Improving Engineering Students' Critical Thinking Skills in English Reading Texts through Critical Reading Strategies

Sally Mohamed Saad El-Din Mostafa

English Language Lecturer, Department of Basic Sciences

Modern Academy for Engineering and Technology

Abstract:

The purpose of this research is to improve the engineering students' critical thinking skills while reading English texts by applying six critical reading strategies. The participants of the study included 30 engineering students who were randomly chosen and divided into two groups: treatment (N=15) and non treatment (N=15). The treatment group received instruction using the critical reading strategies in three stages. The first stage included summarizing and paraphrasing strategies , the second one facts vs. opinion, comparing and contrasting, while the third one comprised drawing conclusions, and text evaluations. On the other hand, the non treatment group received their regular instruction. The instruments of the study were; a critical thinking test for English reading texts prepared by the researcher, and an adapted version of critical thinking rubric to assess the engineering students critical thinking skills when reading English texts. Data were collected and t-test was used for the statistical analysis. Results indicated that there was a statistically significant difference between the mean scores of the treatment and non treatment groups in the critical thinking achievement test favoring the treatment group.It was concluded that the present research provided evidence for the effect of the critical reading strategies on improving the engineering students' critical thinking skills when reading the English texts.

Key words: Critical Reading Strategies, Critical Thinking Skills, Critical Thinking Rubric.

Introduction:

Reading is done for various purposes, such as pleasure or acquiring information. Recent theories have regarded reading as not only a process of extracting meaning from a text, but also as a process of connecting information in the text with the knowledge brought by the reader within the act of reading.

Critical reading is a skill highly required in both academic and everyday lives. Critical reading is mainly a reading process that involves critical thinking (Pardede, 2010). Critical reading is much more complex than reading as it is not just concerned with interpreting the message conveyed in the text, but also analyzing and evaluating the text itself. Critical reading has been described as: examining the evidence or arguments presented, checking out any influences on the evidence or arguments, checking out the limitations , examining the interpretations made, and deciding to what extent the reader is prepared to accept the authors' arguments, opinions, or conclusions.

Pardede (2007) has defined critical reading as a reading process that involves critical thinking. Consequently, defining critical reading requires understanding the meanings of both: reading and critical thinking. Tierney and Pearson (1994) have viewed reading as an active cognitive process where the reader's background knowledge plays a key role in the meaning's creation. According to Rudell et al. (1994), critical thinking occurs when students question their own beliefs and biases or what they are told. Similarly, Kurland (2000b) has mentioned that critical thinking is a technique for evaluating information and ideas, or in other words, for making decisions of what is acceptable or believable.

Uniting both definitions of reading and critical thinking; it could be concluded that critical reading is the application of critical thinking in a reading activity. Kurland (2000a) has defined critical reading as an active and purposeful process of comprehending, questioning and evaluating printed material to react intelligently to the writer's ideas. He also has gone further to illustrate that critical reading refers to a careful, active, reflective, analytic reading that involves reflecting on the validity of what has been read in the light of his/her prior knowledge.

Critical thinking has become a major topic in education all over the world. Consequently, students' critical thinking skills require to be developed and enhanced, particularly in higher education. Information gathering in the engineering fields is a distinct set of skills and behaviors that requires use of wide-reaching sources and the development of critical reading practices that enable learners to take in vast quantities of information. This is particularly relevant in engineering design; engineers must be able to select and justify all aspects of their design process through the application of relevant standards, scientific knowledge, self-discovered knowledge and methods, and technical specifications within their own project context in appropriate ways.

There are several critical reading skills. McClain (1985) for example, pointed out that critical reading skills included the reading material with an attentive and questioning mind, and comparing and contrasting the pieces of information in the reading text. Considering the author's views or bias with regard to the other viewpoints, determining propaganda techniques, identifying both relevant and irrelevant information, and differentiating fact from opinion have also been considered as critical reading skills. High-level critical reading skills require the language learners to draw inferences, state implied main idea, synthesize two or more sentences to formulate divided main ideas, distinguish facts and opinions, evaluate evidence, explain figurative language, identify basic logical fallacies and emotional appeals (Carrigus, 2002).

Fostering and enhancing critical reading necessitate teaching critical reading strategies. Suacillo et al. (2016) have mentioned seven critical reading strategies: previewing, contextualizing, questioning, reflecting on beliefs and values challenges, outlining and summarizing, evaluating, and comparing and contrasting.

Talebi and Marzban (2015) in their study have mentioned three other critical reading strategies. According to their words, the first strategy is annotating. The researcher explicitly taught this strategy during reading, where the reader can mark, circle, write the key words or the meaning of the unknown words while reading. By applying this strategy, the learners pay attention to the unknown words realizing the synonyms and the

antonyms. Language learners can also write key words and short summaries in the margins or even questions that may help them identify the audiences' challenging ideas, knowledge, and beliefs (Diyanni, 2002).

The second strategy is inferencing that takes place after guessing. It has been claimed that a learner who has been taught guessing strategies would not automatically produce correct guesses while reading. Guessing could be influenced by some factors as availability of clues, familiarity with the clue words, and presence of misleading clues. This strategy is common in critical reading because reading is a process that is not regarded as separate units. The reader is frequently engaged in guessing meaning through encountering with the text (Brown, 1993). The third strategy is summarizing that helps the learners to self-correct by the means of reading the text several times, checking the topic sentences, identifying the main ideas, and relating passages to each other.

Context of the problem:

The researcher has been teaching general English and conversational courses for university students for twenty-one years. The researcher has also been teaching English language, Technical Report Writing, and Technical English for engineering students for seven years. While conducting the courses and practicing the language, the researcher has noticed that critical reading questions with their different types are obstacles for the language learners; as they got used to the direct questions that depend on answering them without understanding the minute details or the implied meanings of the reading passage. Guessing the meanings of new vocabulary, comparing and contrasting between ideas, recognizing the author's bias, and evaluating the text were hard tasks for the language learners. The most difficult task was summarizing the reading passage as they either dismiss the important details or misunderstand the essential ideas of the reading text, and sometimes they got confused between the main and subordinate ideas.

The researcher conducted a pilot study among 30 junior students in computing and electronics department studying at Modern Academy for Engineering and Technology. All of the thirty students were asked to

answer an intensive reading test with three different passages examining the critical reading and thinking skills.

Engineering students face a lot of obstacles while reading texts in English, as according to their study, they are only concerned with the technical vocabulary related to their majors without being aware of the sentence structure that could change the whole meaning. Distinguishing the main idea of the text and identifying the supporting sentences or the sub ideas were another challenges facing the engineering students. They also failed in making relevant inferences about the text and differentiating between the facts mentioned and the authors' perspectives. Summarizing or paraphrasing the reading passages in their own words has caused many troubles to the engineering students, as they did not get used to this type of questions; they found it difficult to restate the reading passages in different words or in rewriting it using the same words of the reading passages. Predicting the meanings of the new vocabulary, drawing conclusions, and evaluating credibility were hard tasks for the engineering students.

The aim of this research was to examine if the chosen critical reading strategies would improve the required critical thinking skills of the engineering students.

Based on the above fore mentioned, the following research questions were proposed:

1) **What are the critical thinking skills required for the engineering students in English reading texts ?**

2) **What are the stages and the steps of the applied critical reading strategies to improve the critical thinking skills for engineering students?**

3) **To what extent will the applied critical reading strategies improve the engineering students' critical thinking skills in English reading texts?**

Literature Review:

Critical Reading:

Reading has been the focus of most research studies for the past decades. Oxford dictionary (2015) has defined reading as looking and comprehending the meaning of a text by mentally interpreting its components such as characters and symbols. It has also been stated that reading is a complex activity that involves both perception and thought, which in turn enable us to interpret a certain message for acquiring pieces of information (Suacillio, et al. 2016).

According to Hudson (2007), reading skills could be classified into four main categories: word attack skills, comprehension skills, fluency skills, and critical reading skills. First, the word attack skills help the language learners to convert the orthographic symbols into language, as they have to realize how the text represents units of language, such as phonemes, syllables, and words. Also word attack subskills should be taught to the language learners, as recognizing syllable patterns, converting strings to sound on occasions, recognizing upper/ lower case letters and identifying word boundaries.

