such as use of background knowledge and making inference to resolve their comprehension difficulties.
4. *Reader's response*: The fourth factor involved in reading comprehension is the response of the reader to the text. This response is seen as essential due to the interaction between the reader and the text that makes meaning.

These four comprehension factors can apply to all types of reading texts, including authentic text found in literary works and informal text. Teaching English reading using



4MAT takes into consideration these four factors as the development of each component contributes to the development of reading strategies.

2.2.3 Models of Reading

Bottom-up Model

Early approach in English reading viewed reading as a receptive process and beginner readers as passive recipients of information due to their isolation from other factors that can help in learning. According to Dole et al. (1991) beginner readers obtain a set of hierarchically controlled sub-skills that successively shape comprehension ability. By then, readers are considered as experts when they master these skills. (www.teachingenglish.org.uk, 2017). One of the first models was the simple view model reading. In this model, reading comprehension (R) was viewed as the product of decoding (D) and linguistic comprehension (L) such as $R = D \times L$. The reader "plods through the sentence, letter by letter, word by word".

For Nunan (1991), reading, in this view, is essentially "a matter of decoding a series of written symbols into their aural equivalents in the quest for making sense of the text. He referred to this process as the 'bottom-up' view of reading" (www.teachingenglish.org.uk, 2017, p.2). While McCarthy (1999) named this process as the "outside-in" processing, denoting in that sense that meaning exists in the printed page and is then interpreted by the reader. This model of reading was considered inadequate for the primary reason that relies only on the basic surface features of the language while neglecting other important factors during this process. Despite the denunciation of this view, it is necessary to note that knowledge of linguistic features is also necessary for comprehension to take place. To counteract this school, the cognitive view was created (www.teachingenglish.org.uk, 2017).

Top-down Model

The second approach is the cognitive view which is based on the "top-down" model and was in direct disagreement with the "bottom-up" model presented in the previous section. According to Nunan (1991) and Dubin and Bycina (1991), the psycholinguistic model of reading and the top-down model are the through agreement and harmony (www.teachingenglish.org.uk, 2017). To illustrate, Kostons and Van der Werf (2015) introduced reading as a psycholinguistic guessing game; a process in which readers view the text, construct and test hypotheses, and create new ones continually. Here, the reader is the



manipulator of the text. Adding to this is the schema theory of reading which also mounts within the cognitive- based view of reading. In the 1970s, the top- down process of reading was championed by Goodman (1970) who changed the thinking about reading by adding a “cyclical process”, making inferences about the message of the text and checking the text for confirming or rejecting cues, based on individual prior knowledge and contextual clues (Wang and Zhao, 2021)

The Metacognitive/Interactive model

The third approach is the metacognitive view that grants ownership to the readers who are the mediators of change while learning. According to Block there is now no more controversy on “whether reading is a bottom-up, language- based process or a top-down, knowledge-based process “www.teachingenglish.org.uk,2017). On the contrary, research has gone beyond to investigate the process of self-regulation while reading. This type of regulation, has been referred to as metacognitive which involves thinking about what one is doing while reading to become strategic readers.

(www.teachingenglish.org.uk,2017, p.3) pointed out that readers should attempt the following while reading:

1. Identifying the purpose of the reading prior to reading;
2. Identifying the form or type/ genre of the text before reading;
3. Thinking about the structure/ features of the form or type of the text. For instance, they try to locate a topic sentence and supporting details toward a conclusion;
4. Predicting the author’s purpose for writing the text (while reading it);
5. Scanning or reading in detail;
6. Making continuous predictions about what will occur next, based on information obtained earlier, prior knowledge, and conclusions obtained within the preceding stages; and
7. Forming a summary of what was read. That is, the process of summarization requires the reader to be able to predict, classify, make connections, establish whole-part relationships, infer, and conclude.

2.2.4 Levels and skills or reading comprehension

Westwood (2003) discussed four levels of reading comprehension; each level contains a cluster of component skills:



- **Literal Comprehension.** This is the most basic level of understanding involving the grasp of the factual information presented in the text. It is dependent upon sub- skills such as understanding word meanings, recognition of main idea and grasp of sequence and order of details or events. This is level depends greatly upon the learner's own previous knowledge and experience.
- **Inferential comprehension.** This level involves the reader in going beyond what is actually presented in the text and "reading between the lines" to predict and draw tentative conclusion. Sub-skills include anticipating outcomes, making generalization, reading cause-and-effect relationships when these are not stated.
- **Critical comprehension.** This level involves judgments of quality, value and truthfulness of information given in the text.
- **Creative Comprehension.** At this level, the reader goes beyond the message of the text to generate new ideas develop new insights related to the topic but not explicit in the text.

