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## Examining EFL Learners' Reading Comprehension: The Impact of Metacognitive Strategies Discussion and Collaborative Learning within Multimedia E-book Dialogic Environments

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Examining EFL Learners' Reading Comprehension: The Impact of Metacognitive Strategies  
Discussion and Collaborative Learning within Multimedia E-book Dialogic Environments

by

Abrar H. Alsofyani

A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
Department of Teaching and Learning  
College of Education  
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online discussion

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## **Dedications**

To the ones who disciplined me to be a good person before being a successful woman;  
To the ones who they prayed day and night for me to achieve my highest goals; to my parents,

Amirah Ghamri and Hassan Safar Alsofyani

To my husband, Alaa Alaidaroos, for his support, encouragement, advice, and patience  
throughout this journey

To the apples of my eyes; the light and joy of my life, my kids. May you accomplish higher than  
me in your life.

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## **Abstract**

For most English as a Foreign Language (EFL) learners, both reading and comprehension skills are challenging to acquire. EFL students find reading challenging due to their inability to comprehend and interpret text information, which may lead, at times, to demotivation and loss of interest. The current study intends to explore how Saudi EFL learners may better tackle reading comprehension challenges by examining the utilization of metacognitive reading strategies through discussion and extensive collaborative learning activities within a multimedia e-book dialogic environment. Accordingly, the study investigates the impact of teaching metacognitive strategy-based discussion and collaborative learning on students' application of the reading strategies. It also investigates the influence of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners' reading comprehension. Since an e-book dialogic environment epitomizes the main tenets of this study, the study equally explores how Saudi EFL learners perceive the effectiveness of the multimedia e-book environment on their overall reading comprehension. The participants were 115 Saudi female students at the intermediate college-level from the English Language Institution at a Saudi University. A mixed-methods quantitative-qualitative approach was employed. The findings showed impactful results for learners' application of the reading strategies after being exposed to the treatment. Significant results were found on the effect of the metacognitive strategy-based discussion on learners' reading comprehension. Collaborative learning showed a statistically significant influence on participants' reading comprehension. However, the results did not show interaction between the MS and CL on students' reading comprehension. Although teaching the

MS with CL showed positive impact on students' final reading scores, more research is needed to prove the efficacy of teaching MS with CL. The qualitative findings revealed that the MS-based discussion and collaborative learning was beneficial for EFL students in improving focus on the text, use of strategies, comprehension and reading performance. Participants evaluated the multimedia e-book features of discussion board, videos, glossing and illustrations based on their effectiveness. Both advantages and disadvantage of the e-book environment are addressed and compared to the traditional face-to-face classroom. The study concludes with pedagogical implications for EFL instructors, learners, and future researchers, and also provides limitations and recommended future research recommendations.

## **Chapter 1: Introduction**

### **Background of the Study**

Literacy is considered the most important skill in language acquisition for academic purposes. The connection between reading skills and academic achievement is unequivocal. Acquiring knowledge and information is central for academic success and depends mostly on having “good reading skills” (Jalilifar, 2010 as cited in Coertze, 2011). If language learners are able to read well, they will be able to broaden their academic knowledge, engage in more sophisticated social communication, and improve their writing skills. According to research, many students face difficulty in comprehending the meaning of a written text because reading is a complex sociocultural, cognitive, and linguistic process (Grabe & Stoller, 2002). Reading is a transactional process that involves interaction with the text and the context, while comprehension is “based on the background knowledge, stance, purpose and goal [a student] brings to the reading situation” (L’Allier & Elish-Piper, 2007, p. 339 as cited in Coertze, 2011). Language learning readers mostly understand texts that are familiar to them and tend to not fully comprehend unfamiliar ones; they use their knowledge of the spoken language, the written language, and their cultural knowledge to construct meaning from the text.

Learners of English as a foreign language (EFL) or English as a second language (ESL) face a plethora of challenges related to language learning skills that are further complicated by social and cultural environment factors. Reading comprehension is one of the key elements in learning English as a second language or foreign language (Ahmadi, Ismail, & Abdullah, 2013).