Second, comprehension skills are those that enable the language learners to use both context and knowledge for deriving meaning from the reading text. These comprehension skills are grammatical competence and morphology knowledge, syntax, mechanics, context usage to get the meaning, utilizing schemata as aids, applying metacognitive knowledge, recognizing text structure, and prediction. Third, what help the language learners to improve abilities as sight word recognition, high frequency letter clusters identification, rapid reading, and extensive vocabulary possession are the fluency skills. Fourth, critical reading skills are those that help the language learners to analyze, synthesize, and evaluate the reading text.

Critical reading has also been defined by Kurland (2002) as a technique for discovering information and ideas within a text. McDonald (2004) has gone farther to regard it as an alternative way of reading that goes beyond typical approaches of the reading task itself. It has been claimed that critical reading implies making judgements about how a text is argued (Collins, 2018). Wallace (2011) cited in (Muhammed, 2020) has believed that critical reading is concerned with questioning the facts, how the text works, how it is argued, and how it reaches its conclusions. Kurland (2000) has stated that critical reading does not only mean to read a text reflectively, but also skeptically and analytically and then judging the text's value. The reader should not

only grasp what is written in the text, but also go beyond the conveyed message using the higher-order thinking skills, prior knowledge, or other information sources. Carter and Nunan (2002) defined critical reading as a practice which attends to the ideological underpinning of a text, as signaled not so much by what the writer picks as a topic, but by how people, characters, places and events are being talked about.

Critical reading and critical thinking:

Scriven and Paul (1996) defined critical thinking as "an intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from , or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action." Critical thinking has also been viewed as the ability to differentiate between facts and opinions, judgements and inferences, and objective and subjective impressions.

Kurland (2000) has mentioned that critical thinking is a technique for evaluating information and ideas, for deciding what to accept and what to believe. It involves reflecting on the validity of what we have read in light of our prior knowledge and understanding of the world. According to his words, critical reading is a technique for discovering information and ideas within a text. It refers to a careful, active, reflective, analytic reading. He also has gone further to suggest that both critical reading and critical thinking work together in harmony; as once we have fully understood a text (critical reading), we can truly evaluate its assertions (critical thinking).

Perdede (2007) has presented five important features of critical reading. First, critical reader has to comprehend the author's message, so the reader must approach the reading with an open mind and a willingness to accept new ideas or other points of view. In other words, the reader should not let his personal biases interpose the clear thinking and objectivity. Second, critical reading is classified as a high level of comprehension skills; consequently, the reader has to go beyond the literal interpretation of the text's lines. The reader here should realize the implied meanings in the text read to get the author's perspective. Third, unlike basic literal comprehension, critical reading

requires the reader to interact with the writer. The writer's message should be understood, questioned, and reacted to in terms of the reader's own knowledge and experience. Fourth, critical reading requires wide knowledge. The more experiences and information the critical reader has concerning a subject, the more highly qualified he/she is to read critically.

Kurland (2000) listed critical reading features and characteristics that made it a part of critical thinking. These traits were determined as: (1) previewing; getting knowledge about a material prior to actually reading it. (2) Placing a text in its historical, biographical, and cultural settings. (3) Inquiring in order to comprehend and remember; posing content-related inquiries. (4) Pondering challenges to your principles and beliefs; examining your own reaction. (6) Assessing an argument; examining a text's logic as well as its credibility and emotional impact. (7) Comparing; exploring similarities and contrasts across texts to understand them better.

Critical Thinking for University Students:

Critical thinking can be undertaken when learning how to read when the students employ the appropriate critical reading strategies. Since many reference books use English as the language of instruction, the first thing should be owned by the students is acquiring a good comprehension or a full understanding of the vocabulary in the text. Maslakhatin (2016) in his study tried to foster the critical thinking skills of higher education students using the critical reading strategies. The researcher chose the argumentative text as university students should be able to write scientific papers. Annotating, previewing, skimming and scanning, fact vs. opinion, drawing conclusion, questioning , summarizing, and paraphrasing were the selected and utilized critical strategies. It was concluded that critical reading strategies helped the students improve their critical reading, critical thinking, and high order thinking skills.

Muhammed Din (2020) in his study aimed to evaluate university students' critical thinking ability as reflected in their critical reading skill. The researcher set two objectives that were: (a) understanding

university students' attitude toward critical thinking, and (b) recognizing the relationship between the university students' attitude towards critical thinking and their language proficiency with reference to their critical reading skills and their performance in the critical reading test. The study participants were university students of different state-run colleges of Punjab, Pakistan. Quantitative research methodology was used and the findings revealed that the university students have highly positive attitude towards critical thinking but their level of critical thinking and their ability to reflect critical thinking in their critical reading skill do not correspond with their attitude towards critical thinking.

Reading critically in a foreign language is a fundamental skill that requires readers going beyond literal comprehension of the texts and adopting analytical perspectives. Gonen and Kizialy (2022) in their study aimed at exploring EFL teachers' views on critical reading, critical reading practices, and possible challenges faced when implementing such practices. The participants in this study were seven university instructors in a Turkish EFL context. They were asked to answer an open-ended questionnaire, participate in semi-structured interviews, write self-reflection reports, and they were also engaged in a hands-on practice of critical reading in their classrooms. Qualitative analysis has revealed that although EFL instructors have theoretical information about critical reading, they do not implement its practices to help learners interpret cultural and social relations. According to the study, the instructors also have faced a lot of challenges stemming from the students' backgrounds while practicing critical reading.

Dianti (2015) conducted a study that was concerned with six objectives. They were: 1) finding out whether there was a correlation between students' critical thinking and critical reading skills or not. 2) Identifying the students' level of their critical thinking skills. 3) Determining the students' level of their critical reading skills. 4) Finding out the contribution of each aspect of critical thinking skills toward each aspect of critical reading skills. 5) Seeking the mean differences of students' critical thinking skills based on their gender, and 6) seeking the mean differences of students' critical reading skills

based on their gender. The research was conducted using correlational research design. The participants of the study were 170 undergraduate students of English Education Study Program of Sriwijaya University in Bukit Besar campus in the academic year 2011/2012. Based on the data collected and the analyses applied in this study; the findings revealed that: (1) the student's level of critical thinking skill was in the level of analysis. (2) The students were categorized as poor in critical reading skills. (3) There was a significant and positive correlation between student's critical thinking and critical reading skills with R-value 0.713. (4) Only two out of three aspects of critical thinking – analysis and evaluation- that contributed the influence toward each aspect of critical reading skills. (5) There was no mean difference between male and female students toward their critical thinking skills, and (6) there was no mean difference between male and female students toward their critical reading skills.

Critical Reading/ Thinking for Engineering Students:

  Engineering fields rely heavily on stakeholders as sources of knowledge including users, and external and internal sources of input. External sources refers to clients, while the internal ones refer to colleagues, engineers, mechanics, electricians, management,….etc. When reading specific types of engineering resources, engineering students must learn to become critically engaged with engineering literature. Within engineering, information gathering and processing is done primarily to meet the needs of the design process, and in many practice-based settings, finding good enough information is encouraged. Therefore, failure to apply critical reading skills can lead to inappropriate and poorly informed design decisions that can have drastic consequences for the public at large (Walez, 2001)

  Critical thinking for engineering students, future engineers, is supposed to be more important as these specialists work in the areas of telecommunication, information and communication technologies, mechatronics and robotics, physics, machine building and other engineering areas that require accuracy and fidelity, clearness of actions, practical thinking, attentiveness and systematization. They all

come from the ability to think critically providing a reasonable argument showing a high level of professionalism. Consequently, it is crucial to introduce critical thinking activities in a study process and drill those skills within all courses given in the program starting with humanities and finishing with profession-oriented ones (Ivelva, 2016).

M. Spretnak , (1983) conducted a survey of 1000 engineering alumni from the U.C. Berkely classes of 1948 to 1978 titled "Technical Communication and the Professional Engineering". The researcher found that, on the average, engineers spend twenty-five percent of their job-related time writing, twenty-three percent reading technical and business material, eleven percent supervising the writing of others, and seven percent giving oral presentations; more than half of an engineer's work is comprised of communication tasks.

