The Impact of Teaching Extended Thinking:

A Study on High School Students' Comprehension Skills in a

Private School in Dubai

اثر تدريس مهارات التفكير العليا (التفكير الممتد):
دراسة في تنمية مهارة الإستيعاب لدى الطلاب في مدرسة خاصة بدبي

by

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Abstract

The study aimed to investigate the impact of teaching Exteneded Thinking Skills on enhancing 9th graders' reading comprehension. The skills addressed were text complexity, synthesis, and critique. The researcher adopted the quasi-experimental design to answer the questions of the study. The samples in the study consisted of (38) female students divided into two groups. One represented the experimental group of (22) students; and the other represented the control group of (16) students. Both groups were randomly selected from a private school in Dubai.

The experimental group was taught the Extended Thinking while the control group was taught using the traditional method. For collecting the data, the researcher constructed two tools. The first tool was by selecting a grade-approperiate reading comprehension passage and designing a task based on the passage to be used as a pre and post tests. Concerning the second tool, the researcher used an interview as an additional method to measure the experimental group development in learning Extended Thinking skills.

The data of the study were analyzed using a comparative approach, which was used to determine if there is any differences between the groups. Thematic analysis method was used for the interview to measure the effect of teaching Extended Thinking Skills on the experimental group. According to the results of the study, there seemed to be statistically significant differences between both groups for the experimental one. The analysis of the pre and post tests indicated a large effect of teaching Extended Thinking on improving synthesis and critique skills while it had a slight effect on improving text complexity skill for only few students in the experimental group. The results of the interview showed a large effect on the students' perceptions of using Extended Thinking.

The study recommended to use other Extended Thinking Skills in teaching reading to improve students' reading comprehension. It also proposed that a further research to examine the impact of other factors on developing the students' reading comprehension and language competence should be carried out.

ملخص الدراسة

هدفت هذه الدراسة إلى التعرف على أثر تدريس مهارات التفكير العليا (التفكير الممتد) ودورها في تنمية مهارة الاستيعاب لدى طالبات الصف التاسع في مدرسة خاصة بدبي، حيث كانت المهارات المستهدفة : النص المعقد والتركيب، ونقد النص. وللإجابة عن أسئلة الدراسة، استخدم الباحث المنهج شبه التجريبي، حيث طُبقت الدراسة على عينة ممثلة من (38) طالبة تم تقسيمهن لمجموعتين إحداهما تجريبية تكونت من (22) طالبة والأخرى ضابطة تكونت من (16) طالبة. تم اختيار المجموعتين بالطريقة العشوائية.

تم تدريس مهارات التفكير العليا للمجموعة التجريبية، بينما استُخدمت الطريقة العادية في تدريس المجموعة الضابطة، ومن أجل جمع البيانات قام الباحث بعمل أداتين اثنتين للدراسة وهي اختيار نص قراءة استيعاب وعمل بعض الأسئلة عليه؛ ليتم تطبيقه في الاختبارين القبلي والبعدي على المجموعتين، بالإضافة إلى الأداة الثانية المساندة فقد تم تصميم مقابلة لقياس التقدم في مهارات التفكير الممتد لدى طالبات المجموعة التجريبية.

وبعد تحليل النتائج ومعالجتها إحصائيا باستخدام المنهج المقارن لمعرفة الفروق الإحصائية بين المجموعتين تم إستخدام التحليل المواضيعي في أسئلة المقابلة لقياس مدى الأثر من تدريس مهارات التفكير الممتد على المجموعة التجريبية، وكما أظهرت النتائج وجود فروق ذات دلالة إحصائية بين المجموعتين الضابطة و التجريبية في الاختبارات لصالح المجموعة التجريبية. وجد أيضا أن هناك أثرًا كبيرًا لصالح المجموعة التجريبية في مهارتي نقد النص والتركيب وأثر متوسط في مهارة النص المعقد لعدد قليل جدا في نفس المجموعة، كما أظهرت نتائج المقابلة أثرًا كبيرًا جداً في وجهة نظر طالبات المجموعة التجريبية حول أثر تدريس التفكير الممتد على أدائهن.

هذا وقد أوصت الدراسة بضرورة تدريس مهارات التفكير الممتد الأخرى لتحسين مهارة قراءة الاستيعاب لدى الطلبة، واقترحت الدراسة ضرورة إجراء المزيد من الدراسات للتعرف على أثر استخدام العوامل الأخرى في تنمية الفهم القرائي للغة و الكفاءة اللغوية لدى الطلبة.

Dedication

To the people who played the biggest part in my success: my parents, whose support and love are unstoppable.

To all my close and best friends for their continuous encouragement and motivation.

To everyone who has taught me a letter or a piece of information: my teachers.

To my home country: Syria.

To Dubai, a place that motivated me to finish this work.

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Definitions of Terms

Term	Definitions
9th graders	This refers to students in their first school year of high school in the American schools, where a student's age is 14 - 15.
Foreign Language	This term refers to the language that is neither your mother tongue nor used as official language where you live. (Aharony, 2006).
Learning	This term refers to a conscious process, which results only in knowing about the language.
Extended thinking	This term refers to the concepts and ideas that are transformed when learners synthesize information from different resources. This set of skills help learners to be problem-solvers and good text readers.
Achievement	This term refers to any accomplishment and proficiency of performance in a learned skill or body of knowledge. (Good, Dictionary of Education, p.7).
Experimental Group	This term refers to a group of students who received an intervention that helped them use extended thinking skills.
Control Group	This term refers to a group of students who did not receive any intervention.
Comprehension	This term refers to the construction of meaning using both the decoded language and prior knowledge. (Lunda, 1991).
Reading Comprehension	This term refers to reading that does not only involve understanding words, sentences or even texts, but also involve a complex integration of the reader prior knowledge, language proficiency and metacognitive strategies. (Paran, 1996).

Chapter One: Introduction

1.1 Background & Motivation to the Study

Without a doubt, reading is considered as one of the most basic language skills that our children need to learn today. Sadly, teaching this important language skill has not yet taken the due attention in our schools. In a traditional classroom, reading is still taught by asking the child to learn the letters, master the letter-sound relationships and then learn the vocabulary words in isolation of their context. After that, the child is exposed to simple stories with loads of high-frequency words. After all these efforts and methods, teachers as well as researchers (Harp & Brewer, 1996) state their frustration that most of the students do not comprehend what they read.

The most important element in solving this problem is the teacher's method and the way this method is implemented in classroom. How the teacher views reading will definitely impact how the student reads. Returning to the traditional reading classroom, a traditional method envisions teaching reading by presenting a reading passage that is most of the time in the textbook and then asking students to read it – loudly or silently. This passage will be followed with questions to answer after reading time finishes. The problem here is that all the students will finish reading, but almost all of them do not have the effective strategies of how to read. What makes this problem to happen is the teacher and the method implemented in classroom. As a result, students will only opt for what is required from them even though they do not like what is presented to them. Their only concern will be reading the passage in the textbook and doing the questions that follow so they can pass the exam. Motivation and the ability to read a variety of passages do not exist with this traditional and current scenario in our schools because most of the learners still find reading a taxing task.

It is usually argued that teaching reading is more difficult than teaching writing. That may be true because reading requires an integrated time as well as accumulation of experience. Sanders (2001) believes that a learner becomes able to read when he/she has the linguistic and the rhetorical competencies. Once these two competencies are there, the child can read effectively and meaningfully. This means that students need to learn how to read because reading comprehension requires strategies that usual exist only in the teachers' lesson plans, but students do not seem to master these strategies when they do reading.

From what has been said so far, a very essential question emerges here concerning reading; namely what is reading comprehension? Good readers are those who interact with the text they read and use their own strategies and skills to make their reading meaningful. Therefore, reading comprehension requires, as Sanders (2001) said, a skill that distinguishes the passive and unskilled reader from the active and skilled one. To clarify this idea more, a good reader may use context to learn words, make predictions to understand events and characters, set a purpose to understand the main idea in the passage and make reading meaningful.

According to Raymond (2006), every teacher wants their students to be effective readers, but not every one has a method to teach reading effectivey. Reading requires skills and strategies that help learners comprehend the texts they read automatically. Furthermore, Adams (1990) claims that with proper instruction, learners are able to overcome their reading problems and become fast and efficient readers.

As a matter of fact, reading has not received the required attention from researchers and pedagogues and most of the attention was given to language oral skills, such as speaking and listening. For instance, when the Audio Lingual Method was developed in the United States of America during World War II, reading was totally regarded as a passive skill and hence given no attention (Fry 1997). But, years later when this method proved its failure, there was a necessity for other methods that take other language skills into consideration.

In the years 1960s, the Cognitive Method in the United States and the Communicative Approach in Britain emerged to give equal attention to the four language skills. Since then, researchers and pedagogues started to give reading comprehension more attention to the extent of considering reading as a major skill for English Language Learners (ELL) across the world. Trelease (1989), Ward (1980) and McDonough & Show (1994) viewed reading as the most important and fruitful foreign language skill that should be effectively taught. Also, Al-Mutawa and Kailani (1996) regarded reading as the window through which learners interact with the world. Kim and Krashen (1997) found reading as an essential means for developing competence in second language learners. Moreover, Kaddoumi (1995) argued that reading a foreign language helps in academic studies, professional success and personal development.

There has been some research interest on reading in second language, especially during the first quarter of the last century. That interest paved the way for so many theories that gave research-based insights on the best way to teach reading. Most of those theories have influenced some of the current methods of teaching reading comprehension in schools. Allen & Valet

(1977) contended that though reading does occasionally exist in classroom, it is the most skill that is needed outside classroom. In fact, views and opinions about the nature of reading are many as Robinson & Good (1987, p. 9) once said, "No definition of reading can possibly include all viewpoints and features because each person's definition reflects what reading means to that person."

In general, one cannot separate reading from meaning which plays the biggest role in the reading process. In addition to that, reading is an interactive process in which the reader interacts with the written text. This interaction between the reader and the text takes the form of utilizing experience and recalling prior knowledge to make reading meaningful. It is worth mentioning here that students need all this information and knowledge that help them adopt strategies when they do reading. Add to this, understanding and comprehension that paly a key role in reading success.

In the same vein, many writers came up with various definitions of reading. Brumfit (1980 p.7) defined reading as "an extremely complex activity involving a combination of perceptual, linguistic and cognitive abilities." Williams (1984 p.12) depicted reading as "a process of obtaining meaning from the text." Mayer (2003 p.26) noted that reading comprehension is a "techniqu for improving students' success in extracting useful knowledge from text." Grellet (1981 p.3) considered reading as "understanding a written text through extracting the required information from it as efficiently as possible."

However, due to all these challenges in teaching reading and the advancements in the field of education and linguistics, many views and opinions have changed towards teaching reading. Reading is no longer viewed as a discrete skill; rather it is viewed as an integrated set of skills. So, great emphasis has been placed on reading across all the phases and monitored by school leaders to make sure that students not only read but also understand what they read. There were also some efforts to make students in the higher phases of schooling be able to read authentic English texts and understand other technical topics.

Unfortunately, teachers always grumble that reading is still a challenge for their students and that students are either slow readers or they have poor reading comprehension skill. They also complain about the inability of their students to tackle even factual questions in reading comprehension. It is worth mentioning here that reading is given much time in schools and teachers spend more time on reading comprehension but there is still a large number of students who are lagging far behind in reading.

Undoubtedly, there is a problem with the perception and the method which have both led to this reading crisis. In fact, the main problem lies in the inability of students to think and apply thinking skills to their reading, since reading is a process. Toulmin (1979) & Sacco (1987) said that when learners are lacking in thinking skills, they are unable to participate in their education and unable to contribute to their society. Therefore, learning begins when teachers take an active role in implementing effective strategies and equipping their students with higher-order thinking skills for these students to be life-long learners.