Language learners might face difficulties in comprehending the text if they are not able to decipher the written material (Iwai, 2009). Researchers agree that students who are learning English struggle with constructing meaning which hinders their comprehension abilities (Salataki & Akyel, 2002). Other factors in learning English as a second or foreign language include limited cultural and language background knowledge, unfamiliarity with grammatical structures and vocabulary, a lack of awareness of reading strategies, inappropriate-reading material, and practicing the language solely for higher education purposes in EFL contexts (Aebersold & Field, 1997; Dagostina & Carrifio, 1994; Nuttall, 2000 as cited in Pookcharoen, 2010). All these factors are examples of language learners' struggles with reading skills that call for new pedagogical methods to increase students' reading comprehension level.

Reading strategies such as activating prior knowledge about the text, identifying the main ideas, and connecting thoughts between paragraphs are deemed important for reading comprehension. The development of students' reading strategies plays an important role in their reading comprehension, engagement level, and performance on reading tasks (Coertze, 2011). Comprehension strategies support readers to construct meaning, use textual cues, and apply techniques to better grasp reading tasks (Langer, 1982). Taking into consideration reading strategies as important tools to support ESL/EFL learners with reading comprehension, researchers suggest that metacognitive reading strategies are important and have a significant influence on language learners' reading comprehension (Salataki & Akyel, 2002). It is common knowledge that language learner with higher levels of language proficiency use metacognitive reading strategies, planning, monitoring and evaluation more often than lower language proficiency level readers (Anderson, 2003; O'Malley & Chamot, 1990). Intermediate and lower proficiency level students mostly use supportive strategies such as dictionaries, translation tools, and planning by activating

prior knowledge. However, they barely utilize cognitive strategies such as identifying the text's main ideas or connecting ideas from various paragraphs for better comprehension. They struggle with comprehension due to insufficient awareness of metacognitive strategies (Pookcharoen, In, Lee, & Kigamwa, 2009), which proves disadvantageous to their ability to comprehend the text.

The positive influences of providing direct instruction of reading strategies to language learners to improve reading comprehension have not yet been sufficiently proven (Pei, 2014). This could be either due to instructors' teaching methods or differences in student abilities to understand and absorb new reading materials. Hence, research advocates for the application of metacognitive reading strategies for ESL/EFL language learners with multimodal texts to further investigate how readers of different proficiency levels utilize these strategies to enhance their reading comprehension (Pookcharoen, In, Lee, & Kigamwa, 2009). The implementation of instructional technology in delivering reading strategies will assist language learners struggling to acquire metacognitive strategies and to become better engaged through use of multimedia features. A new paradigm for literacy and language learning has emerged as students engage with written and multimodal texts (Pahl & Rowsell, 2005) consisting of multimedia features such as audio, video, and images to enhance readers' construction of meaning (Kress & Van Leeuwen, 2001). Today's language learners prefer to learn through multimedia features to activate their minds (Sobhani & Bagheri, 2014) and build stronger communicative competence. It will be beneficial for ESL/EFL researchers to investigate English language learners' enhancement of reading strategies and reading comprehension through technology tools, that provide interactivity and accessibility to students, than paper-based texts. New technology tools with the embedded multimedia-enrichment and visual appeal will aid instructors in integrating a variety of supportive learning materials



(Woody, Daniel, & Baker, 2010), reading strategies, and collaborative activities to improve language learners' text reading comprehension.

Interactive e-book learning systems are an emerging technology, with engaging features such as video, audio, and 3D illustrations, that has the potential to improve learners' reading comprehension. Interactive e-books emerged as technology that present content learning materials in an appealing digital interface to promote engaged learning. According to Ebied and Rahman (2015), the attention to e-readers and e-books was established with the launch of the Amazon Kindle in 2007. Around 2010, with the launch of the Apple iPad, digital reading technology began to resemble modern tablets (Ebied & Rahman, 2015). These devices, with their embedded interactive features, met the literacy expectations of the new generation, improved reader engagement and enhanced reading comprehension. The new generation's expectations of education differ from paper and pencil usage, the traditional rote method, and being passive recipients in the classroom (Ebied & Rahman, 2015). Language learners of the new generation expect to be active and engaged participants in the language learning process. They want technology to be integrated within lecture classes for increased opportunity to be active readers and engaged learners.