Bandara etal. (2022) in their research used the SQ4R to develop the students' reading comprehension skills together with critical thinking. The main objective of their research is to develop the students' reading skills so that they will be able to conduct investigations using research-based knowledge. Semester Four Civil Engineering undergraduates were selected as the sample group and the quasi-experimental approach was used in this study. The results of the t-test revealed that there is a significant improvement from the pre-test to the post-test of the experimental group, which indicates that the SQ4R strategy was effective in developing reading comprehension skills. The students' write-up described how some of the students developed their thinking from a lower stage of Perry's model of cognitive development to an upper stage.

Saidalvi etal. (2022) employed a quantitative research method based on a descriptive survey design. The research examined Diploma students' critical reading abilities based on self-perceptions and performance when reading English texts. The participants were 44 engineering major diploma students; they were selected using a simple random cluster sampling design from a university in the southern region of Malaysia. A questionnaire was used to collect data, and a critical reading comprehension test was distributed online through

course teachers; both of them were subjected reliability testing. The findings indicate that Diploma students overestimated their critical reading skills compared to their actual performance as they scored below average of some of Bloom's Taxonomy critical thinking skills.

Madhumathi etal. (2017) in their study tried to assess and analyze the academic reading competence of the ESL engineering students at the entry level of engineering education. The study aimed to identify emerging patterns of levels of academic reading competence among the Indian ESL students at undergraduate levels. The results of SRCI administered to six hundred engineering students revealed four different patterns of reading competence. Those identified patterns are labelled as four bands according to the characteristic performance of the students. By analyzing the band characteristics of the students, appropriate standardized courses for reading instruction can be designed. The objectives of the study were: 1) identifying various subskills related to reading at undergraduate level with reference to ACTFL (American Council for Teaching Foreign Languages) standards, and 2) determining and analyzing the emerging patterns of the academic reading competences' levels among the freshmen engineering students.

Critical Reading Skills:

El-Mahdy (2012) has mentioned some of the critical reading goals. He stated that the readers should recognize the author's purpose, understand the tone and realize the persuasive elements, and determine the bias. He also has ascertained that each of these goals requires inferences from evidence within the text. The reader has to recognize purpose involves inferring a basis for choices of content and language, identify the tone and the persuasive elements that involve classifying the nature of language choices, and determine the bias that involves sorting out the nature of patterns of the language and content choices. According to his words, the critical reading skills include:

1) Identifying the author's intention, tone and point of view.

2) Detecting the author's intention bias.

3) Distinguishing between the facts mentioned in the text and the author's perspectives.

4) Identifying inferences.

According to Manarin, Carey, and Rathburn (2015), reading critically involves the following skills for academic success:

(1) identifying patterns of textual elements.

(2) Distinguishing between main and subordinate ideas.

(3) Evaluating credibility.

(4) Making judgements about how a text is argued.

(5) Making relevant inferences about the text.

Reading critically for social engagement implies an understanding of how texts can be used to achieve social goals. Larking (2017) has stated that critical reading demands an interactive form of reading where there is a relationship between the text producers, receivers, the community, and the text itself. From this perspective, critical reading critical reading necessitates the following criteria: (a) shifting through various forms of rhetoric, (b) recognizing power relations, (c) questioning assumptions, (d) engaging with the world, and (e) constructing new possibilities.

Teacher's and learners' roles in critical reading and critical thinking:

Huckin (1997) has advised the language instructors to consider the students' age and interests so that the lesson or the reading passages will be more relevant to their experience. He also has gone further to emphasize the importance of assigning the reading material that pertains to a familiar subject or culture to the language learners.

Brown (1994) has suggested that there should be three phases to the teaching of reading. The first phase is pre reading discussion, which involves introducing the topic and preparing students for the text. The second phase includes while-reading tasks, where the students are provided with a set of instructions to give them a purpose for reading and to serve as a guide for them as they read. The third phase includes post reading exercises, where the students are given short comprehension

questions, vocabulary work, opportunity for discussing the topic and the author's reasoning.

Correia (2006) when conducting his experiment provided his students with a copy of a newspaper article appropriate to their age and interests. A discussion was held where the students were asked to read the headline and the first sentence of the text; trying to predict what the article would be about. As a pre reading activity, the students were asked to prepare in groups two questions they thought would be answered in the text. A reciprocal questioning technique was applied for motivating the students to answer the reading comprehension questions. The while-reading activity required the students to read the article for the purpose of answering the questions they had raised. Not all the details the students asked about were included in the reading texts; which in turn helped the students to generate more discussion and made them aware that these omissions or missing details may reveal the author's bias. According to the researcher's words, identifying bias in texts should be an essential part for developing critical reading skills. When applying the post reading activities, the researcher discussed the sentence structures, and analyzed the verb tenses and voice with the students. The researcher's target here was to help the students determine the author's purpose in choosing that particular tense, how logically the events were organized, and the credibility of the issues described. Finally, the students were asked to work in pairs and write a summary of the articles or the texts read.

To improve critical reading and thinking skills, Barnes (1979) designed a questioning classification system. His lesson was based on class discussion that should help students organize, develop, and express their ideas. Questions are grouped into one of four categories: (a) cognitive memory questions that elicit recall of facts or yes-no answers, (b) convergent questions that ask students to explain, express in another mode, state relationships, compare and contrast, or solve a problem. (c) Divergent questions that ask students to infer, reconstruct, predict, hypothesize, solve a problem; and (d) evaluation questions that require students to judge, value, defend, or justify a choice or solution.

Paul (1990) devised a series of classifying strategies to enhance high school freshmen's metacognition skills and help them read between the lines, that is, to read critically. These strategies provided an organizational pattern to help students generate clear thinking, reading, and writing. The strategies led them to analyze, synthesize, make inferences, and evaluate. The researcher followed five guidelines: stimulate personal interest, generate active/interactive participation by all students, use prior student knowledge and experience, facilitate and encourage skill transfer, and extend comprehension instruction beyond the 50-minute class period.

Critical Reading Strategies:

Seven critical reading strategies were mentioned by M. Suacillo et al. (2016): previewing, contextualizing, questioning, reflecting on beliefs and values challenges, outlining and summarizing, evaluating, and comparing and contrasting. First, previewing is concerned with learning about the text before reading it. To critically preview, means to get an overview of the reading text content, organization, and to determine the text's rhetorical situation. Second, contextualizing refers to placing the reading text in its historical, biographical, or cultural contexts. The reader or the language learner here has to recognize and identify the differences between the contemporary values and attitudes of his/ her age and those presented in old authentic texts. In contextualizing, the reader has to determine the language or ideas that are odd or out of date involving one's knowledge of the place and time of the written text and evaluating how these differences can influence the reader's understanding and judgement of the text (Axelord and Cooper, 1998).

The third critical reading strategy, questioning, encourages the language learners to write down questions while reading. Salisbury University (2009) has recommended that those written questions should be focused and relevant to the main ideas of the reading texts, and should be answered with the readers' own words as well. Fourth, reflecting on challenges to one's beliefs and values as a critical strategy is applied when the reader marks the paragraphs that challenge his attitude, belief, and status. A critical reader's reflection on his beliefs and values

crucially examines the basis of the personal responses of the read material (Halpern, 2003). Consequently, the reader's beliefs about an issue are sometimes difficult to express because they are so ingrained. To discover these beliefs, it is essential to realize how the text challenges the reader or the language learner.

According to Salisbury University (2009), the fifth strategy, outlining and summarizing, is depicted as determining the main ideas and restating them in the reader's own words. Distinguishing between the main ideas from one side and the supporting ideas and examples from the other side is the main clue to both outlining and summarizing. It has been argued that outlining is a high-level skill, as the reader has to analyze the relationship between the information to be conveniently connected. McCormic (1989) has stated that there are five functions for outlining: (1) enables language learners to focus on important ideas; (2) enhances familiarity with the reading text's structure; (3) promotes better retention; (4) produces alternative materials to supplemental ones; and (5) supports and encourages participation in learning.