Presumably, there is a reading comprehension crisis in all schools and all researchers have agreed upon the fact that teaching effective strategies and promoting higher-order thinking in classroom is an important factor to increase students' reading comprehension. The National Reading Panel in 2005 stated that there is a big number of teachers who do not have a solid foundation for teaching reading comprehension. Here comes the importance of professional development programs that play a role in teaching teachers effective reading comprehension strategies and how to teach these strategies.

All these considered, improving reading is a top priority for all educators and school leaders, and implementing higher-order thinking skills is a mission number one for all teachers. Without strong reading foundation, strategies and skills, our children will remain poor readers and they will struggle through schooling and in life. Pressley (2000) described reading comprehension as a thinking process that is used to make meaning of what a person reads. Powerful readers are those who make good use of their higher-order thinking skills and use them before, during and after reading. As Marier (2000) once said that poor readers are those students who do not use higher-order thinking.

1.2 Statement of the Problem

Most of the students in schools know how to read but they do not know how to comprehend. What teachers ask them to do is only to read and do their tests on what they read and that is why most of them are unable to read meaningfully. The main problem lurks in the fact that there is no effective strategy and no learned reading skill, and reading in schools is still viewed as a discrete language skill. Therefore, students do not interact with the text they read nor they understand the meaning of what they read. This actually happens because students do not have effective skills that may help them in reading or they are not immersed in reading routines

that enhance these skills. Researchers like Simms & Knezek (2002), Heong (2011) and Seif (2012) have reinforced this by the results of their studies.

Moreover, it is widely argued that it is easier for learners when they master higher-order thinking skills to come up with new things than when they receive the information from their teachers. Such argument was stated by Razoky & Elbahadly (2012). So the aim of this study is to examine how students should utilize these higher-order thinking skills to improve their reading outcome. It has been observed that many high school students who are learning the English language as a foregin language still find reading as a barrier and obstacle for their learning despite the fact that they have been exposed to this language for a number of years.

Effective learning takes place when learners connect what they learn to their life and employ all the skills that enable them to learn and be life-long learners. This process will help them to be ready for their future. From this perspective, the researcher extracts the importance of teaching Extended Thinking skills that promote higher-order thinking and encourage students to be critical thinkers. Still, students need to be fully aware of the close relationship between extended thinking and reading comprehension. They usually do not read because they do not have the encouragement, motivation and interest. Therefore, the study strongly highlighted the importance of effective methods that arouse students' interest and instill reading passion into their hearts.

1.3 Aim & Objectives of the Study

The aim of this study is to investigate the effect of teaching Extended Thinking Skills on the 9th grade students' comprehension. Hence, the study has the following objectives:

- The impact of using Extended Thinking skills on improving students' reading comprehension.
- The impact of certain extended thinking skills, such as text complexity, synthesis and critique on students' reading achievement.
- Recommendations and insights on how teaching comprehension improves through effective implementation of Extended Thinking skills.

1.4 Research Questions

This study aimed to answer the following research questions:

- Does teaching Extended Thinking have positive impact on learners' competence to comprehend reading comprehension texts?
- Is there any significant and statistical relationship between teaching extended thinking skills and students' reading comprehension?
- Can teaching Extended Thinking skills result in a better performance on reading comprehension?

1.5 Hypotheses of the Study

Since the study aims at investigating the effect of teaching Extended Thinking on improving 9th grade students' reading comprehension, the researcher attempted to test the following null hypothetical questions:

Hypothetical Question 1: Teaching Extended Thinking has no role in improving students' reading comprehension.

Hypothetical Question 2: There is no relationship between Extended Thinking and reading comprehension.

Hypothetical Question 3: Extended Thinking skills may not necessarily generate good readers.

1.6 Significance of the Study

The importance of this study lies in the fact that Extended Thinking has not been yet researched as a fully-fleged literature like critical thinking. So this study may be the first one which deals with Extended Thinking and the importance of teaching it in schools in the UAE education context. For this very reason, this study may provide teachers and learners with some useful insights on Extended Thinking skills and how these skills may help improve students' reading comprehension. It may also raise teachers' awarencess on the importance of integrating this type of thinking into their method and curriculum. Moreover, this study may affirm in a way or another the correlation between Extended Thinking and reading comprehension. Besides, this study may provide more information on the impact of Extended Thinking on students' reading comprehension in high schools and on their opinions about this type of thinking.

Indeed, teachers need to know the best classroom practices that help improve reading comprehension of those students who struggle in reading second language texts. This may add more value to the significance of this study and help learners overcome reading challenges. With better understanding of Extended Thinking skills and the nature of reading process, teachers will be able to choose the most effective strategies and students will learn the most useful skills that facilitate reading comprehension for them.

1.7 Summary

In this chapter, we have presented the problem of the study which aims at investigating the effect of teaching Extended Thinking skills (text complexity, synthesis and critique) on the 9th graders to improve learners' performance in reading comprehension. Also, this chapter presented the statement of the problem, research questions, hypotheses and the significance of the study.

Chapter Two: Literature Review

2.1 Chapter Overview

In this chapter, we are going to show the relationship between language and thinking through presenting the key concepts of thought and discussing them on the one hand and talking about some relevant theories and dscussing them too. Then we are going to demonstrate how teaching Extended Thinking can maximize learning opportunities in classroom. After that, we are going to review various similar previous studies: Teaching for extended thinking, such as Depth of Knoweldge (DOK), which has definitely a great impact on teaching Extended Thinking in classroom. The chapter then will end up with a summary of the key findings of the literature based on the understanding developed from the similar previous studies.

2.2 Conceptual Analysis

There seems to be a close correlation between language and thinking in cognitive psychology but these two processes can be treated as two independent psychological activities (Greene, J. 1987). Over the years, cognitive psychology has emerged as a theory that explains everything related to human behavior and among many attemps to put this theory as an independent branch of pyshchology that should be distinctive from social psychology, physiological psychology, abnormal psychology and the like, this approach can be potentially applied to any activity related to human beings (Green, J. 1987).

2.2.1 Language as a Human Activity

One of the most distinctive features of human beings is language. Studying human language can pave the way for exploring the essential part of humans; namely the mind, as it leads to full understanding of how this mind works. Chomsky (1972) puts it:

> "When we study human language we are approaching what some might call the 'human essence,' the qualities of mind that are, so far as we know, unique to humans"

Language is also a means of communication whether this communication is face-to-face or a written one. It is very difficult to imagine the world without this verbal knowledge; that is language. (Greene, J. 1987). There is no doubt that language is a cognitive tool that helps facilitate thinking.

2.2.1.1 Functions of Language

There are six essential functions of language as outlined by Andy Cark (1998). The first function of language according to Clark is ***memory augmentation*** in which the acquisition of language helps clreate a storge in memory that contains systematic data to help oral communication as well as written one. The second function is the ***environmental simplification***, a linguistic process that helps labeling the perceived things in the surrounding environment and aligning properties to objects. As far as the third function is concerned, there is the ***coordination language*** that allows a mutual control of both attention and object allocation in a harmonious performance. The fourth function is known as the ***transcending path-dependent learning*** which states that the cognitive path is not the only one that allows linguistic creatures to be short-circuited. The fifth function is how ***control loops language*** makes us control our present behavior and plan our future. The sixth and the last function of language is ***data manipulations and representation***. These intellectual arguments are usually the product of brain and act in concert with other many external resources. These resources enable us to pursue manipulations and juxtapositions of ideas and data which would quickly baffle the un-augmented brain" (Clark 1998 p.173). These different functions of language, though they do not mark the essence and type of thinking, they not only extend thinking but also enhance it.

Building abstract knowledge and the way it is built is still an area of research and discussion among researchers, psychologists and philosophers. Therefore, the term 'knoweldge' has gained a good deal of attention from developmental psychologists whose main interest was to find an answer to the long-standing and essential question: How this knowledge is acquired and formed? Researches (Gelman, & Wellman, 2010; Hickling & Wellman, 2001) have shown that by the age of two, children start to make some predictions about the physical world around them. Children at this age are also able to explain the actions of others (Wellman & Liu, 2007). This ability can also be extended to some imaginary scenarios (Harris, German & Mills, 1996; Sobel & Gopnik, 2003). However, there are other researches (Bullock, Gelman & Baillargeon, 1982; Spelke, Breinlinger, Macomber, & Jacobson, 1992), (Gelman & Wellman, 1991; Inagaki & Hatano, 2006) and (Gopnik & Wellman, 1994; Perner, 1991) that have shown by the age of five, children are able to understand the casual world around them with the daily principals of biology, physics and psychology.

2.2.2 Thinking as a Theory

Thinking has taken a great attention from both philosophers and pychologists long time ago and they have come up with a variety of definitions of thinking. Decartes and Locke, for instance, regard thinking as a process that involves bringing concepts or ideas before the mind (Descartes and Locke); Berkeley and Hulme, on the other hand, view thinking as a process that forms a sequential series of images in the mind (Berkeley & Hulme). Yet, thinking for Hendrick is an activity that uses verbal images in a form of inner speech (Hendrick, 1995). All these views and defintions of thinking are actually dependent upon whether we think in words or express our thoughts in words. In fact, the common rule of all these views is the emphasis on the notion of mind.

However, these views have also been criticized by other philosophers, like Ryle who called it the 'dogma of the ghost in the machine' and some radical behaviourists, such as B. F. Skinner who believes that 'The real question is not whether machines think but whether men do' (Skinner, 1969). To solve this conflict and find a good solution to this problem, there existed two schools of thought. Each one adopts a stance that contradicts what the other has. The first school is represented by the nativists, who adopt the top-down approach for abstract knowledge that must exist as a priori for them. For this party, children already have the innate basic abstract knowledge and they only need to build upon it.

Unlike nativists, empiricists, whose views about abstract knowledge are completely different from their opponents, believe that this knowledge is understood as a set of associations that is designed in a bottom-up structure and it is acquired accordingly. This has, in fact, left human cognitive complexity in nowhere because both nativists and empiricists failed to find the correct answer to the essential aforementioned question. This state of confusion between the views of nativists and empiricists have paved the way for the emergence of a more rational view that can stand in between to find a moderate answer to the question of thinking; namely Rational Constructivism (RC). Rational constructivists have found that both nativists and empiricists' views may include good points that might get a good answer if put togerther. That is why rational constructivists searched for a common middle ground between nativists and empiricists.

2.2.3 Extended Thinking Skills

Despite all these approaches and theories that impact students' learning in a way or another, we intended to focus in this study on the effect of Exended Thinking on students' reading comprehension. We focused particularly on three important extended thinking skills, such as text complexity, synthesis and critique.

- **Text complexity** is a stage in reading where readers use the original text to design a more complex model of that text. This higher comprehension level starts with the questioning process that requires readers to ask and answer questions to achieve full comprehension. Then, learners tend to construct meaning during reading to enhance understanding, solve problems and discover new information. After that, learners will have a text that is designed with more complex ideas than the original text.
- **Synthesis** is defined as a process of combining elements to create something new. When students synthesize, they develop new knowledge out of the ideas, arguments, theories and points of view of others. Synthesis involves taking what is relevant, linking it to other points and creating a coherent whole.
- **Critique** generally refers to criticism and to critique a piece of writing is to criticize it. But, critique can also refer to the activity of making judgments about the qualities of ideas in a text, debate or argument. Hence, critique is a careful judgment in which someone gives an opinion about something whether good or bad.