### **Statement of the Problem**

Reading comprehension is one of the most difficult skills to acquire for college-level Saudi EFL learners. Educational Testing Services show that the most difficult part of the Test of English as a Foreign Language (TOFEL) for Saudi students is the reading test (Educational Testing services, 2007). A gap exists between Saudi college students' English reading proficiency level and the expected standards of reading comprehension at the English Language Institution in Saudi Universities. The instructors' pedagogy, lecture time frame, class size, intensive curriculum, and

the students' lower English proficiency are all factors that limit opportunities for extra practice. These factors may negatively influence students' level of reading comprehension, as well as their confidence and motivation.

The primary challenge for EFL language instructors, especially in Saudi Arabia, is teaching reading skills and strategies. Saudi teaching methods are rooted in exercises of "silent reading," response to general comprehension questions instead of being focused on teaching the reading skills and strategies (Ismail & Tawalbeh, 2015). Most Saudi college-level language learners do not know how and when to correctly apply the reading strategies, or how to use them. They frequently use global strategies such as dictionaries and planning strategies, rather than monitoring and evaluation strategies, which limits their text comprehension (Ismail & Tawalbeh, 2015). There is a need for new instructional methods for teaching metacognitive strategies to EFL instructors and providing EFL Saudi learners with opportunities to practice using the strategies and improve their reading comprehension.

There are existing research studies on the influence of metacognitive reading strategies on reading comprehension (Ahmadi, Ismail, & Abdullah, 2013; Al-Sobhani, 2013; Hong-Nam, 2014; Kummin & Rahman, 2010; Zhang & Seepho, 2013). However, more research is needed to show the influence of MS on reading comprehension in EFL context, especially in Saudi Arabia. According to Ismail and Tawalbeh (2015), existing scholarship does not sufficiently address the use of metacognitive reading strategies to improve reading comprehension for low achieving EFL Saudi learners. Although research studies showed that reading strategies such as global reading strategies, problem-solving strategies and support reading strategies enhance Saudi students' reading comprehension (Ahmadi, Ismail, & Abdullah, 2013; Ismail & Tawalbeh, 2015), further research is needed on teaching pedagogy related to reading strategies. In an age of widespread

technology and interactive social media, the new generation of students is more interested in learning through technology-based and technology enhanced instructional methods. There is a lack of research on the metacognitive strategy teaching methods, such as how to keep students engaged in the learning process during class time and how to encourage them to practice the strategies to improve their reading comprehension. The older pedagogy of drilling or rote memorization might not be the best teaching method with this technologically savvy generation as students are spending a significant amount of time on smartphones, tablets, and various electronic devices. Instructors need to integrate technology-based language instruction into formal lecture style classroom sessions for a more engaging learning experience.

### **The Purpose of the Study**

This study explores the impact of metacognitive strategy-based discussion and collaborative learning within a multimedia e-book dialogic environment to improve EFL learners' utilization of metacognitive strategies and their academic reading comprehension. The study participants were female freshmen students enrolled in the English Language Institution at a female Saudi University. The study investigates the impact of three important factors for students learning English as a Foreign Language (EFL).

Firstly, this study explores the impact of metacognitive strategy-based discussion and collaborative learning in increasing EFL students' utilization of metacognitive strategies (planning, monitoring and evaluation) within the multimedia e-book dialogic environment. The participants practice applying metacognitive strategies (MS) with collaborative learning discussions to support their use of the MS stages: planning, monitoring, and evaluation. Through discussions, students can make predictions about the text, activate prior knowledge, identify main ideas, connect ideas between paragraphs, and summarize or evaluate the text. EFL students have

opportunities to ask questions, negotiate their learning process, and connect their current learning to their prior experiences to improve application of reading strategies. Secondly, the study investigates the impact of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners' reading comprehension. Thirdly, this study determines the effectiveness of multimedia e-book learning system as a reading environment on EFL learners' overall reading comprehension performance. It gathers and analyzes EFL learners' perception of utilizing a multimedia e-book learning environment for reading comprehension and identifies which interactive features of the e-book system (discussion board, videos, glossing, illustrations) are most helpful in increasing reading performance.