The sixth critical reading strategy is evaluating. Text evaluation means analyzing how the evidences of the text portray the subject matter (Bisset, 2014). Critical readers have to make an evaluation of how important and accepted the reading text is bearing in mind the author's topic presentation and the validity of his arguments. In critical reading, all the pieces of information presented in the text are accepted, on the contrary, critical reading serves a different purpose as not all the pieces of information should be accepted , but also the author's arguments should be judged and evaluated. The seventh strategy, comparing and contrasting, is identifying and determining similarities and differences between the reading texts to understand them better. Silver (2010) has claimed that comparing and contrasting have five main goals: (1) strengthen memories by focusing on analyzing ideas and empowering the reader's ability to remember the key contents. (2) Improve higher-order thinking skills. (3) Foster comprehension by highlighting the important details, making abstract ideas concrete, and reducing confusion between related concepts. (4) Enhance writing in simple structure sentences while organizing information and developing ideas

with accuracy. (5) Develop mind habits as thinking flexibly, applying prior knowledge to new situations, and striving for accuracy.

Faridah (2019) in a recent has suggested the following critical reading strategies to help the reading process. Set a purpose for reading before commencing the process itself. Then, preview the text, focus on the print features and text structures, mark the text while you read, make connections between the text and the reader's personal experience and knowledge, monitor the text comprehension, and summarize the key points after finishing reading. Ten critical reading strategies were sorted out by the researcher in the following table.

Table (1): Critical reading strategies:

Critical Reading Strategies	A summary of the strategy
Annotating	Reading reactions to and questions about a text directly on the page. Circling key words and writing questions and comments about the material in the margins.
Previewing	Getting an overview of text structure, text cues, pictures, and personal experiences prior to reading a text.
Skimming and Scanning	Finding out the key features of reading and getting the gist of the text.
Facts Vs. Opinions	Facts can be proved, undisputed, have concrete evidence and opinion refers to a belief.
Drawing Conclusions	Looking for clues in the text, thinking about what those clues trigger in prior knowledge, and making predictions.
Monitoring	Monitoring for understanding by checking to see if the text makes sense.

Summarizing	Briefly present the main ideas of the text. Write a paragraph or more that presents the main ideas in your own words.
Paraphrasing	Restate and clarify the meaning of a few sentences from the text. Reread the passage to be paraphrased and look up unknown words.
Synthesizing	Combine ideas and information selected from different texts identifying whether these pieces of information support or refute your ideas.
Questioning	Write questions while reading the text for better understanding of the material.
Contextualizing	Putting a text within its original historical or cultural context.

Faridah (2019). Lintang Songo: Journal Pendidkan, Vol.2, No. 2.

ASSESSMENT OF CRITICAL READING/ THINKING:

Critical thinking simply means higher level thinking skills. It has a central role in language learning especially in reading because the reading process is a form of thinking; reading skills are thinking skills. Reading and thinking derive from common roots, and are in many ways indistinguishable (Al Bajalani, 2016).

Bloom's Taxonomy is a system that classifies cognitive behaviors into six levels, ranging from fairly simple to more complex, and is considered by most educators and experts in critical thinking as probably the best known system for classifying educational objectives. Bloom's Taxonomy has six levels; each level requires different kinds of thought processes: knowledge, comprehension, application, analysis, synthesis, and evaluation. When engaging in critical thinking, the language learner must go beyond the given material and elaborate on the idea. Traditionally, the basic thinking skills are knowledge and understanding, but in college classes, students are expected to think at higher levels;

they might be asked to analyze, synthesize, or evaluate. In other words, they are asked to think critically and in depth (Orlich etal, 2007).

Paul and Elder (2009) have suggested a framework that used a specific method of analysis and evaluation in instructing students how to improve their critical reading skills. They created a diagram clarifying the Elements of Thoughts concerning:

a) purpose (goals and objectives),

b) question at issue (a problem and an issue),

c) information (data, facts, reasons, observations, experience, and evidences),

d) interpretation and interference (conclusions and solutions),

e) concepts (theories, definitions, laws, principles, and models),

f) assumptions (presuppositions, axioms, taking for granted),

g) implications and consequences,

h) point of view (frames of reference, perspectives, and orientations).

Both researchers (2008) applied their framework of critical thinking to the reading process. According to their words, a good critical reader should recognize the need to develop and apply general critical reading skills applicable to any type of reading as different kinds of reading tasks are assigned in colleges. They also have gone farther to propose that students who are critical readers can move from paragraph to another realizing and monitoring the author's thinking. During the reading process, students need to distinguish between their own thinking from one side and the author's thinking from the other side. For example, students may read for their own purposes, using their own concepts, ideas, assumptions, interferences within their own personal perspectives, yet they must also recognize the implied meanings in the text including the author's purpose, question, assumptions, concepts and so forth (Paul and Elder,2008). The following figure shows the Paul- Elder critical

thinking framework applied to reading that was adopted by Leist et al. (2012):

The Standards	
Clarity	Precision
Accuracy	Significance
Relevance	Completeness
Logicalness	Fairness
Breadth	Depth

Must be applied   to:

The Elements	
Purposes	Inferences
Questions	Concepts
Points of View	Implications
Information	Assumptions

As we learn to develop:

Intellectual Traits	
Intellectual Humility Perseverance	Intellectual
Intellectual Autonomy Reason	Confidence in
Intellectual Integrity Empathy	Intellectual
Intellectual Courage	Fairmindedness

Figure (2) Paul –Elder Critical Thinking Framework

Leist et al. (2012) adopted 6 universal intellectual standards with the criteria and points illustrated in the following table. The scoring system

is concentrated on a chart form with four elements, namely (a) assignment characterization (reading prompt), (b) a range supporting degrees of accomplishment, (c) preferred skill types or dimensions, as well as (d) performance level categories. The students here were assessed according to their writing responses.

Research hypotheses:

1) There would be a statistically significant difference between the mean scores of the treatment and non-treatment groups of the engineering students in the critical thinking posttest favoring the treatment group.

2) There would be a statistically significant difference between the mean scores of the treatment and non-treatment groups of the engineering students in the critical thinking skills favoring the treatment group.

3) There would be a statistically significant difference between the mean scores of the treatment and non-treatment groups of the engineering students in the critical thinking rubric favoring the treatment group.

4) There would be an effectiveness for the applied critical reading strategies on developing the engineering students' critical thinking skills.

Methods and Procedures:
The research participants included thirty (30) junior engineering students; all of them were studying in the computing and electronics department at Modern Academy for Engineering and Technology. The participants joined an intensive English course organized by the academy in the academic year 2021-2022 to practice critical reading and speaking skills. The whole course was 40 hours; only sixteen hours were specified for the critical reading skills with two sessions per week. Those thirty (30) participants were divided into two groups: treatment and non-treatment ones. Each group involved fifteen (15) students; the participants in both groups were approximately at the same age (from 21 to 23 years old). All engineering students must have good command of the English language as many references,

literatures about engineering, and explanation of source codes are available in English. The critical reading strategies were used because junior engineering students showed low achievement in the critical thinking questions administered in the reading comprehension passages. Interpreting the reading texts, understanding the implied meanings, distinguishing between facts and opinions, making relevant inferences, and identifying the author's bias were the main problems and challenges faced by the students. The thirty participants had been administered a placement test by the researcher before joining the two groups for studying the course. The purpose of the placement test was to get sure that all the students were practicing the same language level with the same proficiency. The treatment group was taught to improve their critical thinking skills by applying the critical reading strategies; while the non-treatment group was taught by the regular method.

Instructor:

The researcher conducted the experiment herself; as she has been teaching General and Conversational English courses for twenty-two years; and instructing the Academic/General IELTS and International TOEFL preparation courses for fourteen years.

The instructor is also a PhD holder in TEFL and has been working as a lecturer in Modern Academy for Engineering and Technology for seven years.

The critical reading strategies for improving the engineering students' critical thinking skills in English reading texts :

Sixteen hours have been specified for the critical reading course. The instructor has applied six critical reading strategies divided in pairs in three stages to improve six critical thinking skills while reading the English texts. The following table illustrates the critical reading strategies in the three stages, the critical thinking skills, and the types of questions used for each stage.