2.3 Theoretical Framework

Long time ago, learning has gained a great attention from philosophers as well as linguists, and knowelge hence has been viewed differently by two schools of thought. Some have viewed knowledge as an innate thing born with the person (nature) while others have contended that knoweldge is acquired from environment and learned by experience (nurture). This contention between nativists and empiricists have built a good platform for learning about knowledge acquisition and relating these two schools of thought will definitely add some value to the theortical structure of this research.

2.3.1 The Behaviourist/ Structuralist Learning Theory

B. F. Skinner's theory of behaviourism has taken behavior as a core concept and evidence for measuring learning. Skinner focuses on behavior and how evnvironment infuences this behavior. Therefore, for behaviourists learning is measured by observable behaviours that are affected by antecedents and reinforcements. Hence, behaviourism as a theory of knowledge views all aspect of scientific knowledge as related to experience. J. M. Willhite (2013) claims that behaviorism is a philosophical theory that argues all human knowelge is derived entirely from sensory experience.

In a closer look into learning inside classroom, teachers, according to behaviorists, should not only shape students' behaviours gradually and carefully, but also adjust any opportunity of learning by encouraging students to behave in a way that helps learners achieve a certain goal. So learning here is viewed as a mere acquisition of new behaviours that are learned and reinforced by repetition till learners reach the level of mastery. In this way, learning is seen as a mechanical process rather than a mental one. As Twaddell (1935: 57, cited in Brown 2000: 8-9) states:

> Whatever our attitudes toward mind, spirit, soul, etc., as realities, we must agree that the scientist proceeds as though there were no such things, as though all his information were acquired through processes of his physiological nervous system. In so far as he occupies himself with physical, no material forces, the scientist is not a scientist. The scientific method is quite simply the convention that mind does not exist…"

As a matter of fact, behavioristic view of learning has dominated the 1940s and 1950s period of time in which learning has become the mere connection between stimuli and responses. However, this theory has undoubtedly its own limitations due to the entire and only focus on observable behavior rather than the underlying levels of learning such as understanding, reasoning and thinking.

In spite of all these limitations of behavioursm, no one can ignore the fact that some of its aspects and principles are still active and used by teachers in today's classroom. Many teachers are still influenced by this approach and believe strongly in it. Needless to say that behaviorism is a theory that informs the instructional method and this behaviorist model of education informs teachers to teach content to students using particular methods (Joyce et al., 2004).

2.3.2 The Cognitive/ Constructive Learning Theory

The Constructive Learning Theory (CLT) emerged in the 1960s when cognitive psychologists started to challenge what behavioursts thought of learning. In behavioural theories, knowledge is seen as a mere passive and automatic response to external environmental factors, while cognitive approach focuses on the mental processes that underlie that response. According to Piaget, learners respond not to external stimuli but to their interpretation of those stimuli. Chomsky (1966: 43, cited in Allen and Campbell 1972: 53) claims:

> "… it seems to me impossible to accept the view that linguistic behavior is a matter of habit, that it is slowly acquired by reinforcement, association, and generalization…"

Knowledge for cognitivists is viewed as an entity constructed by learners through learning process. Hence, learning is far from only memorizing facts, but it is a mental and active process that includes adding and integrating new experiences and information with existing concepts. So learning here is not only receiving information conveyed from teachers to learners and repeating this information, but also taking this information by students and assimilating it with their pre-existing notions and experiences to come up with new understanding of this information in a complex and refined way.

So the role of the teacher in this connection is transformed from a person who only gives information to his students to a person who helps these students construct and build their own knowledge and understanding of various issues. Such a cognitive view on knowledge has an impact upon the methodology used inside classroom. The emphasis here shifts from the teacher, who is no longer the source of information, to the students, who become responsible for their own learning. The teacher's role here has two important points; designing class activities that engage learners and making sense of the content that is being taught. Unlike behaviourist classroom in which learners are passive recipients, constructivist classroom produces learners who are more self-dependent and autonomous. This criticism against behaviorism is put clearly by Curran's statement about learning as

> "animal learning," in which learners are "passive" and their involvement limited"
> (Curran 1976: 84, cited in Richards and Rodgers 1986: 117)

It is clearly evident that the cognitivist theory stripped teachers of their 'trasitional' role in classroom as information givers into facilitators of acquisition and organization of language. So the importance of constructivism here springs from the fact that learning is that social construction of knowledge and that students should be taught by and with the teacher and each other to learn new content (Joyce et al.). So I think that this theory is the best example for personalized instruction because it emphasizes the give-take relationship in learning and it focuses on how students learn (Campbell, Robinson, Neelands, Hewston, & Mazzoli, 2007). Therefore, the principals of this theory are much needed for today's classroom.

2.3.3 Norman Webb's Depth of Knoweldge

In the 1990s the American scientist Norman L. Webb developed a four-level model that was refered to as Depth of Knoweldge (DOK). This concept represents the depth of understanding required to explain assessmet-related and classroom activity items. Webb's DOK is intended to not only address depth of knowledge but also to promote cognitive rigor among learners and measure their own readiness for colleage. the wheel targets higher-order thinking skills and categorizes them in a way that is similar to Anderson and Krathwohl's revision of Bloom's Taxonomy, Cognitive and Metacognitive Systems of Marzano's New Taxonomy, and Biggs and Collis's Taxonomy. Yet, Webb's model is viewed as different by educators and considered as an effective tool for teaching and learning because it is aligned to its own solo four quadrants.

The importance of Webb's model springs from the fact that it promotes text complexity and encourages learners to understand why and how they apply their knoweldge to new contexts. Traditionally, learners were required to understand and think deeply about certain issues and topics given to them in classroom, but Webb's model comes to provoke learners to use their previous knowledge and apply their own understanding by using a bundle of higher-oorder thinking skills and strategies to make their learning meaningful and connect it to real-life. However, the model contains four thinking levels and each level represents a plethora of skills and strategies of which learners have to have a good command to excel in their tasks. The following figure [1] represents how Depth of Knoweldge (DOK) model looks like.

Figure 1

Depth of Knowledge (DOK) Levels

Level One (Recall)

Draw, Identify, List, Define, Label, Memorize, Calculate, Illustrate, Arrange, Who, What, When, Where, Why, Measure, State, Name, Tabulate, Report, Repeat, Use, Infer, Tell, Recall, Recognize, Quote, Categorize, Recite, Match, Collect and Display

Level Two (Skill/Concept)

Graph, Identify Patterns, Organize, Classify, Construct, Separate, Modify, Cause/Effect, Predict, Estimate, Interpret, Compare, Distinguish, Relate, Use Context Cues, Make Observations, Assess, Summarize, Construct, Show, Compare, Investigate, Differentiate

Level Three (Strategic Thinking)

Revise, Develop a Logical Argument, Use Concepts to Solve Non-Routine Problems, Critique, Explain Phenomena in Terms of Concepts, Formulate, Draw Conclusions, Hypothesize, Cite Evidence, Apprise, Prove

Level Four (Extended Thinking)

Design, Connect, Synthesize, Apply Concepts, Critique, Analyze, Create, Prove

Describe Explain Interpret

Level One Activities	Level Two Activities	Level Three Activities	Level Four Activities
Recall elements and details of story structure, such as sequence of events, character, plot and setting.

Conduct basic mathematical calculations.

Label locations on a map.

Represent in words or diagrams a scientific concept or relationship.

Perform routine procedures like measuring length or using punctuation marks correctly.

Describe the features of a place or people. | Identify and summarize the major events in a narrative.

Use context cues to identify the meaning of unfamiliar words.

Solve routine multiple-step problems.

Describe the cause/effect of a particular event.

Identify patterns in events or behavior.

Formulate a routine problem given data and conditions.

Organize, represent and interpret data. | Support ideas with details and examples.

Use voice appropriate to the purpose and audience.

Identify research questions and design investigations for a scientific problem.

Develop a scientific model for a complex situation.

Determine the author's purpose and describe how it affects the interpretation of a reading selection.

Apply a concept in other contexts. | Conduct a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/ solutions.

Apply mathematical model to illuminate a problem or situation.

Analyze and synthesize information from multiple sources.

Describe and illustrate how common themes are found across texts from different cultures.

Design a mathematical model to inform and solve a practical or abstract situation. |

2.3.4 Teaching for Extended Thinking

The term Extended Thinking (ET) represents the fourth level in Webb's cognitive model of depth of knowledge. According to the model, this type of thinking requires higher-order thinking and deep knowledge of the topic or task. As the name implies, the task in this level requires both exended activities as well as extended time for the learner to complete it properly. It is worth mentioning here that the extended time given is not always a distinguishing factor if the work is only repetitive or the task does not require the application of significant conceptual understanding and higher-order thinking.

Moreover, this type of thinking includes a number of skills that should be taught to students systematically when they embark on any thinking activity or complex task. This makes teaching extended thinking skills a necessity in the classroom. Reading, whether first, second, or even additional language, is not only a very essential component of classroom activity and routine but also a highly complex process (Wurr, 2003) and teaching extended thinking is highly recommended for this complex process. Also, reading is not a passive activity; rather it is a task that requires learners to search for meaning and read with comprehension (R. C. Anderson & Pearson, 1984). Extended thinking here requires learners to dig deep into the text level and combine different components to evaluate the overall text.

The researcher in this study focuses on teaching three extended thinking skills (**text complexity, synthesis and critique**). Each of these skills demands mental efforts. For instance, in text complexity, learners need to study all the aspects of a certain text, such as linguistic and non-linguistic aspects, to be able to evaluate the ideas. Synthesis, on the other hand, requires learners to transform their knowledge from at least one given text to a new task. This transformation process is said to help learners develop hypotheses and perform complex analyses out of the connections among texts and tasks. Concerning text critique, learners are asked to evaluate the point of view in the text and express their own opinion about this point of view. This skill allows learners to either agree or disagree with this point of view. So when teachers tend to teach for extended thinking, students need to *analyze* and *synthesize* information from different sources, *examine* and *explain* alternative perspectives across a variety of sources, and they also need to evaluate practices or theories in an analytical way.

2.4 Review of Related Literature

Several studies and researches have been conducted by many researchers all over the world to advocate and promote teaching higher order thinking and reasoning skills. These studies have taken this topic from different dimesions and investigated its eeffectiveness when it is learned and taught properly. Here is a brief summary of the most recent 15 case studies that investigated the impact of teaching extended thinking skills such as critical thinking, reasoning, analysis and synthesis skills on learners.

In 2010 Mamour Choul Turuk Kuek from Newcastle University conducted a study on how L2 students' thinking and reasoning abilities as manifested in their argumentative writing skills can be improved. The study randomly selected 30 first year university students from the faculty of Medicine, Upper Nile University, Sudan. The subjects in the study were first tested and then assigned into experiemtal and comparison groups. There was a 12-week intervention program for the experimental group in which participants were taught reasoning and critical thinking to improve their argumentative writing skills by integrating some close reading strategies. After the 12 weeks, the group was post-tested to find out that the students' reasoning and critical thinking skills in argumentative writing improved dramatically. The findings also showed that the students' attitudes towards reasoning and critical thinking have changed positively and students got a clear understanding of the relationship between reading and writing.

In 2011, Soheer Mahmoud Ahmad Abu Nejmeh did a research on higher thinking skills on 10th grade students and investigated how this integration helps improve learners' achievement in reading comprehension. A reading passage was selected and an achievement test was constructed by the researcher. Participants in this study were divided into two groups: experimental group and control group. The experimental group was exposed to (inferring, questioning and summarizing) while the control group was not exposed to any of these aforementioned skills. The researcher then asked all the groups to respond to the test questions. The study used two methods to analyze the results: paired test, and Shafe Post-Hoc test. The results of the study showed significant differences for the experimental group. Moreover, significant differences were revealed in the test scores attributed to gender but not to the interaction with the strategy. Based on that, the researcher recommended that more attention should be given by teachers to the (HOTS) strategies. The study finally encouraged that further research should be carried out to examine other HOTS skills.