2.2.5 Reading Comprehension and Schema Theory

According to Gilakjani and Ahmadi, (2011) schema theory is based on the notion that as readers construct meaning from clues found in a text which is related to the use of background knowledge in understanding the content of the passage. Reading is an interactive process in which readers construct a meaningful representation of text using their schemata. Schema theory describes the process by which readers combine their own background knowledge with the information in a text to comprehend that text. All readers carry different schemata (background information). This is an important concept in EFL teaching and reading.

2.2.6 Assessment Reading Comprehension

Reading comprehension assessment can be done by asking students to read and answer questions about what they have read. Formats include multiple choice, short answers, cloze or fill-in-blank questions. Teachers also can assess learners' knowledge of comprehension strategies such as asking questions while reading, writing summaries or creating outlines, observing students while they read or asking them about the strategies they use. Because results from comprehension assessment may vary widely depending on the test used and when it is administered, teachers should design comprehension tests carefully. They should



also decide whether any secondary issues related to reading comprehension difficulties need to be addressed.

In addition, several authors identified some various types of reading assessment. These are as follows:

(1) Placement tests: An internal placement examination for reading may be set up to account for perceptual identification skills, reading rate skills, general comprehension skills and lexical, syntactic knowledge. This reading test can easily be combined with any essay, dictation, grammar and oral interview to form a rather thorough placement procedure.

(2) Standardized tests: Standardized tests are those that are commercially available, ranging from the reading sub-section of TOEFL examination to recent, less well-established commercially available tests such as ELSA test. Standardized silent reading test include three types; survey tests, analytic tests and vocabulary tests.

(3) Cloze tests: Cloze tests have been considered a good assessment technique for reading ability and language proficiency through which students fill in the blank with a word that makes sense with the remainder of the sentence paragraph.

(4) Diagnostic tests: Diagnostic tests provide data about students' reading abilities in relation to their course goal. Thus, the teacher should be clear about the goals of the course. There are five types of diagnostic tests including diagnostic reading scales, Durel analysis of reading difficulty, Gates- McKillop reading diagnostic test, Stanford diagnostic reading test and Woodcock reading mastery test- revised.

(5) In-class tests: They are reading quizzes which can take a variety of shapes and sizes. The expectation of the assessment using in-class tests indicate to students that the reading program is well thought-out and that the teacher is serious about the work demands placed on students. Quizzes should not be taken casually, and the grade should always be entered in record books.

(6) Interviews and oral questioning: Interviewing and oral questioning students enable teachers to gather information regarding reading interests and attitudes, word analysis skills, word recognition skills and reading comprehension skills.

(7) Observations: Observations provide an excellent source of assessment information concerning students' reading skills. They can be systematic or nonsystematic. Systematic



observation is when the assessor sets out to observe specific behaviors. Nonsystematic observation is when the assessor observes a general classroom situation.

(8) Informal reading inventory: It consists of a series of graded reading passages and questions used to determine reading levels and comprehension skills.

(9) Informal teacher- made tests: These tests are developed by teachers for assessing students' reading skills and they are closely related to the reading curriculum used in the classroom.

2.2.7 Critical Reading in English Language

In English as a Foreign Language Setting (EFL), there is little interest in critical discourse analysis and critical reading in specific. Three issues might be the reasons for not having much research: feasibility, ethicality, and necessity. How can learners analyze and critique a foreign language without having the core features of that target language? How can teachers and students balance their discussion of different topics raised by authors? And what is the actual need for critical language and critical reading for learners? For beginners, reading is viewed as a bottom-up process which conceptualizes reading as a decoding process of the text with a focus on letters and words recognitions. For advanced learners, reading is viewed as a top-down process that conceptualizes how a whole text is accessed and understood (Wallace, 2003). However, many definitions have been given for critical reading by researchers. According to Huijie (2010), in the past, the definition of critical reading had to do with the readers' ability to discuss and question the written materials for analysis and evaluation. Later, the definition of critical reading turned to focus on viewing reading as an active and interactive process that requires a dialogue between the reader, text, and author at different levels using different higher order thinking skills. Considering reading as an active process requires readers to take active positions by being involved in the reading process. Readers should develop a distance between the writer's arguments and the written materials after making a rigorous analysis to reach sound conclusions (Pennycook, 2000; Priozzi, 2003). One thorough and clear definition is given by Priozzi (2003) Critical reading can be defined as a very high-level comprehension of written materials requiring interpretation and evaluation skills that enable readers to separate important from unimportant information, distinguishing between fact and opinions, and determine the writer's purpose and tone.

Related studies to critical reading comprehension:



Olifant; Cekiso and Rautenbach (2020) did a study to understand the critical reading perceptions and actual practices of English learners. The results revealed that learners had high self-perceptions when they reported their reading ability, i.e., implementing a rich repertoire of reading strategies when answering reading comprehension questions. However, their claims to have different strategies did not reflect their actual practice inside the classroom when working on reading passages. Their reading ability could deal with only what was clearly stated in the lines but failed to capture what was stated between lines and beyond lines.