Table (2): The applied critical reading strategies in their three stages:

Stages and Critical Reading Strategies	Critical Thinking Skills	Types of Questions
Stage One: Summarizing and Paraphrasing	1) Distinguishing between the main and subordinate ideas. 2) Identifying the author's intention, tone, and point of view.	1) Summary completion question 2) Multiple choice question
Stage Two: Facts Vs. Opinion Comparing and Contrasting	3) Distinguishing between the facts mentioned in the text and the author's perspectives. 4) Making relevant inferences about the text.	1) True, False, or Not Given question 2) Written essay question
Stage Three: Drawing Conclusions and Text Evaluation	5) Making judgements about how the text is argued. 6) Evaluating credibility	1) Multiple choice question 2) Written questions

<u>Stage One: Summarizing and paraphrasing</u>:

1) Two reading passages are assigned to the engineering students each session; one of them is performed in class while the other one is done individually as an assignment.

2) At the beginning of the session, the students are divided into five groups, each group of three members only. General discussion is held about the topic of the chosen reading passage as a kind of warming up for eliciting new ideas; this discussion is administered by the instructor among the whole groups.

3) Within ten minutes, each group should skim and scan the reading passage, guess the meanings of the new vocabulary, and identify the general main idea and the sub ideas as well.

4) Then, the students should identify the topic sentence, the supporting sentences and the examples in the reading passage, and the concluding sentence if exists.

5) The instructor then illustrates the meanings of the new vocabulary, provides synonyms to enrich the engineering students' credit of words, and finally discusses these main and sub ideas with each group clarifying the topic sentence and how it has been demonstrated through the relevant supporting sentences in the passage.

6) Students in each group are then asked to summarize and paraphrase the whole passage in their own words and hand in these drafts to the instructor.

7) The students are finally asked to answer the summary completion question that briefly restates the whole passage in a few sentences; where they are ordered to fill in the blanks with only limited number of words chosen from the passage to complete the summary.

8) The instructor then discusses those missed details in the received drafts and answers the summary question with the learners clarifying the main and sub details in the reading text.

9) The learners are asked to answer the multiple-choice questions that require them to understand the implied meanings in the reading text, as the choices are not directly stated in the passage.

10) The instructor revises the answers with the learners illustrating the embedded ideas beyond the text while clarifying the author's intention, tone, and bias.

Stage Two: Facts Vs. Opinions, Comparing and Contrasting:

1) Each group has to state the sentences that reveal either facts or opinions in the reading text while supporting their answers with words or examples from the text.

2) The instructor discusses with the students the differences between facts and opinions in the reading text explaining the key words and the transitions used.

3) Engineering students are then asked to answer the True, False, or Not Given question; where they have to determine if the statements about facts given are correct, in correct, or not mentioned in the reading text. The answers are revised and discussed by the instructor illustrating the differences between statements expressing facts or those revealing opinions.

4) Students in each group have to answer the written essay questions where they should express their opinions about the author's perspectives and how they are related to the mentioned facts in the reading text. The written responses of each group are then discussed among the groups.

5) The students are then asked to determine the points of similarities as well as those of differences between their own opinions and the author's perspectives while relating all of them to the text.

Stage Three: Drawing Conclusions and Text Evaluations:

1) The engineering students in each group think of acceptable consequences to the facts mentioned in the reading text and hand in their opinions or ideas written in points to the instructor. Then, a whole discussion is held among all the groups to illustrate all the acceptable and unacceptable drawn conclusions.

2) The students are given a chance to answer the multiple-choice questions in groups for determining the most acceptable consequences and conclusions. Students are also asked to give reasons to their choices. The responses are then revised and discussed by the instructor.

3) Each group is asked to provide its evaluation about the reading text, where the students have to analyze the text by identifying

the odd vocabulary or the outdated ideas relating them to the place and time of writing. The groups are also asked to criticize how the author has presented the topic and illustrated the details throughout the text.

4) Finally, the instructor discusses all of these evaluations among the groups, manages the arising arguments, and selects the most appropriate estimation.

Study Instruments:
1) A critical thinking test for reading English texts prepared by the researcher. (see appendix one)
2) A critical thinking scoring rubric, an adapted version of Arifin 2020, has been employed to assess the engineering students' critical thinking skills' enhancement when reading English texts. (see appendix two)

Scoring the critical thinking test :

The ultimate goal of assessments is to improve instruction for the language learners and enable the instructors get sure that they are on the right track. Whatever the method of assessment used, there are some points the instructor has to follow to guarantee that an effective assessment has been employed. According to Arifin (2020), the standards and elements of assessing critical thinking for critical reading involves: 1) accuracy in recognizing the main purpose and objective of the reading text and distinguishing between the main and subordinate ideas. 2) Clarity that is revealed in understanding facts, data or examples supported through illustrating the frequent correct use of these facts or data and distinguishing between the facts mentioned in the text and the author's perspectives. 3) Precision that is measured through categorizing and using the content and certain specific vocabulary that paraphrase the reading text. 4) Depth that helps in reading the text while demonstrating complexity of understanding and making links between intent and concepts, identifying the author's bias , and making judgement about how the text is argued. 5) Relevance that is specified for identifying or generating conclusion and adding personal opinion based on the content of the reading text and making relevant inferences about the text. 6) Logic in implementing concepts and content and evaluating credibility. (see appendix two)

Pre-test results:

Comparison between the mean scores of the critical thinking skills required for the engineering students in reading English texts for both the treatment and non-treatment groups:

Table (3) : Comparing the mean scores of the required critical thinking skills for the treatment and non-treatment groups:

Group	No.	Mean	SD	T-value	Significance level	df	significance
Treatment	15	32.04	4.13	0.33	0.01	28	Non-Significant
Non-treatment	15	32.15	4.11	0.33	0.01	28	Non-Significant

The previous table showed that there was no statistically a significant difference between the mean scores of the treatment and non-treatment groups in the pre critical thinking test as their means were (32.034) and (32.15), which meant that both groups were at the same level before conducting the experiment. Also, it was noticeable that (T-value) was not significant as it was (0.33).

Post-test results: In the light of the research hypotheses:

Paired sample t-test was used to compare the performance of the treatment and non treatment groups in the post critical thinking test to determine whether the engineering students' critical thinking skills have been improved after applying the critical reading strategies or not. This was conducting by testing the first hypothesis stating:

"There would be a statistically significant difference between the mean scores of the treatment and non-treatment groups of the engineering students in the critical thinking posttest favoring the treatment group."

Table (4) Comparing the results of the post critical thinking test for both the treatment and non-treatment groups:

Group	No.	Mean	SD	T-value	Significance level	df	significance
Treatment	15	54.04	3.16	3.36	0.01	28	Significant
Non-treatment	15	41.15	5.11	3.36	0.01	28	Significant

 This table shows that there was a statistically significant difference between the mean scores of the two groups favoring the treatment group. The mean score of the treatment group was higher than that of the non treatment group; as it was (54.04) for the treatment and (41.15) for the non treatment group. T-value indicated that the engineering students' critical thinking skills of the treatment group were more improved and developed than those of the non-treatment one; as it was (3036) at significance level (0.01). So it can be concluded that the first hypothesis was accepted.

Table (5) Comparing themean scores of the critical thinking skills for both the treatment and non-treatment groups:

Skill	Group	No.	Mean	SD	T-Value	Significance level	df	Significance
1)Distingui-shing between the main and subordinate ideas	Treatment	15	7.700	0.815	5.250	0.01	28	Significant
	Non-treatment	15	4.400	0.912			28	
2)Identifying the author's intention, tone, and	Treatment	15	6.166	0.688	5.092	0.01	28	Significant
	Non-treat	15	4.400	0.425			28	

point of view	ment							
3)Distinguish-ing between the facts mentioned in the text and the author's perspectives.	Treat-ment	15	12.631	1.301	5.630	0.01	28	Significant
	Non-treatment	15	9.933	1.715			28	
4)Making relevant inferences about the text.	Treat-ment	15	8.233	0.897	4.863	0.01	28	Significant
	Non-treatment	15	7.600	0.813				
5) Making judgements about how the text is argued.	Treat-ment	15	15.133	1.628	5.525	0.01	28	Significant
	Non-treatment	15	12.733	1.939				
6)Evaluating credibility	Treat-ment	15	14.145	1.478	5.206	0.01	28	significant
	Non-treatment	15	12.231	1.957				

The above table has revealed that there was a statistically significant difference between the mean scores of the treatment and non-treatment groups in the post critical thinking test favoring the treatment group. The mean scores of the treatment group in each skill was higher than that of the non-treatment group. The mean scores of the treatment group were (7.700) for distinguishing between the main and

subordinate ideas, (6.166) for identifying the author's intention, tone, and point of view, (12.631) for distinguishing between the facts mentioned in the text and the author's perspectives, (8.233) for making relevant inferences about the text, (15.133) for making judgements about how the text is argued, and (14.145) for evaluating credibility. Those of the non-treatment group were (4.400), (4.400), (9.933), (7.600), (12.733), and (12.231) respectively. T-value was high which indicated that the engineering students' critical thinking skills have been developed after applying the critical reading strategies. So the second hypothesis was accepted.