One more research done by Nor Shidrah Binti Mat Daud in 2012 at the University of Canterbury on developing critical thinking skills in tertiary academic writing through the use of an instructional rubric for peer evaluation. In this study, the researcher explored several approaches to developing critical thinking in undergraduate students' academic writing course. The study divided the partcipants into three groups: peer review, peer evaluation and self-evaulation group. Critical thinking for these groups were measured before and after the intervention plan. The study used two instruments: the Cornell Critical Thinking Test Level X (CCTT-X) and the English for Academic Writing term paper for evidence. Other instruments such as questionnaires, inteviews and classroom observations were also used in the study. The study found that all treatments showed some potential for fostering the development of critical thinking skills and introducing either the rubric or checklist or promoting peer discussion has promoted critical thinking in an academic writing course.

In 2014, Berna Canturk Gunhan did a study to evaluate the reasoning skills in geometry-related subjects of six 8th Grade students. The researcher collected data in a public elementary school and uses a case study with qualitative research techniques to investigate how students use reasoning skills. In this study, six geometry problems were used to collect the study data. The students were asked to think aloud when solving the problems so as to be better able to explain their thoughts. The findings of the study identified that the processes involved when demonstrating reasoning skills showed a number of differences.

Another study conducted by M. Secil Kurbal in 2015 on the effects of Puzzles and Games on the 6th grade students' problem-solving and reasoning skills. The study focused on the students' problem-solving strategies in the beginning and at the end of the course to measure the effectiveness of such course on students' performance. 40 students were selected in this study from 6th grade in a private middle school in Ankara, Turkey. The data were collected through the Mathematical Problem Solving Test (MPT), course evaluation forms and semi-structured interviews. The researcher in this study had a pre-test and a post-test to compare the results. The findings of the study indicated an increase in the students' problem-sovling strategies after being exposed to Puzzles and Games course. The study concluded that the main reason for improvement is the proper reasoning skills and the effective puzzles strategy games and problems with which students were engaged.

Moreover, in 2015 Lundstrom, K., Diekema, A. R., Heather, L., Haderlie, B. S. and Holliday, W. have done a research on teaching and learning information synthesis. The main

purpose of this research was to determine how information synthesis skills can be taught effectively, and to discover how the level of synthesis in student writing can be effectively measured. The researchers created a rubric to assess students' levels of information synthesis demonstrated in their final research essays and a form of counting analysis was also created to see if other methods could help in measuring synthesis. The findings of the study revealed that students appear to benefit from the synthesis lesson. In addition, the study showed that the different measures of synthesis established were able to identify different levels of information integration. Then the study concluded that discovering effective ways to measure and teach synthesis is very essential in helping students become information literate.

In her study in 2015, Rania Deeb Abd al-Rahman al-Kafarna investigated the effect of question-answer strategy on improving grader 6 students higher thinking in reading. The research targeted three key skills: analysis, synthesis and evaluation. The researcher adopted the experimental design in her study that consisted of (77) students distributed into two groups: the experimental group of (38) students; and the control one of (39) students. The experimental group received the question-answer relationships strategy while the other group received a traditional method. Three tools were used in collecting data in this study: The Higher Order Thinking Skill test, a 30-item scale to determine the students' interest toward reading and an observation card to measure the experimental group level in learning Higher Thinking. The results of the study revealved that Question-Answer strategy had a great impact on skills like synthesis and evaluation, but did not have the same impact on analysis skills with the experimental group. The observation used in the study indicated a big impact on the learners attainment in all the higher-order thinking skills when using Question-Answer strategy.

A sixth study conducted in 2016 in Queensland University of Technology in Austraila by Elizabeth Jane Sansome that identifies the importance of teaching reasoning skills and its effect on students' performance. The study focused on how teaching reasoning helps primary students excel and improve their mathematical proficiency. 5 teachers were selected for this study and their teaching styles were monitored to see how much pedagogy imapcts students' learning outcomes in mathematics. The findings of this study concluded that certain teacher practices such as questionin, journaling and discussion have a great impact on improving students' mathematical proficiency.

In 2016, Mehraj A. Bhat conducted a study on the predictive power of reasoning ability on academic achievement in which he examined six components of reasoning ability (inductive

reasoning, deductive reasoning, linear reasoning, conditional reasoning, cause-and-effect reasoning and analogical reasoning). The aim of the study was to explain the variation in academic achievement among 10th grade students. The investigator chose randomly 598 students to solve 35 contextualized different components of reasoning problems. The different components of reasoning ability were assessed with help of automatic linear modelling. The findings from the study showed that the predictive power of various components of reasoning ability for academic achievement was 31.5 %. Out of the six dimensions of reasoning ability, the maximum involvement was reflected by deductive reasoning (.49) followed by cause and effect reasoning (.26) inductive reasoning (.16), linear reasoning (.05), conditional reasoning (.03) and analogical reasoning (.02) on academic achievement. The results achieved with the help of this method predicted greater accuracy and authenticity.

A recent study was done in 2017 by Pawadee Srisang on the influence of inferential skills on reading comprehension ability. The study targeted adult Thai (L1) and English (L2) students by investigating inferential skills and reading comprehension in two different languages (Thai and English). The researcher examined the reciprocal relationships of inferential skills within Thai and English and investigated whether inferential skills can predict reading comprehension both within each language and across languages (Thai-L1 and English-L2). Inferential skills, reading comprehension, vocabulary and listening comprehension in Thai and English were all used in the study, along with appropriate adaptation, piloting and revision. Raven's Advanced Progressive Matrices test was also used to explore nonverbal reasoning, and a questionnaire was used to provide background details about the participants and their views on reading comprehension strategies. Data collection included a group of 220 Thai undergraduate students. The findings of the study indicated that the addition of inferential skills significantly increased the predictability of reading comprehension in the same language. The study also concluded that there is positive correlations between Thai inferential skills and English reading comprehension, and between English inferential skills and Thai reading comprehension.

Another research was done in 2017 by Dr. Seçil Saygili in which he examined how well certain students in high school solve non-routine problems. The study presented problem situation that required the use of students' conceptual understanding of mathematics and their procedural knowledge of the algorithm involved in the solution. The results of the study showed that each student employed at least three problem solving strategies. Nine out of the ten possible problem solving strategies were used at least once to solve the eight non-routine problems. The

most frequently used strategies were making systematic list, looking for patterns, logical reasoning and making a model or diagram. Those who performed well were also proficient in the use of solution strategies. The study concluded that there is a relation between Mathematics success levels of the students and the strategies they used. The students whose problem solving skill was at proficient level used seven different strategies, and generally, solved the problems with more than one strategy while the students whose problem solving skill was at novice level used only four strategies and could not solve four problems.

2.5 Summary

It has been shown clearly from the eleven research studies consulted and after reviewing their findings that there is a strong correlation between teaching higher order thinking skills and students' academic success. So it is hoped that the current study will add to this success in terms of improving students' reading comprehension. Moreover, these studies above were selected from different social and educational contexts and they all agreed on the existence of a certain area that needed improvement. Similarly, this study found an academic area that needed improvement and tried to provide a solution to it. Also, the time frame of the studies is restricted from the years 2010 to 2017 so all the results are recent and relevant to nowadays educational context and literature. This makes the findings of these studies relevant to the findings of this study. For the sake of more credibility and validation of results, the studies selected showed the impact of higher-thinking from different academic subjects on a variety of education levels. Finally, all the studies strongly recommended further extended research on other higher-order thinking skills that will have a great impact on students' academic performance if these skills are taught and learnt well in classroom.

Chapter Three: Methodolgy

3.1 Introduction

In this chapter, we are going to talk about all the procedures that were followed throughout the research. This chapter then provides a thorough and extensive description of the study methodology, the research context which includes information about the population and sampling in the study, the data collection instruments, the experiment design and a brief description of the stratey used to collect these data.

3.2 Type of Research Design

The experimental design was adopted in this study in which the researcher tried to explore the effects of teaching extended thinking skills such as, synthesis and measure the effect of these skills on 9th graders female students. To achieve this purpose, the study included two types of groups: an experimental group and a control group. However, both groups were given a reading comprehension passage that is a grade-approperiate passage selected by the researcher. The participants in the experimental group were given a 2-hour extensive explanation on extended thinking skills and 3-day extended time to turn the task in while the control group was taught the reading passage through the traditional method that focused mainly on modeling reading without using any extended skill or giving any extended period. The experiment took less than a week. See figure (2)

Experimental Group	Pre-test + 2-hour Teaching Session	Extended Thinking Skills	Post-test + Evaluation+ Interview
Control Group	Pre-test + Reading Passage	Traditional Method	Post-test + Evaluation
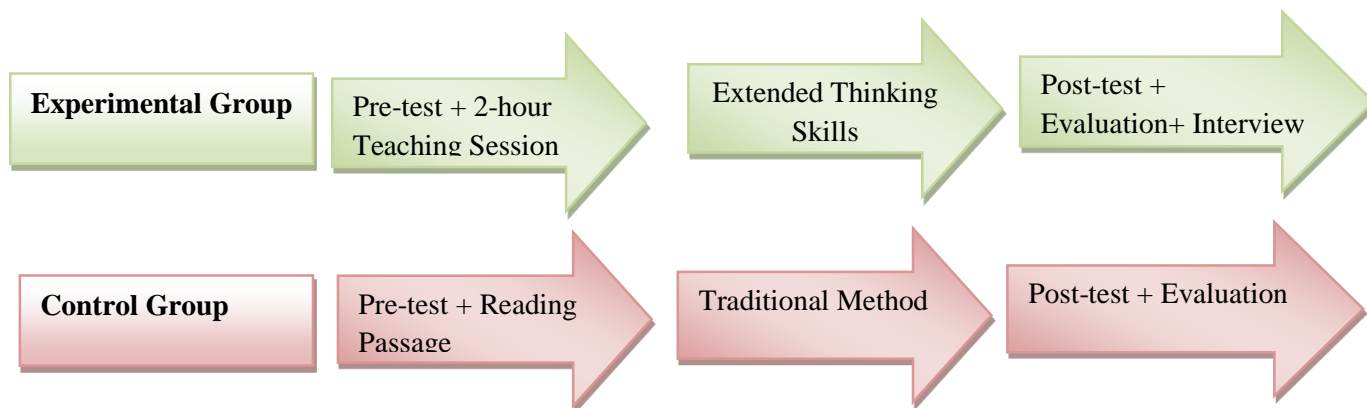
3.3 The Research Context

The study is carried out in a private school in the United Arab Emirates, Dubai. This school teaches the American curriculum and the majority of the students there are non-native speakers of English. So English for those students is a foreign language. The school teaches the four phases: the KG, the elementary, the middle and the high. The study was conducted in the high school and targeted the 9th grade female students.

3.3.1 Population

The study consisted of all ninth female students (N=38) enrolled at the selected school for the academic year 2017-2018.

3.3.2 Sample

The study included 38 female ninth grade students split into two groups at the school chosen for the experiment. One group was named the control group with (16) students; and the other was named the experimental one with (22) students. This study sample was chosen from a private school in Dubai and the experiment was carried out with the help of the 9th grade English Language teacher at the school.

The English language teacher and the researcher were both equivalent in their English language achievement. The control group was taught by their English language teacher while the experimental group was taught by the researcher. The permission from the teacher and from the people in charge of the section and the school was obtained for the purpose of completing the research in the place concerned. Fortunetly, all these people concerned were very positive and willing to cooperate.