### **Research Questions**

The present study examines the impact of metacognitive strategy-based discussion and collaborative learning in increasing student utilization of reading strategies within a multimedia e-book environment. It also explores the impact of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL to improve EFL learners' reading comprehension. To determine the effectiveness of the e-book dialogic environment, the study further investigates EFL students' perception of the multimedia e-book learning environment in improving their overall reading comprehension performance. To accomplish the purpose of this study, the researcher posed three central research questions:

1. Does metacognitive strategy-based discussion and collaborative learning impact EFL learners' application of reading strategies within multimedia e-book dialogic environments?

2. What is the impact of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners' reading comprehension?
3. How do EFL learners perceive the effectiveness of a multimedia e-book learning environment on their overall reading comprehension?

### **Hypotheses**

The researcher's hypotheses are established for the quantitative research design:

1. Students learning English as a Foreign Language are better at utilizing reading strategies after being exposed to the MS and CL treatment.
2. Students learning English as a Foreign Language who have been exposed to MS achieve final reading scores greater than those who have not been exposed to MS.
3. Students learning English as a Foreign Language who have been exposed to CL achieve final reading scores greater than those who have not been exposed to CL.
4. Students learning English as a Foreign Language who have been exposed to the combined use of MS and CL show interaction effects on their final reading scores.

### **Significance of the Study**

To contribute to the instruction of metacognitive strategies, researchers need to conduct more studies about the influence of technology on teaching metacognitive strategies to enhance EFL learners' utilization of reading strategies and reading comprehension. Twenty-first century literacy is viewed as an interactive and dynamic method of processing meaning that goes beyond encoding and decoding the meaning of a text (New London Group, 1996). Dreyer and Nel (2003) state: "in order to meet the reading needs of students in the 21st century, educators are pressed to develop effective instructional means for teaching reading comprehension and reading strategy

use” (p. 349). The present study fills a significant gap in the Second Language Acquisition and Instructional Technology (SLA/IT) literature by exploring the influence of teaching metacognitive strategies (MS) through discussion and collaborative learning within an e-book dialogic environment to enhance Saudi EFL learners’ utilization of reading strategies and reading comprehension. The current study is significant for a variety of purposes.

First, the current study is significant because it raises EFL instructors’ and students’ awareness about the effectiveness of teaching and learning metacognitive reading strategies and may reduce students’ reading comprehension struggles. Exploring the effectiveness of learning the MS through discussion and collaborative learning for Saudi EFL learners will supply valuable data to EFL instructors in Saudi Arabia and to instructors in other EFL contexts. This (data) will create a baseline for the utilization of different teaching methods for reading skills and will improve student training on the use of reading strategies to achieve higher comprehension levels. Next, the current study provides EFL instructors in Saudi Arabia and other places with an effective pedagogical method and instructional content design for teaching reading skills and comprehension. It proposes using strategic methods for teaching the MS through discussion and collaborative learning following MS structured discussion questions as shown in Chapter 2, Table 1, to encourage students at the intermediate and lower English language levels to participate and achieve better reading comprehension results. Additionally, it suggests that EFL instructors divide the text into paragraphs with the MS structured questions (see Appendix F) to help students digest the text information and practice identifying and analyzing important ideas in each paragraph.

This study highlights the importance of integrating technology, such as a multimedia e-book learning environment that promotes collaboration via the discussion board feature, as a supplemental tool for EFL learners. Such tools allow students more opportunities to practice

reading strategies during the formal lecture-style class by engaging all students in an online discussion about the text. Previous studies have found that the provision of e-books in learning can improve students' learning achievement and increase their confidence in learning (e.g., Huang, Liang, Su, & Chen, 2012; Karemaker, Jelley, Clancy, & Sylva, 2017; Sung & Ting, 2017). Researchers argue that interactive e-book learning systems have been investigated more heavily on native language than English as a second or foreign language (Bikowski & Casal, 2018). In contrast, this study implements engaging pedagogical designs with appropriate materials for English language learners through digital platforms for academic successes. By exploring the connection between an appropriate multimedia e-book learning system and reading comprehension for EFL learners, this study seeks to find better approaches in learning to support EFL readers' comprehension and engagement through technology. It also shows the benefits of integrating multimedia features within a technology-based environment such as videos, glossing, discussion boards, and illustrations, within a technology-based environment to enhance comprehension, create a fun learning environment, and generally motivate students in reading. Finally, the study might help to encourage college-level administrators of English Language Institutions in Saudi universities about the importance of having computer labs for reading classrooms and employing a web-based design for instructors and students to improve reading skills.