Comparing between the mean scores and results of both the treatment and non-treatment groups in the post critical thinking rubric:

To test the third hypothesis that, "There would be a statistically significant difference between the mean scores of the treatment and non-treatment groups of the engineering students in the critical thinking rubric favoring the treatment group", paired sample t-test was used to compare the results of both groups.

Table (6): Comparing between the mean scores and results of both groups in the post critical thinking rubric:

Standards and Elements for Assessing Critical Thinking Skills	Group	No.	Mean	SD	T-Value	Significance level	df	Significance
1)Accuracy (Recognizing the main purpose(s) and distinguis	Treat-ment	15	8.620	0.703	4.980	0.01	28	Significant
	Non-treatment	15	5.301	0.928			28	

hing between main and subordinate ideas)								
2)Clarity (Understands facts, data, or examples supported, and distinguishing between the facts mentioned in the text and the author's perspectives)	**Treat-ment**	1 5	7.16 6	0.7 08	4.8 92	0.01	2 8	Signific ant
	Non-treatment	1 5	4.40 0	0.5 23			2 8	
3) Precision (Categorizing and using the content, and certain vocabulary)	**Treat-ment**	1 5	14.6 31	1.6 31	5.8 90	0.01	2 8	Signific ant
	Non-treatment	1 5	8.93 3	1.6 15			2 8	
4)Depth Demonstrating complexity of understanding,	**Treat-ment**	1 5	10.2 54	0.7 97	5.8 63	0.01	2 8	Signific ant
	Non-treatment	1 5	6.50 2	0.9 13			2 8	

identifying the author's bias and making judgements how the text is argued.)								
5)**Releva nce** (Identifying / generating g conclusion and adding personal opinion based on content, and making relevant inferences about the text)	**Treat-ment**	1 5	9.58 9	1.4 98	5.0 75	0.01	2 8	Signific ant
	Non-treat ment	1 5	6.73 3	1.9 21				
6)**Logic** (Implementing Concepts and content and evaluating g credibility)	**Treat-ment**	1 5	14.7 55	1.3 87	5.4 16	0.01	2 8	significa nt
	Non-treat ment	1 5	11.2 31	1.8 57				

The above table has demonstrated the standards and elements in the rubric adopted by the researcher for assessing the critical thinking skills required for critical reading. It has shown that the critical reading strategies have greatly influenced the development of the critical thinking skills of the engineering students. There was a statistically significant difference between the mean scores of the treatment and the non-treatment groups in the six standards: accuracy, clarity, precision, depth, relevance, and logic. The mean scores of the treatment group were (8.620, 7.166, 14.631, 10.254, 9.589, and 14.755) respectively, Those of the non-treatment group were (5.301, 4.400, 8.933, 6.502, 6.733, and 11.231) respectively. For each standard, t-value was also high favoring the treatment group. T-value has scored the highest values in both precision and depth standards, as the students of the treatment group got trained in the first stage of implementing the critical reading strategies to categorize the text, paraphrase and summarize it in their own words, and finally answer the summary completion question that requires them to use the text's vocabulary. They also became more able to understand the complexity and the implied meanings behind the text, distinguishing between facts and opinions, and making relevant inferences in the second stage; this has been revealed when t-value was high in clarity and relevance standards. T-value was also high in accuracy and logic standards as the students in the treatment group got trained in the third stage to evaluate the text credibility, draw conclusions , and be accurate in identifying the author's purpose and main idea.

Testing the effectiveness of the applied critical reading strategies on developing the engineering students' critical thinking skills:

To test the fourth hypothesis of the research stating: "There would be an effectiveness for the applied critical reading strategies on developing the engineering students' critical thinking skills", the mean scores of the treatment group were compared before and after conducting the experiment. The results of the pre and post critical thinking test for critical reading were calculated. Also η^2 and Es were calculated to examine how the applied critical reading strategies have affected the performance of the treatment group.

Table(7):Testing the effectiveness of the applied critical reading strategies on developing the engineering students' critical thinking skills:

Group	Measurement	N	Mean	SD	T-value	df	Significance	η^2	Es
Treatment	Pre-test	15	32.036	7.824	12.34	28	0.01	0.862	6.20
Treatment	Post-test	15	46.008	3.018		28			

The previous table showed that the applied critical reading strategies proved to have an effect on improving the critical thinking skills required for the engineering students. There was a statistically significant difference between the mean scores of the treatment group in the pre and post tests favoring the post test. The previous table has shown that the mean of the post test (46.008) was higher than that of the pre test (32.036).T-value was also highly significant; as it was (12.34). η^2 and Es were also calculated and they were high enough to prove remarkable effectiveness of the applied critical reading strategies on the critical thinking skills, as η^2 was (0.862) and Es was (6.20); this indicates that the fourth hypothesis has been accepted.

Conclusions, Recommendations, and Suggestions:

The following part presents conclusions based on the study findings drawn from the results and the statistical data analysis. It also provides some recommendations and finally suggests some area of further research.

From the results, it could be concluded that:

1) The critical reading strategies are highly effective on improving the critical thinking skills required for the engineering students.

2) Dividing the engineering students into groups of no more than three members in each group has helped a lot in sharing experiences among the students and facilitates working with them as well.

3) Holding a general discussion about the topic before reading the English text has enabled the students to create an idea about the text and helped them to think critically about it.

4) Determining the topic sentence and distinguishing the supporting ones have helped in understanding the topic more.

5) Asking the students to summarize and paraphrase the reading text in their own words has offered them a chance to fully comprehend the text and create their own ideas.

6) The summary completion question has proved to be great on enhancing the students' accuracy in filling in the blanks with words from the text; that in turn reveals the students' understanding of the text.

7) The true, false, not given question has enabled the students to differentiate between the mentioned and unmentioned facts from one side, and the author's opinions from the other side; which in turn fosters their critical thinking skills.

8) Dividing the critical reading strategies into three stages has been extremely helpful for enabling the instructor to organize the students' performance and accurately assess their skills' development.

9) Revising the answers with the engineering students while identifying the standards of the rubric used has enabled them to comprehend the questions, realize the implied meanings, and improve their critical thinking skills.

Recommendations:

The following recommendations can be proposed:

1) It is advisable to divide the engineering students into groups; this helped them to elicit new ideas, work confidentially, practice the required skills together and then improve their critical thinking skills.

2) It is recommended to give the instructions for enhancing the required skills and applying them in class with the students while reading the text, then assigning another reading passage with the same level of complexity to be performed individually. This in turn will help the students to practice the critical thinking skills on their own.

3) The idea of discussing the missed details in the received written drafts has helped in illustrating the reading texts, understanding the implied meanings, and clarifying the author's intention, tone , and bias from various perspectives.

4) Providing the students the chance to think of the acceptable consequences to the facts mentioned in the reading texts and discussing them in groups would help them to make judgements about the texts argued and think logically.

5) Dividing the critical reading strategies into three stages and applying each stage separately with its required skills, types of questions, and illustrating the rubric standards could be helpful in enabling the students to comprehend better and then enhance their critical thinking skills.

6) Asking the students to express their opinions about the author's perspectives and how they are related to the mentioned facts in the reading texts could be helpful in evaluating the texts' credibility.

Suggestions for further research:

1) It is suggested to conduct a study to investigate the effect of the critical reading strategies on teaching the critical thinking skills for the high school students in English Language schools; as they are studying all the scientific subjects in English.