Table [1]

The Sample of Control and Experimental Groups

School	Class	Group Name	Student No
Private School in Dubai	9 C	Control Group	16
	9 D	Experimental Group	22
Total	2 classes		38

3.4 Variables

There are two variables in this study: the independent variable and the dependent one. **The independent variable** was in teaching extended thinking skills that included text complexity, synthesizing information and critiquing text. On the other hand, **the dependent variable** was represented in the positive impact of those skills on improving students' performance on the reading post-test.

3.5 Instruments

The researcher used three tools to attain the purpose of this study. He selected a grade-approperiate reading comprehension passage, prepared both a pre-test assignment and a post-test one that were based on the reading passage and then created a list of ten interview questions. The reading comprehension passage was used for both groups. Moreover, both groups were given the pre-test and the post-test tasks that covered certain extended thinking skills of analysis, synthesis and evaulation to show that if the work product is the same in both groups or not. However, only the experimental group was interviewed by the researcher at the end of the experiment. The main goal of the interview was to elicit the students' opinions and identify their attitude towards reading after they had applied extended thinking to their reading task.

3.5.1 Reading Comprehension Passage (see appendix -1)
3.5.2 Pre-test Assignment (see appendix -1)
3.5.3 Post-test Assignment (see appendix -1)

3.6 Experimental Design Procedure

Concerning the control group, I asked their English teacher to give them the reading comprehension passage so they can read it by themselves and then I wanted her to give them the pre-test task to do it in class and collect it at the end of the lesson. The lesson was about 45 minutes. On the other day, I asked the English teacher to model the same reading passage to her students and give them the post-test task as homework so the students can turn it in on the coming day. Concerning the experimental group, first of all I asked them to read the same passage that was given to their parallel group and then I wanted them to do the pre-test task, exactly the same way their parallel did. After that, I provided a whole lesson to them on extended thinking skills and how these skills should be applied effectively to reading comprehension. I also gave them a three-day extended time to go, read, research and then do the post-test assignment that was handed to them in class. The students were given a period of three days to do that task and submit it.

3.7 Interview Protocol

The interview was another essential element in the study and it is considered as a supportive tool for measuring the real impact of the findings of the study. At the end of the three-day period that was given to the students in the experimental group and after the researcher collected their work, an interview was conducted with only ten participants of this group. Before the interview, the researcher took the students', parents' and school leaders' permission and they were all very cooperative. The interview had ten questions that covered the three extended thinking skills (text complexity, synthesis and critique). The questions were constructed by the researcher and adjusted to suit each participant concerned. Each participant was interviewed for only 10 minutes.

The first question in the interview elicits the students' opinion about the complexity of the text they read. Also, it urges them to think about the difference between text complexity and text difficulty on the one hand, and the interaction between them and the text, on the other hand. In a similar vein, the second question draws students attention indirectly to talk about the reading strategies that they used to understand the passage they read. This leads them to talk about the effect of skills and strategies in the reading process. The third question is directed to the extended time given to know whether they used this time effectively. Moreover, it is asked to know whether the factor of extended time affect their reading and research process. Concerning the fourth question, it allows us to know how much active the students' reflective strategies are. It also allows us to know what undermines students' progress in reading and what makes them more active.

Unlike question two, the fifth question asks students directly about the strategies that they used to maximize their own understanding of reading texts. By asking this question, the researcher intends to focus on extended thinking strategies such as connecting the text to other texts, synthesizing information, applying different concepts or critiquing the passage. The sixth question focuses on a very important extended thinking skill: synthesis. The researcher intended to know how combining a component or element to the text can form a connected whole and enrich students' understanding of the text given to them. By asking the seventh question, the researcher tries to focus on how much students know about text critique and to what extent this extended thinking skill improves their text understanding. The eighth question focuses on how students designed their own text based on the text they read. It is intended by asking this question

to draw students attention that extended thinking skills require them to design their own understanding. The ninth question elicits the students' opinion about their own approach to improve understanding when they read the passage. In the last question, the researcher intends to make the students talk about how they form hypotheses and prove them in a strong scientific way. Also, it urges them to say that formulating a hypothesis and proving it with evidence is more useful extended thinking skill than just providing a summary of the text.

3.8 Ethical Consideration

Research ethics were of crucial concern in this study. This research was conducted to examine the impact of teaching extended thinking on students' reading comprehension, so it was commonly accepted that the research setting would not lead to any mental or physical harm. However, it was important to consider any discomfort that the students might feel about doing the tasks in the experiment. Therefore, it was very necessary that the study corresponded with the code of ethics. All participants in this study were given an explanation of the purpose of the study and the intended outcome of the research process. More importantly, all the participants were guaranteed anonymity and assured that their performance in this research would be kept confidential. They were also informed that they have the right to withdraw from any task at any time. So participants were well-informed after this information was advised.

3.9 Validity of Data

To ensure the content validity of the research data, they were given to a some English Language teachers from the school where the experiment is carried out to examine their adequacy to the Grade 9 students at their school. They were also asked to examine the objectivity included in the interview questions with the ten students in the experimental group. The teachers consulted at the school consisted of two English Language teachers and the English language teacher of grade 9. However, their comments were received and the necessary modifications were accordingly made.

3.10 Summary

This chapter presented the methodology of the study. It talked about the design of the method, described the population of the study and highlighted its sample. Also, we talked about the instruments that were used in the study and we explained the procedures followed to complete the experiment. For the sake of optimal fulfillment of the objective of the study, the

researcher utilized three main tools: a grade-approperiate reading comprehension passage, a pre- and post- tests and an interview card for the experimental group. By using these three tools, the researcher tried to make the study not only comfortable but also transferable and dependable. The pre-test and the post-test were designed to measure the effectiveness of applying extened thinking skills of ninth graders to reading while the interview card was created to investigate the attitude of the experimental group that received careful teaching of these extended skills. To clarify this, the main purpose of the interview was to show whether ninth graders in the experimental group improved their reading habits after they had applied some extended thinking to the reading passage. Moreover, the ethical consideration and the reliability of the data in the study were also highlighted in this chapter to explain the validity of the findings and the objectivity of the researcher.

Chapter Four: Results & Data Analysis

4.1 Introduction

The aim of this study was to examine the impact of teaching exended thinking skills to enhance 9th graders' higher order thinking skills in reading. Two main tools were used by the researcher in order to collect data: a grade-approperiate reading comprehension passage with a pre- and post- tests material and an interview for the experimental group. This chapter highlights the findings of the study and connect them to the research questions and the study hypotheses. The researcher is going to analyze the class-session materials which the students have done in class based on the reading passage given to them and then compare between them. Then, he will also analyze the interview questions which were administered for only ten of the experimental group participants.

4.2 Discussion of the Study Data

In this section, we intend to analye the pre-test and post-test data that were obtained from the control group and the experimental one. The same reading comprehension passage was distributed to the control group as well as the experimental one and they were asked to write an integrated piece of writing based on the reading passage. This text-related task was given to both groups twice: one time is before teaching the text and the other one is after teaching the text. It is worth mentioning here that the main purpose of giving the same task twice is for the sake of comparison. The participants' responses to both tests were collected and evaluated based on certain extended thinking skills rubric, such as level of complexity, synthesis and critique.

4.2.1 Interpretation of the Pre-Test Question

Based on the passage you read, create a 250-word essay that clearly demonstrates your own understanding of the information presented in the passage in a novel way.

The reason behind asking the participants this question was to know how much they understand about extended thinking and how they usually present information they read from different resources in their own way. So the aim of this study is to have 9th graders master particular extended thinking skills (text complexity, synthesis and reasoning) at the end of the experiment. An exhaustive explanation was provided on these skills in chapter 4 in this study.

4.2.2 Interpretation of the Post-Test Question

During this phase of the experiment, the students in both groups were given the same task that was given at the start of the experiment; namely the pre-test task. So before the students responded to the post-test task, only the experimental group had received an intervention. A detailed summary of this intervention is explained in chapter 4.

4.3 The Analysis of Pre-test & Post-test Data

First of all, we intend to analyze the data obtained from both groups in the pre-test in the following table. The task was marked out of 15 points on a scale of three-criteria rubric: level of complexity, synthesis and reasoning. Each category is worth only 5 points.

4.3.1 Comparison of Control Group & Experiemental Group's Performance in the Pre-test

Table [2]

Participant No.	Control Group
9 C/ 1	9
9 C/ 2	7
9 C/ 3	8
9 C/ 4	8
9 C/ 5	6
9 C/ 6	7
9 C/ 7	7
9 C/ 8	9
9 C/ 9	11
9 C/ 10	5
9 C/ 11	6
9 C/ 12	6
9 C/ 13	5
9 C/ 14	8
9 C/ 15	7
9 C/ 16	7
Participants' No.	Experimental Group
9 D/ 1	4
9 D/ 2	6
9 D/ 3	8
9 D/ 4	6
9 D/ 5	7
9 D/ 6	7
9 D/ 7	9
9 D/ 8	11

9 D/ 9	**12**
9 D/ 10	**4**
9 D/ 11	**7**
9 D/ 12	**9**
9 D/ 13	**8**
9 D/ 14	**9**
9 D/ 15	**10**
9 D/ 16	**10**
9 D/ 17	**10**
9 D/ 18	**8**
9 D/ 19	**11**
9 D/ 20	**11**
9 D/ 21	**10**
9 D/ 22	**11**

When Table (2) is analyzed, it is seen that the performance of both groups in the pre-test is almost the same. Very few participants have shown a mark above 10 that is about only 5 participants out of 38 total in both groups. It is also seen that the students, whose performance levels are shown as below 5 in the test, are two in each group. However, it is possible to claim here that the participants' samples of both groups in the pre-test showed a lack in almost all the extended thinking skills. Almost all the students have provided a summary of the text and quoted the same facts and examples in the original text.

4.3.2 Comparison of Control Group & Experiemental Group's Performance in the Post-test
Table [3]

Participant No.	**Control Group**
9 C/ 1	**9**
9 C/ 2	**8**
9 C/ 3	**8**
9 C/ 4	**8**
9 C/ 5	**7**
9 C/ 6	**8**
9 C/ 7	**7**
9 C/ 8	**8**
9 C/ 9	**11**
9 C/ 10	**6**
9 C/ 11	**7**
9 C/ 12	**7**

Participants' No.	Experimental Group
9 C/ 13	6
9 C/ 14	9
9 C/ 15	8
9 C/ 16	7
Participants' No.	**Experimental Group**
9 D/ 1	8
9 D/ 2	12
9 D/ 3	13
9 D/ 4	12
9 D/ 5	13
9 D/ 6	13
9 D/ 7	13
9 D/ 8	14
9 D/ 9	14
9 D/ 10	8
9 D/ 11	13
9 D/ 12	13
9 D/ 13	12
9 D/ 14	13
9 D/ 15	14
9 D/ 16	14
9 D/ 17	14
9 D/ 18	13
9 D/ 19	14
9 D/ 20	13
9 D/ 21	14
9 D/ 22	12

When Table (3) is analyzed, it is seen that the performance of both groups in the post-test is not the same. It is worth mentioning here that only the experiemental group received the intervention and that is definitely one of the most factors that impacted on this variance in results. As far as the control group's result is concerned, there was a very small portion of improvement but that improvement is not remarakable at all. The only reason for such improvement was the fact that the students did the work once again. The majority of the students in this group produced the same work that they had produced in the pre-test.