Ozensoy (2021), investigated the impact of introducing critical reading skills on students' academic success in social studies courses. He found that there was a significant difference in students' academic progress who practiced critical reading skills compared with another group who did not. Another finding was that in teaching critical skills, there were other factors to be considered such as the school, the classroom environment, and how activities were integrated within the curriculum.

.3. Method

3.1 The Experimental Procedures:

3.1.1 Pre- testing

Students were pre- tested before treatment. This revealed that both groups were, to a great extent, homogenous.

3.1.2 Implementation of 4MAT

The experimental group (N=30) taught by the researcher herself through 4MAT whereas the control group (N=30) received regular instruction.

Teaching through 4MAT included 12 sessions. It lasted for four weeks, three sessions a week, and every session lasted for 50 minutes. The first session included an introduction in which students were acquainted with 4MAT and its main steps. In each session, students were required to read a text cooperatively in groups.

The 4MAT session went through the following steps: before reading, during reading, after reading. In every step there were reading comprehension activities and tasks based on 4MAT. During the experiment, the researcher observed that the students were interested in reading texts using 4MAT strategy, they also responded well to the instructions.



During the implementation the researcher used:

- 1) Student's book.
- 2) Papers and worksheets.
- 3) Marker pens.
- 4) Longman dictionary.

3.1.3 Post-testing

At the end of treatment, the EFL reading comprehension test was administered both groups on April 2nd, 2022. The post-testing aimed at determining the effect of 4MAT strategy on developing secondary school students' reading comprehension skills.

Data of pre post testing were treated statistically and results and discussion are dealt with in the following chapter

3.1.4 Results

In order to answer the previous research questions and in light of the quantitative results of the post administration of the EFL critical reading comprehension skills test on the participants of the experimental and control research groups.

- **Hypothesis one:**

There is a statistically significant difference between the experimental and the control groups' mean scores of reading comprehension skills posttest (critical level) in favor of the experimental group.

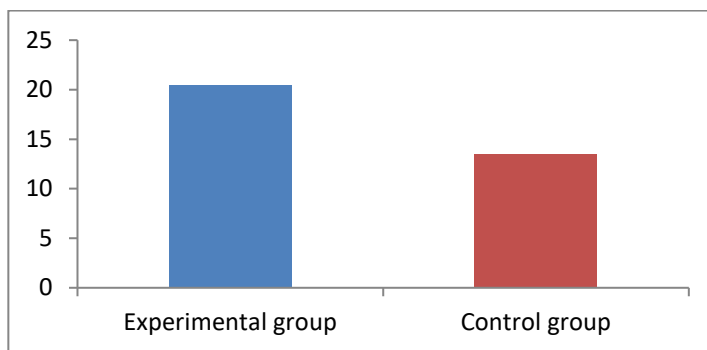
To verify this hypothesis, data were treated statistically. Means, standard deviation, minimum and maximum scores were computed and table (10) reveals this.

Table (2) Descriptive Statistics of the Control and the Experimental Groups in critical reading.

Test	Group	N	Mean	Std. Deviation	Minimum	Maximum	Mean difference	total score
Critical	Experimental	30	20.47	1.83	17	25	6.97	25
	Control	30	13.50	2.27	10	18		

Table (2) shows that the value of critical mean score of the experimental group's critical level was (20.47) which is higher than that of the control group which was (13.5). As table (8) shows, the experimental group's scores were higher than those of the control group in the post-administration of critical reading test It also indicated a higher homogeneity (=Std. Deviation /Mean) of the experimental group's scores than those of the control group due to the use of the 4MAT . This is represented graphically in figure (1)

Figure (1) Mean Scores of the Control and the Experimental Groups in the Post critical reading posttest Administration.



To show the significance of the difference, t-value was calculated for the difference between the mean scores of the two groups. This is illustrated in table (3):

Table (3): t-Value and effect size of both groups

Test	Group	Mean	Std. Deviation	t-value	d.f	Sig	η^2	d	Effect size
critical	Experiment al	20.47	1.83	13.076	58	Significant at (0.01)	0.31	1.34	Large
	Control	13.50	2.27						

It is clear from table (3) that the calculated value of "t" (=13.076) which is higher than the tabulated value of "t" with 58 degrees of freedom and significant level "0.01". This reflects that the difference between the mean scores of the two groups reached the level of statistical significance.

To investigate the effect and educational importance of the results, the value of ETA squared (η^2) and the effect size (d) were calculated. ETA squared was 0.31 reflecting its practical significance. Accordingly, It can be said that 31% of the variations between the scores of students in the critical reading could be due to differences of teaching treatment

which the two groups were exposed to. The effect size (d) was **1.34** and that there was a large effect on developing critical reading.