2) The critical reading strategies could be applied for teaching and interpreting the literary texts for high school students in English Language schools. The students can understand the implied meanings of the text, the author's bias and the message conveyed beyond the literary work.

3) The critical reading strategies could be effective in enhancing the critical thinking skills for the candidates who are going to be examined the TOEFL IBT; as the speaking section of the test requires the examinees to think critically about the texts presented in various fields and summarize them in their own words while expressing their perspectives.

4) The critical reading strategies can help in improving the critical reading skills for the candidates to the IELTS ; as the reading section in the exam requires accuracy, clarity, and precision in answering the reading questions.

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Appendix One

Pre/ post test

Answer the following questions:

Read the following passage then answer the questions (1) to (6):

Cell Phone Etiquette

What do you do in a situation like this? You are eating dinner with friends at a nice restaurant. You are having a great time when a phone rings at the table next to you. A man takes out his phone and starts talking loudly about problems he's having with his girlfriend. He talks for almost ten minutes! This happens all the time on buses, in restaurants, everywhere.

 Many people find cell phones useful in their day-to-day lives. But we have all sat next to someone talking loudly on a cell phone. You may want to tell the loudmouth to end the conversation, but let the management take care of noisy customers. You can only control your own behavior. Here are few rules: (a) Off means off: Respect the rules of restaurants and other public places. If a sign says "turn off cell phones", don't use your phone. (b) Keep private conversations private: speak softly and for a short time. Try to away from other people. Speak softly and for a short time. Try to move away from other people. (c) Lights off, phone off: Never take calls in a theater or at the movies, and (d) Pay attention: Talking on a cell phone while driving is dangerous. And watch where you are going when you are walking down the street and talking on the phone.

  As more as people use cell phones, things are only going to get worse. So, the next time you are getting ready to make a call, stop and consider the people around you.

1) Read the article then complete the summary with information from the article:

Many people talk too …………………………on cell phones. While you …………………….control their behavior, you can follow few simple rules. For example: turn ………………….your phone in public places, speak ……………………on phone calls, and …………………….take a phone call in a movie theater.

2) Check (√) the statements the writer would agree with:

   a) You should never use a cell phone in public.

   b) Cell phone users are very rude people.

   c) Turn off your cell phone if someone asks you to.

   d) You should challenge people who talk too loudly on cell phones.

   e) It is okay to talk on the cell phone while driving a car.

   f) You can use a cell phone in public if you speak quietly.

   g) Do not shout into the phone.

   h) Do not stand close to other people when you are using a cell phone.

3) What is the main purpose of the passage? Support your answer with details from the passage.

4) Do you agree with the writer's opinion? Why / Why not?

5) Suggest other rules can help in improving cell phone etiquette.

6) What behavior you hate the most when people use cell phones in public? Why?

Read the following passage then answer questions one (1) to thirteen (13):

The Dover Bronze-Age Boat

A beautifully preserved boat, made around 3000 years ago and discovered by chance in a muddy hole, has had a profound impact on archaeological research.

It was 1992. In England, workmen were building a new road through the heart of Dover, to connect the ancient port and the Channel Tunnel, which, when it opened just two years later, was to be the first land link between Britain and Europe for over 10000 years. A small team from the Canterbury Archaeological Trust (CAT) worked alongside the workmen, recording new discoveries brought to light by the machines.

At the base of a deep shaft six meters below the modern streets a wooden structure was revealed. Cleaning away the waterlogged site overlying the timbers, archaeologists realized its true nature. They had found a prehistoric boat, preserved by the type of sediment in which it was buried. It was then named the Dover Bronze-Age Boat.

About nine meters of the boat's length was recovered; one end lay beyond the excavation and had to be left. What survived consisted essentially of four intricately carved oak planks: two on the bottom , joined along a central seam by a complicated system of wedges and timbers, and two at the side, curved and stitched to the others. The seams had been made watertight by pads of moss, fixed by wedges and yew stitches.

The timbers that closed the recovered end of the boat had been removed in antiquity when it was abandoned, but much about its original shape could be deduced. There was also evidence for missing upper side planks. The boat was not a wreck, but had been deliberately discarded, dismantled and broken. Perhaps it had ben ritually killed at the end of its life, like other Bronze-Age objects.

With hindsight, it was significant that the boat was found and studied by mainstream archaeologists who naturally focused on its cultural context. At the time, ancient boats were often considered only from a narrower technological perspective, but news about the Dover boat reached a broad audience. In 2002, on the tenth anniversary of the discovery, the Dover Bronze-Age Boat Trust hosted a conference, where

this meeting of different traditions became apparent. Alongside technical papers about the boat, other speakers explored its social and economic contexts, and the religious perceptions of boats in Bronze-Age societies. Many speakers came from overseas, and debate about cultural connections was renewed.

Within seven years of excavation, the Dover boat had been conserved and displayed, but it was apparent that there were issues that could not be resolved simply by studying the old wood. Experimental archaeology seemed to be the solution: a boat reconstruction, half-scale or full-sized, would permit assessment of the different hypotheses regarding its end and the missing end. The possibility of returning to Dover to search for the boat's unexcavated northern end was explored, but practical and financial difficulties were insurmountable- and there was no guarantee that the timbers had survived the previous decade in the changed environment.

Detailed proposals to reconstruct the boat were drawn up in 2004. Archaeological evidence was beginning to suggest a Bronze-Age community straddling the channel, brought together by the sea, rather than separated by it. In a region today divided by languages and borders, archaeologists had a duty to inform the general public about their common cultural heritage.

The boat project began in England but it was conceived from the start as a European collaboraiton. Reconstruction was only part of a scheme that would include a major exhibition and an extensive educational and outreach program. Discussions began early in 2005 with archaeological bodies, universities and heritage organizations either side of the Channel. There was much enthusiasm and support, and an official launch of the project was held at an international seminar in France in 2007. Financial support was confirmed in 2008 and the project then named BOAT 1550BC got under way in June 2011.

A small team began to make the boat at the start of 2012 on the Roman Lawn outside Dover museum. A full-scale reconstruction of a mid-section had been made in 1996, primarily to see how Bronze-Age replica tools performed. In 2012, however, the hull shape was at the center of
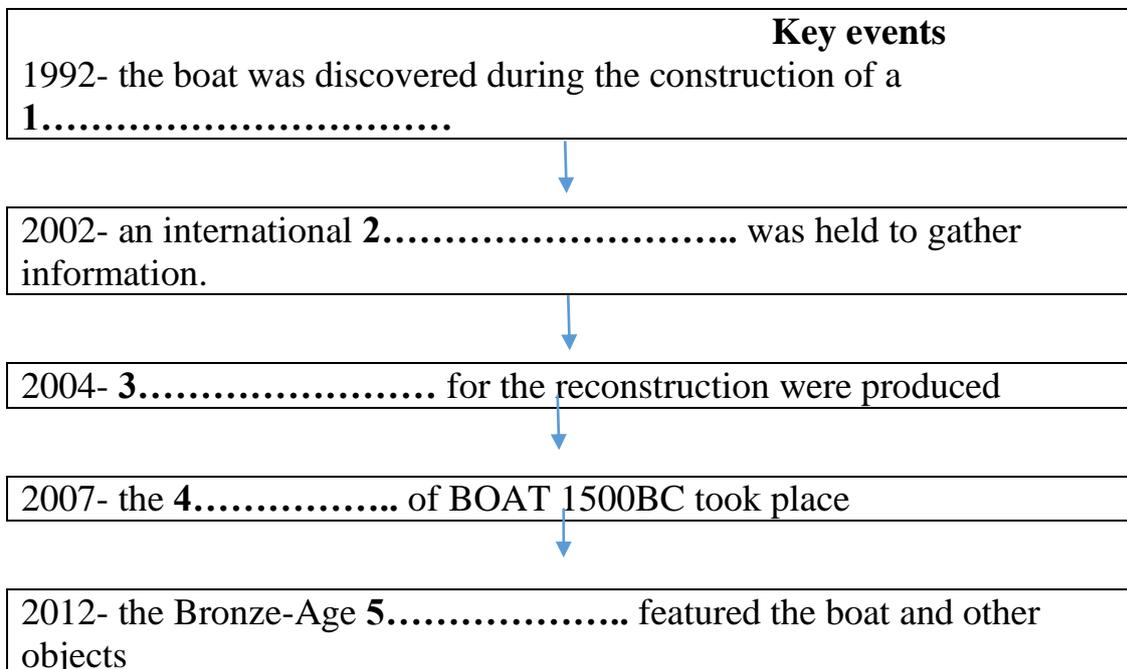
the work, so modern power tools were used to carve the oak planks, before turning to prehistoric tools for finishing. It was decided to make the replica half-scale for reasons of cost and time, and synthetic materials were used for stitching, owing to doubts about the scaling and tight timetable.