However, almost all the participants in the experimental group, that received the intervention, have shown a remarkable progress in their marks. Only two participants out of the

twenty two have scored below 10 in their post-test. Moreover, most of the participants in the experimental group have doubled their marks compared to the pre-test marks. Most of the responses showed depth of analysis of the students' views in which they meangfully justifies their personal views using sophisticated reasoning and logic. They have also demonstrated deep understanding of the topic.

4.3.3 Comparison of Control Group's Performance in the Pre-test and Post-test
Table [4]

Participant No.	Pre-Test Data	Post-Test Data
9 C/ 1	9	9
9 C/ 2	7	8
9 C/ 3	8	8
9 C/ 4	8	8
9 C/ 5	6	7
9 C/ 6	7	8
9 C/ 7	7	7
9 C/ 8	9	8
9 C/ 9	11	11
9 C/ 10	5	6
9 C/ 11	6	7
9 C/ 12	6	7
9 C/ 13	5	6
9 C/ 14	8	9
9 C/ 15	7	8
9 C/ 16	7	7
Mean Score	7.25	7.75

When Table (4) is analyzed, it is seen that the performance of the control group in boh the pre-test and the post-test is almost the same. Most of the participants have only improved with one or two marks in the post-test. It is worth mentioning here that this group has not received any intervention during the experiment. So there was no focus on implementing extended thinking skills for this group and that fact may be a reason of such a result.

4.3.4 Comparison of Experimental Group's Performance in the Pre-test and Post-test

Table [5]

Participant No.	Pre-Test Data	Post-Test Data
9 D/ 1	4	8
9 D/ 2	6	12
9 D/ 3	8	13
9 D/ 4	6	12
9 D/ 5	7	13
9 D/ 6	7	13
9 D/ 7	9	13
9 D/ 8	11	14
9 D/ 9	12	14
9 D/ 10	4	8
9 D/ 11	7	13
9 D/ 12	9	13
9 D/ 13	8	12
9 D/ 14	9	13
9 C/ 15	10	14
9 C/ 16	10	14
9 D/ 17	10	14
9 D/ 18	8	13
9 D/ 19	11	14
9 D/ 20	11	13
9 D/ 21	10	14
9 D/ 22	11	12
Mean Score	**8.54**	**12.68**

Unlike the control group, when Table (5) is analyzed, it is seen that the performance of the experimental group in boh the pre-test and the post-test is uncomparable with the control group. Almost all the experimental participants have greatly improved their marks on the post-test. This indicates that there has been improvement in the performance due to the intervention that this group has received. The data in this table shows clearly the impact that teaching extended thinking skills have on the participants' performance.

4.4 Interview Questions Data: A Thematic Anaysis

The purpose of this sort of data in the study is to show the perceptions of the ten students who received the intervention and to know whether they find any difference after teaching extended thinking in a reading lesson. Also, to know to what extent reading comprehension is related to extended thinking and how teaching this type of thinking enhanced the performance of these students. Our aim, however, is to know whether these students are aware of the reasons which lie behind such improvement after the intervention.

First of all, I would like to say that all the ten students who were interviewed find, in a way or another, that teaching skills and strategies is more effective than teaching content. Moreover, all of them have nearly agreed on similar reasons concerning the close correlation between teaching extended thinking and enhancing text understanding. Although the sixth student (S6) when he responded to the first question in the interview concerning the text complexity level has stated that the content should be as important as the skill, but she agreed on the fact that teaching the skill has to come first. But, the problem remains that in schools the content most of the times enterly overlaps the skills.

In another question, particularly the third question, almost all the students praised the idea of the extra time given in extended thinking for the work to be done except for two students who had a good perception on extended time. For example, S9 and S10 though they appreciated the idea of extended time, but they said that this time should be invested to produce a quality work that reaches the required complexity in extended thinking. Otherwise, it is not recommended. This point was highly supported by S1, S2, S3, S4 and S5 when they attempted the last question of the interview. They all agreed on the fact that extended time should be utilized efficiently and that extended thinking should not be part of the curriculum; rather it should be the curriculum itself. When answering the fifth question, S7 and S8 along with some others illustrated the role of technology as a way to maximize understanding and enrich knowledge. However, I can say that S7 contradicted herself when she said that the best strategy is to read, identify key ideas and summarize the text. But in the fifth question the contradiction occurs by saying that:

> I am technology addict and I strongly believe in the role of technology in education. I read many articles about the topic in the reading passage and I viewed many examples that support the ideas in the passage. I learnt 20% from the passage, but I learnt the 80% from the internet. Technology is the best strategy for maximizing our understanding. (see Appendix 9)

Table [6]

Exended Thinking Skills		
Text Complexity	**Synthesis**	**Critique**
Text is difficult	Read other articles about the topic	I added other authors' views
Text is for experts	Did some research and added new information	I did not agree with all what the text said
Text has many difficult words	I read what other authors have said about the same topic.	I wrote my opinion about the topic.
Text has complex ideas	Asked for my parents' opinion	I added to what the text said
Text is complex	I read other articles	I added more examples to support the author's opinion.
Text is easy	I added what I know about the topic.	I supported some points and I did not do some others.
Text is on grade-level.	I searched and I added more details.	I went against some points mentioned in the text.
Text is easy	I connected the text to my previous knowledge.	I agreed with all he points mentioned in the text.
Text is fine	I researched and asked for experts' opinions.	I added what experts said.
Text is complex	I simplified the ideas in the text.	I re-arranged the points in bullets.

As we have mentioned before that only ten students from the experimental group were selected for a short interview. The interview included ten questions for each participant. These ten questions revolve around three extended thinking categories: text complexity, synthesis and critique. However, this section intends to present what the interview participants of the experimental group said concerning all the questions asked and presented (in appendix I). Thus, the points which are noticed and agreed on by all the participants will be highlighted as well as those which are perceived differently. So all the responses will be analyzed according to the interview questions.

a. The first question

What do you think of the passage you read in terms of the level of complexity?

Concerning this question, three students agreed that the passage they read was complex and two said that it was difficult but four students expressed that the passage was easy. Only one student gave a different answer to this question. These four categories of the students used different expressions to state their responses. S1, S2 and S3 said that the passage was complex in

terms of ideas, whereas S4 and S5 agreed that it was difficult in terms of vocabulary. S6 used the word 'expert' to refer to the level of the passage. However, she illustrated this by saying that:

> Reading a text like that widens our horizon and broaden our knowledge about medical breakthroughs. I found the text interesting in terms of ideas and examples, but I struggled a little bit with very few medical idioms and expressions. However, I think the text was neither complex nor difficult. It is for experts. (see Appendix 10)

On the other hand, S7, S8, S9 and S10 all agreed that the passage was easy for them. As per them, the passage was smooth and challenged them with interesting ideas.

b. The second question

What changes did you make to extend your understanding of the topic in the passage?

The second interview question was related to the best strategy to access the text. Regarding this question, S1, S2, S3, S4, S5, S6 and S7 agreed that the best way to understand the text was to read more about the text. They said that carrying out a research on the topic was very usefull for them to access the text. S3 illustrated this by saying that:

> When I got the passage in class, I read it silently. I was very excited because both of my parents are doctors and the passage is relevant to their specility. Other than me reading about the topic and carrying out a research, I had a lengthy discussion with my parents about the topic in the passage. I consider this as a research, too. (see Appendix 7)

However, S8, S9 and S10 said that understanding the text required from them identifying the key ideas by summarizing the text. S10 stated that by saying:

> The resources are very limited for me at home. What I did was that I read the passage more than one time. I understood all the strange expressions in the passage and after that I identified the main ideas of the passage. Then I produced the passage in my own simplified way. That is how I undersand any reading passage. (see Appendix 14)

c. The third question

How would you improve your own understanding of the passage if you were given more time to read and research?

Here almost all the students supported the advantage of giving extended time. S1, S2, S3, S4, S5, S6, S7, S8 all said that giving them an extra time to read and research was for their benefit, especially that they had other school duties. S4 expressed this in a very interesting way by saying that:

Extended time was a very essential factor for my mission to be accomplished. I connected the passage topic to my science class. I did a project and presented it in front of my classmates. I got many bright ideas when I listened to their feedback. I added all this to enrich my final assignment on the passage. (see Appendix 8)

S9 and S10 also appreciated the idea of extended time, but they had a quite interesting opinion about that. S10 clarified this by saying that:

I do not think that the idea of giving an extended time is a bad idea, but the success of this idea is measured by the quality work you produce after. So quality is what makes this idea good or bad. (see Appendix 14)

d. The fourth question

How would you adapt a reflective strategy to create a different understanding of any given information or topic?

The main purpose of this question was to know whether students understood fully how to synthesize information and express their own understanding of the passage. S1 and S2 said that their reflective strategy to come up with a different understanding was connecting the topic to what they had learnt before. S3, S4 and S5 agreed on the fact that synthesizing information from different resources helped them produce a different understanding of the passage they read. S3 illustrated this by saying that:

Before I learnt about the importance of synthesizing information, I had thought that I should always repeat what is usually written in the passage. After I had learnt about synthesis, I collected information from different resources on the same topic. I really found this method very effective. (see Appendix 7)

Moreover, S6, S7, S8, S9 and S10 all unanimously agreed that adapting a reading strategy was the key for creating a different understanding of the passage. S9 expressed this clearly by saying that:

Using strategies is very important for literacy in general and reading comprehension in particular. However, there is no only one strategy that we should use for creating different perspectives of a given topic. On the contrary, students should adapt the strategy that they find helpful and effective on the condition that this strategy is well-proved and academic. (see Appendix 13)

e. The fifth question

What could be done better to maximize your own understanding of any new topic given to you?

At first glance this question looks similar to the fourth question, but it is relevant not similar. That is why all the students gave different responses to this question than the fourth one. S1, S2 and S3 believed that cross-curricular integration was very useful in maximizing their own understanding of the passage. They used other academics' skills and strategies to widen their own understanding. S1 said:

> I dealt with the reading passage the same way I always deal with my mathematical equations. In maths I always intend to look for other possibilities and ways to solve equtions. Similarly, I used my mental mathematical skills and strategies to maximize my text understanding. (see Appendix 5)

Concerning the rest of the group S4, S5, S6, S7, S8, S9 and S10, they all agreed on the fact that using technology, such as the internet is the only way to maximize understanding and enrich knowledge. S7 expressed this by saying that:

> I am technology addict and I strongly believe in the role of technology in education. I read many articles about the topic in the reading passage and I viewed many examples that support the ideas in the passage. I learnt 20% from the passage, but I learnt the 80% from the internet. Technology is the best strategy for maximizing our understanding. (see Appendix 11)

f. The sixth question

What could be combined to improve (change) the argument in the passage you read?

This question and the four remaining ones all revolve around one extended thinking skill; namely text critique. Concerning this question, students provided a large variety of answers. S1 and S2 showed that coming up with new examples and facts about the topic is an important part of critiquing the text. Others, however, like S3, S4, S5 and S6 agreed with what S1 and S2 said but they added that disagreeing with what the author mentioned in the passage was anoher part of our critique skill. S6 illustrated this by saying that:

> After I read the passage, I felt that I do not agree with everything the author mentioned. However, I praised the points I agreed with but I criticized the ones I do not. Critiquing the text is not only showing the disagreement but it is also showing the agreement. (see Appendix 10)

Furthermore, S7, S8, S9 and S10 said that adding counter-arguments to the argument in the passage was a helpful skill to critique the text.

g. The seventh question

Suppose you could write about the same topic you read in the passage, what would you do different or same?

The importance of this question springs from the fact that this particular question showed how much the intervention enhanced their own understanding of extended thinking skills. Surprisingly, all the students agreed on the fact that highlighting the good points along with the counter-ones is what they did to critique the text that they read. One of the students – S6 – said that:

> If I were the writer of this passage, I would not only show what supports my argument, but also what refutes it. Having ideas with and ideas against makes a point. That is what I would do if I were the writer of this text. (see Appendix 10)

h. The eighth question

How would you construct a model that would change what has been mentioned in the passage?