### **Definition of Terms**

The following definitions are provided to clarify terms that have been used in this study:

*English as a Foreign Language (EFL)* “is used in contexts where English is neither widely used for communication, nor used as the medium of instruction” (Carter & Nunan, 2001, p. 2).

*Reading* is defined as a receptive language and psycholinguistic process; the writer encodes a linguistic representation and the reader has to construct the meaning from this encoded language (Goodman, 2000).

*Reading Comprehension* is defined as “the amount of learning, meaning, and information gained which readers are able to develop while reading” (Alsamadani, 2009, p. 24).

*English as a Second Language (ESL)* presents learners with “situations in which English is being taught and learned in countries, contexts and cultures in which English is the predominant language of communication” (Carter & Nunan, 2001, p. 2).

*Reading strategies* are defined as a set of cognitive actions that help readers construct meaning from texts and comprehend the reading materials before, during and after reading. Reading strategies embed “the use of mental operations involved when readers approach a text to make sense of what they read” (Barnett, 1988, p. 66).

*Metacognition* is defined as “one’s knowledge concerning one’s own cognitive processes and products, or anything related to them” (Flavell, 1976, p. 232).

*Metacognitive strategies* involve learners’ plans and approaches to achieve better comprehension levels including planning before reading, monitoring their own comprehension while reading, and evaluating their own reading performance after the reading task (Alsamadani, 2009).

*Planning strategies* (before reading) include setting the learning goals, preparing (activating the learners’ prior knowledge), and predicting (what the reader is expecting while processing text information).

*Monitoring strategies* (during reading) involve focusing on the text materials, searching for information related to the learner’s memory, comparing present information with prior knowledge, making inferences, and confirming the understanding of the presented information.



*Evaluating Strategies* (after reading) include the reviewing process by confirming new information learners have comprehended through the practice of recalling, revising information, assessing the author's voice and presenting the learners' point of view.

*The Survey of Reading Strategies* is a survey that reports "adolescent and adult ESL students' metacognitive awareness and perceived use of reading strategies while reading academic materials such as textbooks" (Mokhtari & Sheorey, 2002, p. 2).

*Test of English as a Foreign Language (TOEFL)* is a standardized English language test that is developed by the Educational Testing Service (ETS) for non-native English speakers to assess their English language proficiency level.

*Instructional Technology* is "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Reiser, 2012, p. 13).

*E-book* is "a book that is displayed on a computer screen or an electronic device that is held in the hand, instead of being printed on a paper. It is in multiple electronic format" (Oxford Advanced Learner's Dictionary, 2011).

*A multimedia e-book* is defined as "a learning environment with an application program containing a database with assistant media for educational resources capable of saving multimedia presentations related to subjects before importing them" (Shiratuddin & Landoni, 2003).

*A dialogic environment* is a framework or atmosphere where students ask themselves or others questions and exchange thoughts on the text and assigned tasks to better comprehend the text and verify their understanding (Park & Kim, 2011).

## **Organization of the Study**

Chapter 1 introduces the current study by highlighting the research background, the purpose and significance, and the central research questions. Chapter 2 provides a comprehensive

literature review on various dimensions. An overview related to reading comprehension encompasses definitions of reading and reading comprehension, a history of reading and reading models, and Second Language Acquisition theories. A synopsis of metacognitive strategies and reading comprehension, the role of instructional technology in language learning, and the integration of metacognitive strategies and collaborative learning within the e-book systems for language learning are elaborated in this chapter. Chapter 3 breaks down the study's research design into context of inquiry, participants, treatment, data collection, and data analysis procedures. Chapter 4 reports the findings and provides a discussion of the posed research questions. Finally, Chapter 5 details the pedagogical implications, limitations, future research recommendations, and the conclusion of this study.