   Meanwhile, the exhibition was being prepared ready for opening in July 2012 at the Castle Museum in Boulogne-Sur-Mer. Entitled "Beyond the Horizon: Societies of the Channel & North Sea 3500 years ago", it brought together for the first time a remarkable collection of Bronze-Age objects, including many new discoveries for commercial archaeology and some of the great treasure of the past. The reconstructed boat, as a symbol of the maritime connections that bound together the communities either side of the Channel, was the centerpiece.

Questions 1-5:

Complete the flow chart below:

Choose **ONE WORD ONLY** from the text for each answer:

Key events
1992- the boat was discovered during the construction of a **1……………………………**

↓

2002- an international **2………………………..** was held to gather information.

↓

2004- **3……………………** for the reconstruction were produced

↓

2007- the **4……………..** of BOAT 1500BC took place

↓

2012- the Bronze-Age **5………………..** featured the boat and other objects

Questions 6-9:

Decide whether the following statements agree or disagree with the information given in the text. Write:

True if the statement agrees with the text

False if the statement contradicts the text

Not Given if there is no information on this.

Then support your answers with details from the passage:

6. Archaeologists realized that the boat had been damaged on purpose. (   )

7. Initially, only the technological aspects of the boat were examined. (   )

8. Archaeologists went back to the site to try and find the missing northern end of the boat.   (   )

9. Evidence found in 2004 suggested that the Bronze-Age Boat had been used for trade.   (   )

Questions 10-13:

Choose **NO MORE THAN THREE WORDS AND/OR A NUMBER** from the text for each answer:

10. How far under the ground was the boat found?

11. What natural material had been secured to the boat to prevent water ending?

12. What aspect of the boat was the focus of the 2012 reconstruction?

13. Which two factors influenced the decision not to make a full-scale reconstruction of the boat?

Questions 14 -15:

14) Where can we read the previous article? Support your answer with details from the reading passage.

15) Summarize four facts mentioned in the text in your own words.

Questions 16- 22 are based on the following passage:

The following selection is about the invention of the compact disc, and explains how it works.

Compact Discs

Compact discs (CDs), which may be found in over 25 million American homes, not to mention backpacks and automobiles, first entered popular culture in the 1980s. But their history goes back to the 1960s, when an inventor named James Russell decided to create an alternative to his scratched and wrapped photograph records – a system that could record, store, and replay music without ever wearing out.

The result was the compact disc (CD). Made from 1.2 mm of polycarbonate plastic, the disc is coated with a much thinner aluminum layer that is then protected with a film of lacquer. The lacquer layer can be printed with a label. CDs are typically 120 mm in diameter, and can store about 74 minutes of music. There are also discs that can store 80, 90, 99, and 100 minutes of music, but they are not as compatible with various stereos and computers as the 74–minute size.

The information on a standard CD is contained on the polycarbonate layer, as a single spiral track of pits, starting at the inside of the disk and circling its way to the outside. This information is read by shining light from a 780 nm wavelength semiconductor laser through the bottom of the polycarbonate layer. The light from the laser follows the spiral track of pits, and is then reflected off either the pit or the aluminum layer. Because the CD is read through the bottom of the disc, each pit looks like a bump to the laser.

Information is read as the laser moves over the bumps (where no light will be reflected) and the areas that have no bumps, also known as land (where the laser light will be reflected off the aluminum). The changes in reflectivity are interpreted by a part of the compact disc player known as the detector. It is the job of the detector to convert the information collected by the laser into the music that was originally recorded onto the disc. This invention brought 22 patents to James Russell, who today says

he working on an even better system for recording and playing back music.

Questions 16 – 18:

Choose the correct answer then give reasons for your choice:

16) **According to the passage, why did James Russell invent the CD?**

   a) He was tired of turning over his records to hear both sides.

   b) He wanted to record more music on a new format.

   c) He wanted a purer, more durable sound than he could get from vinyl records.

   d) He was interested in getting patents.

   e) He wanted to work with lasers.

17) **What would happen if the detector on a CD player malfunctioned?**

   a) The spiral track would not be read properly.

   b) The pits and land would look like one unit.

   c) The changes in reflectivity would be absorbed back into the laser.

   d) The music would play backwards.

   e) The information read by the laser would not be converted into music.

18) **Paragraph 3, lines 12 – 18, explains all of the following EXCEPT:**

   a) how the information on the CD is read.

   b) why semiconductor lasers were invented.

   c) where information is stored on a CD.

   d) what pits and bumps are.

   e) the purpose of the aluminum layer of a CD.s

19) **Think of other technological inventions that have influenced our lives in the recent years. Support your answer with reasons.**

20) **Summarize the previous passage in your own words in no more than ten sentences.**

21) **If James Russel would not have invented the compact disc, what would be the alternatives? Express your opinion.**

22) **Identify the main purpose of reading passage determining both the main and the supporting ideas.**

Appendix Two: Critical Thinking Scoring Rubric

Standards and Elements	1	2	3	4
Accuracy: Recognizing the main purpose(s). Distinguishing between the main and subordinate ideas.	Highly inaccurate, with wrong or no objective mentioned. Inability to diffrentiate between the main and subordinate ideas.	Low accuracy, the purpose is inaccurately mentioned. The main idea is also inaccurately mentioned	Some accuracy with the objective but subtle inaccuracy. The main idea is correctly illustrated but with inaccurate details.	Complete accuracy and specific intent
Clarity: Understanding facts, data, or examples supported. Distinguishing between the facts mentioned in the text and the author's perspectives.	Without the use of data, fact, or readable details. Students are unable to differentiate betwwen the facts and opinions.	Improper or minimum use of the facts, data, or examples from the reading, and misinterpretation of the author's perspectives.	Minimal use of reading facts, information, or examples. Students are able to understand and clarify some of the author's perspectives.	Frequent correct use of the facts, data, or examples from the reading. High ability of interpreting the author's perspectives.
Precision: Categorizing and using the content, and certain	Includes no content specific vocabulary	Low precision, an attempt to use the content specific vocabulary, but	Some precision, does incorporate content specific	Complete precision with frequent use of content-specific

vocabulary		uses incorrectly or minimally	vocabulary, may paraphrase correctly	vocabulary, may often paraphrase correctly
Depth: Demonstrating complexity of understanding. Identifying the author's bias. Making judgements about how the text is argued.	No understanding of the connections among purpose, concepts, and/or support in the reading. Inability to make correct judgements about the text.	Limited comprehension or relations in reading purposes, definitions and subtle judgements	Mainly understands the links between intention, concepts and /or reading help and able to make comprehensive judgements.	Complex understanding between intent, concepts and help in reading the text and accurate comprehensive judgements are made.
Relevance: Identifying / generating conclusion and adding personal opinion based on content, Making relevant inferences.	No relevance or conclusions stated	Low relevance, with basic conclusions stated	Some relevance with basic conclusions, but does not personally connect to the concepts.	Total relevance, describes some assumptions, can involve personal opinion on the topic based on the content
Logic: Implementing Concepts and content. Evaluating credibility	Not implementing concepts. Inability yo check the author's credentials and expertise.	Low implementation or incorrect application of concepts. Limited ability to analyze the bias of the author	Some application of concepts, but uses generic ideas. Some how able to check the truthfulness and correctness of information.	Total application of Concepts and other contexts utilizing specific examples and information. Totally able to check the information with other credible sources.

**Adopted from Arifin (2020). The Role of Critical Reading to Promote Students'
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