There was a unanimous consusens among the students on the importance of using critique. S1, S2, S3, S4 and S5 said that critiquing the text helped them improve their approach towards the text. It also gave them more insights on how to contend and argue. S2 clarified this by saying that:

> Expressing your opinion is very important because it shows that you are not parroting information. Critique teaches you how to be different when you read something. It gives you the confidence when you construct your own approach. That is the power of skill; it is extending the text level. (see Appendix 6)

Concerning S6, S7, S8, S9 and S10, they also appreciated the use of critique to construct their own model. S6 voiced this clearly by saying that:

> What I did to construct my own model when I read the text was that I used a comparative approach. It is exactly like how Venn diagram works. After that, I highlighted how many similar points my model shared with the original text and how many were different. I liked that approach and I am proud of myself. (see Appendix 10)

i. The ninth question

What would be your own original way to improve understanding of the topic mentioned in the passage?

The students gave interesting responses to this question. S1, S2 and S3 argued that implementing extended thinking skills is what improves understanding of the topic. S3 stated this clearly by saying that:

> As the name implies, extended thinking is to extended the information that the orginal text presents. It is going beyond the text by digging deep to reach the complex level, to synthesize information and enrich the topic and to agree and disagree with what is written. This is the original way to improve understanding. (see Appendix 14)

On the other hand, S4, S5, S6 and S7 claimed that higher-order thinking always guarantees originality for understanding. S4 compares extended thinking to critical thinking by saying that:

> There is no big difference between extended thinking and critical thinking because they are both higher-order thinking skills. The only difference is that in extended thinking you have more time to improve thinking while in critical thinking you just race with time. At the end of the day, with both you improve thinking. (see Appendix 15)

Also, S8, S9 and S10 agreed on the importance of higher-order thinking to improve understanding. They advocated thinking out of the box and how such thinking sharpens intelligence.

j. The tenth question

How would you reformulate your hypothesis based on results stated in the passage?

This is the last and the most important question because it summarizes the reasons why there was a quality work produced after the intervention. So, we can find that all the students agreed on the importance of extended thinking in reading. They agreed on the higher-order skills, strategies and extended time that should be used efficiently to produce good work. S1, S2, S3, S4 and S5 found out that extended thinking facilitated their work many ways better than before. It made them understand the passage better and improve their understanding. S3 said that:

> I found the text challenging in the beginning, but after I applied extended thinking skills, I found it way easier. I reached the conclusion that extended thinking is not only part of our curriculum but it is also our education. (see Appendix 16)

S6, S7, S8, S9 and S10 answered directly to this question by saying that there is a close relationship between teaching the skill and mastering it. S7 stated this by saying that:

> I just tried to compare the work I presented with all the works which I did before to find that I improved a lot. I think the only reason for such improvement is that I learnt the skills not the content. (see Appendix 11)

4.3 Summary

This chapter contained a detailed analysis of the study data that were obtained from the pre-test and post-test and that from the interview questions. What we did first was an exhaustive analysis of the pre-test for both groups in one table followed by another analysis of the post-test for both groups in another separate table. After that, we analyzed the control group pre-test as well as post-test data to measure progress without intervention. We did the same for the experimental group to measure their progress after the intervention. Then, we have analyzed the interview questions for the ten students from the experimental group to show how much the intervention have impacted their understanding of extended thinking skills on reading comprehension. Also, the interview questions analysis presented the points that were agreed on by the participants and those which were perceived differently.

Chapter Five: Conclusion

5.1 Overview

In this chapter, we are going to write the findings and discussions about what we have analyzed in chapter (IV). Thus, this chapter is dedicated to look at both types of data that were collected in this study: test data and interview data. These data will be discussed in parallel with what other researchers have investigated within the same areas of research. However, those are referred to in chapter (II) that dealt with the literature review. Then, certain points, suggestions and recommendations to improve teaching extended thinking in classroom are going to be highlighted in this chapter.

5.2 Findings

We have been discussing so far the two types of data collected in this study. In this section, we are going to relate what have been found to the hypothetical research questions in this study. However, the following findings were observed based on the results of this study

- Teaching extended thinking to 9th graders' reading intensively proved to have significant and positive impact on the students' reading comprehension attainment.
- The experimental group out-performed the control group on the reading comprehension tests.
- There were statistically significant differences between the group that received the intervention and the group that did not receive any intervention.
- The mean score of students of the experimental group on the post-test was (12.68) which was higher than the mean score of the control group on the same test (7.75).
- There was a change in the perceptions of students on the importance of using extended thinking skills and strategies to facilitate the content and improve performance.
- There was a consensus among all the students who were interviewed that teaching extended thinking was the only reason that made such statistical difference in their performance.
- The students not only applied the skills that they learnt in class but also appreciated the fact that they are able to know why they should learn these skills.

5.3 Implications of the Current Study

The following implications can be drawn for teaching exended thinking depending on the findings of this study:

First of all, it is suggested that the role of the teacher is to activate the learnes' prior knowledge and to provide the conditions that help them not only using the appropriate knowledge but also applying it effectively. Secondly, teachers are recommended to try a variety of higher-order thinking skills and effective strategies in order to find the most suitable one for their learners and use it for each teaching situation. In this study, three extended thinking skills were focused on and experimented: text complexity, synthesis and critique. The experimental group that received the intervention using these skills proved to be more effective than the control group. So, teachers need to teach these skills to their students. In addition to these three skills adopted in this study, teachers can try other extended thinking skills mentioned in the well-known Norman Webb's Depth of Knoweldge Model, Level 4, and look for the best skill that motivates and arouses the student's interest during the class time. In addition to this, teachers need to teach the skill before the content or make sure the the skill is there when dealing with the content.

Thirdly, teachers should be fully aware that the four language skills are interrelated and that each one supports the other. This is stated clearly by Richard (2002) by saying that "proficiency refers to the degree of skill with which a person can read, write, speak, or understand language". This study, however, focused on reading as an essential component of language but this does not necessarily mean that other factors, such as cultural, social, psychological and many others do not play a key role in the reading process. Fourthly, language teachers should also be aware that the focus in teaching is not only on the product but on the process. When students learn new skills, master these skills and apply them, their teachers should always keep an eye on how these students learn these skills. Therefore, teachers should always expose their students to different reading skills that help the latter to know the process before giving the product.

5.4 Recommendations

This study highlights the importance of students' reading comprehension and the necessity of improving this skill through promoting extended thinking in classroom. Therefore, in light of the findings of this study, it is hoped that the following recommendations are of value and importance for teachers and researchers.

- There should be more focus and emphasis on promoting higher-order thinking culture in classroom.
- Teachers should always motivate students and help them use their cognitive skills properly.
- There should be always a room for using more than one skill and strategy. Teachers should try a variety of strategies so their students can learn many skills.
- Teachers should give more time and attention to students' reading skills and reinforce their speed to read and promote their level to comprehend.
- Teachers should always develop their professional knowledge through trainings, workshops or conferences to be able to teach the most effective techniques and strategies to their students.
- There should be more research to investigate the impact of other extended thinking skills other than the ones investigated in this study.
- There should be more similar studies on other classes at other levels and in other areas and environment.

5.5 Limitations of the Study

The limitations of this study include four categories: locative, temporal, human and topical limitations.

- **Locative limitation:** This study covers only one private American-curriculum school in Dubai.
- **Temporal limitation:** The researcher carried out this study in the academic year 2017 - 2018.
- **Human limitation:** The sample consisted of only female students at the school concerned.
- **Topical limitation:** The study was conducted to examine the impact of teaching extended thinking on learners' reading comprehension in a private school in Dubai.

5.6 Concluding Note

In this last chapter, we have discussed the two types of data which we have analyzed and talked about in the previous chapter. We have also testified the hypothetical research questions in this study and stated the improvement that the students experienced after the experiment. Then, we have formulated our perspectives about the impact of teaching extended thinking on reading comprehension from the findings interpreted in this study. After that, we have given certain suggestions to improve teaching reading comprehension in class, such as activating prior knowledge, promoting higher-order thinking skills, prioritizing teaching skills to teaching the content and focusing on the process rather than the product. In addition to all these important insights mentioned, we implicated that the main goal of teaching and learning is to train the students not only how to apply knowledge but also why to apply this knowledge.

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Appendix 1

Topic: Reading Comprehension
Subject: English   **Grade:** *Nine*
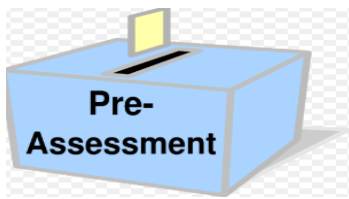**Name:** _____   **Class:** _____ **Date**: *Monday, May 21ˢᵗ*

> Read the following passage carefully and understand its content. You will be given an assignment based of this passage to do and submit soon.

A   Hearing impairment or other auditory function deficit in young children can have a major impact on their development of speech and communication, resulting in a detrimental effect on their ability to learn at school. This is likely to have major consequences for the individual and the population as a whole. The New Zealand Ministry of Health has found from research carried out over two decades that 6–10% of children in that country are affected by hearing loss.

B   A preliminary study in New Zealand has shown that classroom noise presents a major concern for teachers and pupils. Modern teaching practices, the organisation of desks in the classroom, poor classroom acoustics, and mechanical means of ventilation such as air-conditioning units all contribute to the number of children unable to comprehend the teacher's voice. Education researchers Nelson and Soli have also suggested that recent trends in learning often involve collaborative interaction of multiple minds and tools as much as individual possession of information. This all amounts to heightened activity and noise levels, which have the potential to be particularly serious for children experiencing auditory function deficit. Noise in classrooms can only exacerbate their difficulty in comprehending and processing verbal communication with other children and instructions from the teacher.

C   Children with auditory function deficit are potentially failing to learn to their maximum potential because of noise levels generated in classrooms. The effects of noise on the ability of children to learn effectively in typical classroom environments are now the subject of increasing concern. The International Institute of Noise Control Engineering (I–INCE), on the advice of the World Health Organization, has established an international working party, which includes New Zealand, to evaluate noise and reverberation control for school rooms.

D   While the detrimental effects of noise in classroom situations are not limited to children experiencing disability, those with a disability that affects their processing of speech and verbal communication could be extremely vulnerable. The auditory function deficits in question include hearing impairment, autistic spectrum disorders (ASD) and attention deficit disorders (ADD/ADHD).

E   Autism is considered a neurological and genetic life-long disorder that causes discrepancies in the way information is processed. This disorder is characterised by interlinking problems with social imagination, social communication and social interaction. According to Janzen, this affects the ability to understand and relate in typical ways to people, understand events and objects in the environment, and understand or respond to sensory stimuli. Autism does not allow learning or thinking in the same ways as in children who are developing normally.

Autistic spectrum disorders often result in major difficulties in comprehending verbal information and speech processing. Those experiencing these disorders often find sounds such as crowd noise and the noise generated by machinery painful and distressing. This is difficult to scientifically quantify as such extra-sensory stimuli vary greatly from one autistic individual to another. But a child who finds any type of noise in their classroom or learning space intrusive is likely to be adversely affected in their ability to process information.

F   The attention deficit disorders are indicative of neurological and genetic disorders and are characterised by difficulties with sustaining attention, effort and persistence, organisation skills and disinhibition. Children experiencing these disorders find it difficult to screen out unimportant information, and focus on everything in the environment rather than attending to a single activity. Background noise in the classroom becomes a major distraction, which can affect their ability to concentrate.