## **Chapter 2: Literature Review and Theoretical Framework**

The present study explores the impact of metacognitive strategy-based discussion and collaborative learning to improve EFL learners' utilization of reading strategies and comprehension level within an e-book dialogic environment. This aim of this chapter is threefold: the theoretical framework of the study, a literature review, and gaps in research. The theoretical framework presents important theories from the Second Language Acquisition (SLA) and Instructional Technology (IT) fields that guide the framework of the current study. The literature review sheds light on the following: reading comprehension in SLA, history and approaches of reading models, and a review of metacognition and metacognitive strategies (MS). It also provides an overview of metacognitive strategies in relation to reading comprehension and collaborative learning. Since the multimedia e-book learning environment is utilized in the current study, a review of the e-book learning system is discussed for reading comprehension. The existing gaps in scholarship about integrating metacognitive strategies and collaborative learning for ESL/EFL learners in various e-book learning systems are also touched upon.

### **Theoretical Framework of the Study**

Important theories based on the field of Second Language Acquisition (SLA) and Instructional Technology (IT), as well as literacy theory related to reading comprehension guide the framework of this study. Theories from SLA include interactionist theory (Vygotsky, 1978), constructivism learning approach, and the lower affective filter (Krashen, 1982). Theories from IT

includes cognitive information processing theory (Driscoll, 2018) and Chapelle's (2009) perspectives.

The interactionist theory is an important theoretical framework in second language acquisition field. This theory emerged in the 1980s and was influenced by the views of Russian psychologist Lev Vygotsky (1978). The interactionist theory emphasizes that learners acquire a second language through interaction, communication, and comprehensible input (Ellis, 1986). Researchers agree that conversational interaction plays a significant role in acquiring a second language (Gass, 1997; Pica, 2005). Long (1985) stresses that both input and communication are significant factors for acquiring a second language. As a result, errors should not be corrected unless they prevent communication (as cited in Iwai, 2009). According to Bakhtin (1986), interactions occur when individuals engage in dialogues. He considers language as speech rather than "a system of grammatical categories" (Park & Kim, 2011, p. 2157). The utterance is a basic unit of speech that belongs to individual speakers and occurs in dialogues where there is a relationship between the previous and preceding utterances (Park & Kim, 2011). Throughout the online reading sessions, students chat about reading tasks, respond to questions, dialogue with themselves, others, and the online sources to better understand the text (Bakhtin, 1986; Johnson, 2004; Lantolf & Thorne, 2006; Vygotsky, 1978). Mondada and Dohlier (2004) note that mediation, such as dialogue, is a central idea in the sociocultural approach in Vygotsky's theory. "Higher forms of human mental functioning are mediated by tools (language or object) and constructed collaboratively by a member of a culture. The development of higher forms of mental functioning are rooted in socio-interactional practices within that culture. Cognition, is thus, understood to be situated in social interaction" (p. 504).

The constructivist learning approach is another applicable framework for SLA. This approach explains that individuals construct meaning based on context, social interaction, cultural background, prior knowledge and experiences (Dunleavy & Dede, 2014). Based on this theory, the role of the instructor is to guide students on how to use technology and reading strategies, how to activate their prior knowledge through reflective questions and how to solve their own problems by applying their background knowledge and experience. The lower affective filter by Krashen (1982) is a hypothesis that plays a role in the present study. It refers to the complex emotional and motivational factors language learners might face while receiving and processing comprehensible input such as reading texts (Ur, 2011). Students might become anxious or unmotivated in learning if the reading content is complex, if they make mistakes, or if they are continuously corrected by their instructors.

Cognitive information processing theory emphasizes the importance of learning environment as well as the “internal processes within the learner that explain learning” (Driscoll, 2018, p. 55). The use of computers and technology become a path of “interpreting early work on memory, perception, and learning. Stimuli became inputs; behavior became outputs. And what happened in between was conceived of as information processing” (Driscoll, 2018, p. 55). The information processing theory addresses three memory systems: sensory, short-term, and long-term memory. In the sensory memory system, learners discern patterns within the learning environment and develop ways of identifying and encoding such patterns. The short-term memory, learners hold information in memory for a short time to connect it with prior information that exists in the long-term memory. Long-term memory assist learners to apply information that has been stored for long time in the memory after being learned. Additionally, to promote learners’ processing for information, instructors may incorporate interactive features within the learning

environment such as boldface, illustrations and diagrams to help students make connection between prior knowledge and new information.