• **Hypothesis two:**

There is a statistically significant difference between the experimental and the control groups' mean scores of overall reading comprehension skills posttest in favor of the experimental group

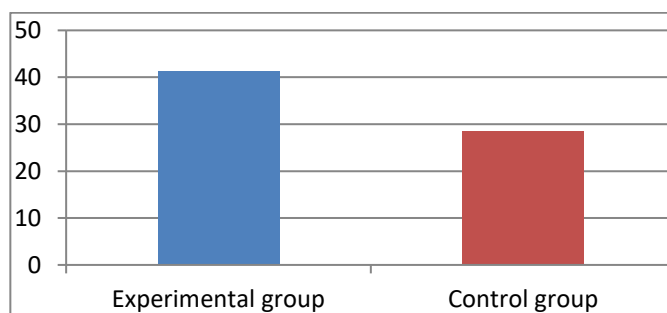
To verify this hypothesis, data were treated statistically. Means, standard deviation, minimum and maximum scores were computed and table (4) reveals this.

Table (4): Descriptive Statistics of the Control and the Experimental Groups in overall Reading comprehension.

Test	Group	N	Mean	Std. Deviation	Minimum	Maximum	Mean difference	total score
Reading comprehension	Experimental	30	41.27	3.97	35	50	12.90	50
	Control	30	28.37	3.05	23	33		

Table (4) shows that the value of reading comprehension mean score of the experimental group's overall reading was (41.27) which is higher than that of the control group which was (28.37). As table (12) shows the experimental group's scores were higher than those of the control group in the post-administration of overall reading comprehension test. It also indicated a higher homogeneity (=Std. Deviation /Mean) of the experimental group's scores than those of the control group due to the use of the 4MAT. This is represented graphically in figure (2).

Figure (2): Mean Scores of the Control and the Experimental Groups in the Post Reading comprehension Posttest Administration.



To show the significance of the difference, t-value was calculated for the difference between the mean scores of the two groups. This is illustrated in table (5):

Table (5): t-Value and effect size of both groups

Test	Group	Mean	Std. Deviation	t-value	d.f	Sig	η^2	d	Effect size
Reading comprehension	Experimental	41.27	3.97	14.113	58	Significant at (0.01)	0.33	1.40	Large
	Control	28.37	3.05						

It is clear from table (5) that the calculated value of "t" (= **14.113**) which is higher than the tabulated value of "t" with 58 degrees of freedom and significant level "0.01". This reflects that the difference between the mean scores of the two groups reached the level of statistical significance.

To investigate the effect and educational importance of the results, the value of ETA squared (η^2) and the effect size (d) were calculated. ETA squared was 0.33 reflecting its practical significance. Accordingly, it can be said that 33% of the variations between the scores of students in overall Reading comprehension could be due to differences of teaching treatment which the two groups were exposed to, and the effect size (d) = **1.40** and that there was a large effect on developing overall Reading comprehension.

3.1.5 Discussion of the Results:

The statistical analysis presented earlier in this research resulted in supporting all the hypotheses of the study. It also resulted in achieving the present study's main aim, which was to develop the necessary reading comprehension skills for 1st year secondary school students through the use of 4MAT strategy.

The results of the experimental and control groups on the reading comprehension pre-test indicated that both groups were approximately homogeneous in their entry level on their reading comprehension skills before using 4MAT. In addition, the results of both groups on the reading comprehension pre- test showed students' poor level in the determined reading comprehension skills. Having taught using 4MAT, post testing results revealed significant differences in favor of the experimental group students who were taught via 4MAT.

Results, related to verifying the first hypothesis showed that there was improvement in the students' literal comprehension skills. This was due to breaking up the text into smaller



sections and looking for main ideas and rehearsing it during working in pairs and students could scan for details in an effective manner.

These results indicated that 4MAT proved to have a large effect on developing the experimental group students' critical reading comprehension skills. The effect size was also calculated and Eta squared (η^2) values of overall reading comprehension skills and each of the reading comprehension skills of the post- test were large. Also, the results of the post test revealed that the level of the experimental group students was higher than that of the control group due to 4MAT. Such results are consistent with Saleh (2019) who pointed out that 4MAT increased the students' success and had a large affection in developing students' comprehension skills. Using 4MAT in teaching reading comprehension is beneficial for EFL learners. This made their reading comprehension ability improve

Recommendations:

Based on the findings of the study and the above mentioned conclusions, the following recommendations are suggested:

1. Teachers should be aware of the importance of reading comprehension and how to help their students develop their reading comprehension skills.
2. 4MAT should be recommended to be implemented in teaching reading comprehension skills for secondary school students.
3. 4MAT strategy helps develop secondary students' thinking skills.
4. Training should be given to EFL in-service teachers and on how to use 4MAT for teaching reading at the various stages of Education.

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