G   Children experiencing an auditory function deficit can often find speech and communication very difficult to isolate and process when set against high levels of background noise. These levels come from outside activities that penetrate the classroom structure, from teaching activities, and other noise generated inside, which can be exacerbated by room reverberation. Strategies are needed to obtain the optimum classroom construction and perhaps a change in classroom culture and methods of teaching. In particular, the effects of noisy classrooms and activities on those experiencing disabilities in the form of auditory function deficit need thorough investigation. It is probable that many undiagnosed children exist in the education system with 'invisible' disabilities. Their needs are less likely to be met than those of children with known disabilities.

H   The New Zealand Government has developed a New Zealand Disability Strategy and has embarked on a wide-ranging consultation process. The strategy recognises that people experiencing disability face significant barriers in achieving a full quality of life in areas such as attitude, education, employment and access to services. Objective 3 of the New Zealand Disability Strategy is to 'Provide the Best Education for Disabled People' by improving education so that all children, youth learners and adult learners will have equal opportunities to learn and develop within their already existing local school. For a successful education, the learning environment is vitally significant, so any effort to improve this is likely to be of great benefit to all children, but especially to those with auditory function disabilities.

I   A number of countries are already in the process of formulating their own standards for the control and reduction of classroom noise. New Zealand will probably follow their example. The literature to date on noise in school rooms appears to focus on the effects on schoolchildren in general, their teachers and the hearing impaired. Only limited attention appears to have been given to those students experiencing the other disabilities involving auditory function deficit. It is imperative that the needs of these children are taken into account in the setting of appropriate international standards to be promulgated in future.

Appendix 2

Topic: Evaluate Ideas

Subject: English

Grade: *Nine*

Name: _____

Class: _____

Date: *Monday, May 21ˢᵗ*

Based on the passage you read, create a 250-word essay that clearly demonstrates your own understanding of the information presented in the passage in a novel way.

_____

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Appendix 3

15

Topic: Evaluate Ideas   **Subject:** English   **Grade:** *Nine*

Name: _____   **Class:** _____   **Date:** *Wednesday, May 23rd*

Based on the passage you read, create a 250-word essay that clearly demonstrates your own understanding of the information presented in the passage in a novel way.

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EXAMINER'S USE ONLY

EXAMINER 1 NUMBER: ....

EXAMINER 2 NUMBER: ....

Appendix 4

Interview Questions

1. What do you think of the passage you read in terms of the level of complexity?

2. What changes did you make to extend your understanding of the topic in the passage?

3. How would you improve your own understanding of the passage if you were given more time to read and research?

4. How would you adapt a reflective strategy to create a different understanding of any given information or topic?

5. What could be done better to maximize your own understanding of any new topic given to you?

6. What could be combined to improve (change) the argument in the passage you read?

7. Suppose you could write about the same topic you read in the passage, what would you do different or same?

8. How would you construct a model that would change what has been mentioned in the passage?

9. What would be your own original way to improve understanding of the topic mentioned in the passage?

10. How would you reformulate your hypothesis based on results stated in the passage?

Appendix 5

The answers of Student 1

1. **What do you think of the passage you read in terms of the level of complexity?**

   I think the passage was quite challenging, but I read it smoothly. In terms of complexity, it was fine.

2. **What changes did you make to extend your understanding of the topic in the passage?**

   After I read the passage twice and identified the key points, I read many articles on the same topic and I synthesized information from different resources. I learnt a lot about this topic.

3. **How would you improve your own understanding of the passage if you were given more time to read and research?**

   Time factor is very important for research. If I were given more time, I would definitely produce a good quality work. I would research more, read more and watch more about the topic.

4. **How would you adapt a reflective strategy to create a different understanding of any given information or topic?**

   Reading needs a strategy, because without a strategy you are reading without a purpose. I always connect what I read to my prior knowledge. I think back about everything I read and learnt before. I even connect to what I learnt in other subjects.

5. **What could be done better to maximize your own understanding of any new topic given to you?**

   I dealt with the reading passage the same way I always deal with my mathematical equations. In maths I always intend to look for other possibilities and ways to solve equtions. Similarly, I used my mental mathematical skills and strategies to maximize my text understanding.

6. **What could be combined to improve (change) the argument in the passage you read?**

      Every passage I read, I find the author supports his/ her argument with examples and details. I think counter-arguments or going against what the author believes is one of the things that I could change in the passage. That is part of extended thinking; namely text critique.

7. **Suppose you could write about the same topic you read in the passage, what would you do different or same?**

      What I can do the same is supporting my argument with evidence and details as the author did in the passage. What I can do differently is showing the author view point. By doing this, I give more credibility to the text. It is text critique.

8. **How would you construct a model that would change what has been mentioned in the passage?**

      I would make use of extended thinking skills I learnt. I would do some research on the topic, read articles and synthesize information from different resources. Then, I would construct a model that is more objective and more reasonable than the model I read.

9. **What would be your own original way to improve understanding of the topic mentioned in the passage?**

      My original way to understand any passage would be reading the passage and using context clues to figure out the meaning of strange words. After that, I would highlight the key details to understand the passage. I would also use the internet to read about the topic in the passage.

10. **How would you reformulate your hypothesis based on results stated in the passage?**

      Based on what I learnt in the passage, I would learn more about what others say on this topic. I would extend my learning to add my own views about what the author talked about.

Appendix 6

The answers of Student 2

1. **What do you think of the passage you read in terms of the level of complexity?**

   For me the passage was easy. I enjoyed reading it because I learnt a lot while reading. In terms of complexity, it had complex ideas and I loved it!

2. **What changes did you make to extend your understanding of the topic in the passage?**

   When I read the passage, I highlighted the key ideas and then I did a research on the points I took. I read few articles about the topic on the Internet.

3. **How would you improve your own understanding of the passage if you were given more time to read and research?**

   If I were given more time, of course I would understand more and more about the topic. I would also write about the topic and present it in front of class as a project. Giving more time means giving more opportunities to learn more.

4. **How would you adapt a reflective strategy to create a different understanding of any given information or topic?**

   I would use my prior knowledge and connect information. I would go back to my project file and make use of what I did before that supports what I am doing now.

5. **What could be done better to maximize your own understanding of any new topic given to you?**

   I would research for more information. I would read more passages and articles about the same topic and then I would add what I think I learnt from all what I did.

6. **What could be combined to improve (change) the argument in the passage you read?**

   I think saying what the author did not mention in the passage could be a good idea to improve the argument in the passage.

7. **Suppose you could write about the same topic you read in the passage, what would you do different or same?**

   I would support my idea with examples and some evidence as it was done in the passage. Differently, I would show others' opinions to give more credit for my ideas. I would also show that other people view things differently than me and that shows my objectivity.

8. **How would you construct a model that would change what has been mentioned in the passage?**

Expressing your opinion is very important because it shows that you are not parroting information. Critique teaches you how to be different when you read something. It gives you the confidence when you construct your own approach. That is the power of skill; it is extending the text level.

9. **What would be your own original way to improve understanding of the topic mentioned in the passage?**

You maximize understanding when you go beyond the text and when you extend wherever the passage allows. I always synthesize information from different resources, such as people, articles and the like.

10. **How would you reformulate your hypothesis based on results stated in the passage?**

I would reason what is stated and what I would learn and then I can use this to make a point out of it. I would go beyond the author's opinion and challenge this opinion with my view point.

Appendix 7

The answers of Student 3

1. **What do you think of the passage you read in terms of the level of complexity?**

   The passage had some difficult words and the ideas are complex. I did enjoyed reading it. I like these types of passages.

2. **What changes did you make to extend your understanding of the topic in the passage?**

   When I got the passage in class, I read it silently. I was very excited because both of my parents are doctors and the passage is relevant to their specility. Other than me reading about the topic and carrying out a research, I had a lengthy discussion with my parents about the topic in the passage. I consider this as a research, too.

3. **How would you improve your own understanding of the passage if you were given more time to read and research?**

   I would read the passage more and search for others articles that have the same point. I would discuss the topic with my classmates and we would even do it a class project.

4. **How would you adapt a reflective strategy to create a different understanding of any given information or topic?**

   Before I learnt about the importance of synthesizing information, I had thought that I should always repeat what is usually written in the passage. After I had learnt about synthesis, I collected information from different resources on the same topic. I really found this method very effective.

5. **What could be done better to maximize your own understanding of any new topic given to you?**

   Extra and extended time could help me understand anything I read and could also allow me to do some research about it. It could also give me more opportunities to produce good work.

6. **What could be combined to improve (change) the argument in the passage you read?**

   I think arguing against the ideas mentioned in the passage could prove the passage. Agreeing as well as disagreeing with what is there could improve the level of understanding, too. Implementing extended thinking skills and using them effectively could also improve the agument in the passage.

7. **Suppose you could write about the same topic you read in the passage, what would you do different or same?**

    I would add what others said about the topic. I do not think that we should be one-sided when we provide serious content. People need to know the other side of the matter.

8. **How would you construct a model that would change what has been mentioned in the passage?**

    I would use a comparative approach concerning the ideas. This could change the overall impression about the passage. It could also add some value to the content.

9. **What would be your own original way to improve understanding of the topic mentioned in the passage?**

    As the name implies, extended thinking is to extended the information that the orginal text presents. It is going beyond the text by digging deep to reach the complex level, to synthesize information and enrich the topic and to agree and disagree with what is written. This is the original way to improve understanding.

10. **How would you reformulate your hypothesis based on results stated in the passage?**

    I found the text challenging in the beginning, but after I applied extended thinking skills, I found it way easier. I reached the conclusion that extended thinking is not only part of our curriculum but it is also our education. (see Appendix 16)

Appendix 8

The answers of Student 4

1. What do you think of the passage you read in terms of the level of complexity?

      It was difficult in terms of vocabulary and some expressions. I used the dictionary to find out the meaning of some words.

2. What changes did you make to extend your understanding of the topic in the passage?

      When I read the pssage, I started formulating my questions and I tried to answer these questions after I fnished reading it.

3. How would you improve your own understanding of the passage if you were given more time to read and research?

      Time is a very important factor if it is used properly and effectively. The passage needed some time to be supported with examples and evidence. Definitely, having more time will reflect good work product.

4. How would you adapt a reflective strategy to create a different understanding of any given information or topic?

      Extended time was a very essential factor for my mission to be accomplished. I connected the passage topic to my science class. I did a project and presented it in front of my classmates. I got many bright ideas when I listened to their feedback. I added all this to enrich my final assignment on the passage.

5. What could be done better to maximize your own understanding of any new topic given to you?

      Doing a research and reading some articles to synthesize more information could be the best way to maximize our understanding of any text.

6. What could be combined to improve (change) the argument in the passage you read?

      I think the best way to improve the agument in the passage could be listing the points that you agree with the author and the points that you do not. This way could make your argument more believable and convincing.

7. Suppose you could write about the same topic you read in the passage, what would you do different or same?

What I could do differently is saying the opinions of other authors.

8. **How would you construct a model that would change what has been mentioned in the passage?**

   I would use text critique technique that shows the counter-argument of the the text would say. This would give more insights on how to argue more about the topic.

9. **What would be your own original way to improve understanding of the topic mentioned in the passage?**

   There is no big difference between extended thinking and critical thinking because they are both higher-order thinking skills. The only difference is that in extended thinking you have more time to improve thinking while in critical thinking you just race with time. At the end of the day, with both you improve thinking.

10. **How would you reformulate your hypothesis based on results stated in the passage?**

    I would do my own research and ask for expert opinions. I would also draw my own conclusions from my own readings and test my hypotheses.