Chapelle (2009) draws a theoretical framework that connects Second Language Acquisition (SLA) and Computer Assisted Language Learning (CALL). She touches on multiple theoretical perspectives classified under four general approaches: cognitive perspective, psycholinguistic perspective, human learning and language in social context. cognitive perspective is concerned with learner's internal mechanisms and how appropriate sequence of instruction within a technology-based environment enhances students' language learning according to their language proficiency level. The psycholinguistic perspective includes input processing, which highlights the nature of the input and activities that promote learner's awareness. The psycholinguistic perspective draws attention to the interactionist theory and how learners' interactions with computers and peers within an online environment enhance their comprehension. The human learning approach discusses how learning a skill is a matter of practice. Language development occurs when language learners engage in interactions and negotiate meaning using the target language (as cited in Chapelle, 2009).

According to these different perspectives, Chapelle (2009) discusses six characteristics to evaluate materials in the CALL learning environment. The first characteristic, language learning potential, includes the quality of input, the materials and the interactions used. The second trait, importance of meaning, focuses on significance of providing comprehensible input. The third aspect, learner's fit, refers to the language level utilized in the context. The fourth attribute, positive impact, spotlights the benefit students obtain from the assigned task. The fifth quality, authenticity, references the linguistic match between the language usage in the instructional materials and the learners' language used beyond the classroom in a technology context. Six and last, practicality,

refers to learners having the skills to achieve certain tasks (as cited in Chapelle, 2009). Chapelle's theoretical perspectives are covered in the current multimedia e-book learning study.

### **Reading Comprehension in SLA**

Researchers have various definitions for reading and reading comprehension. McShane (2005) defined reading as a complex system that derives meaning from written texts that require decoding words, background and vocabulary knowledge, motivation to read, reading comprehension strategies and how to relate sound speech to meanings. Reading is a meaning-making process with psychological, linguistic, and social dimensions (Pearson, 2009). Many studies show that for second and foreign language learners, reading is a key strategy for accessing a variety of text resources (Day & Bamford, 1998; Dreyer & Nel, 2003; Fasting & Lyster, 2005; Lynch, 2000; Nicolson, 2000 as cited in Sung & Ting, 2017). Through reading, learners can understand the meaning of vocabulary in context, grammar, textual structure, and syntactic composition. Language learners utilize their language skills and their knowledge of the world and cognitive strategies during the interaction process between the reader and the text (Ahmadi, Ismail, & Abdullah, 2013; Rumelhart, 1994). Other scholars define reading as “a meaning-construction process that enables us to create carefully reasoned as well as imaginary worlds filled with new concepts, creatures, and characters” (Ruddel & Unrau, 2004, p. 1462). McShane (2005) definition is the closest in meaning to how the current study expounds on reading. McShane explains that reading is a complex system and language learners can decode the complexity of this system by activating their prior knowledge. In the current study, text complexity may address EFL learners' struggles since they face difficulties with decoding text meanings in English. The definition advocates the use of various reading strategies to help EFL learners with their cognitive processing to decode the text meanings and ideas. This definition also highlights utilization of vocabulary

background. The current study is helping learners with vocabulary background by glossing new vocabulary within the e-book system to help students with text comprehension.

Researchers also have varying definitions for reading comprehension. Comprehension is a crucial literacy component for English language learners to achieve success in reading (Cummins, 1991) because they rely heavily on their literacy input (Eskey, 2005). Reading comprehension is the process through which readers construct meaning via multiple, complex processes that include strategies, knowledge of words, the world, and text organization (Cain, Oakhill, & Bryant, 2004; Fuchs, Fuchs, Hosp, & Jenkins, 2001; Paris, Carpenter, & Hamilton, 2005; Paris, Wasik, & Turner, 1991; Perfetti & Hogaboam, 1975 as cited in Rastegar, Kermani, & Khabir, 2017). Anderson (2003) defines comprehension as the reader's process that combines meaning and information from the text with prior knowledge, utilizing different reading models such as bottom-up or top-down based on their language proficiency level, to construct meaning from the text. Almasi (2003) defines comprehension "as an interactive-compensatory process in which readers attempt to make connections between their prior knowledge and the new information contained in the text" (p. 100). Other researchers define reading comprehension as "the ability of readers to understand the surface and the hidden meanings of the text using meta-cognitive reading strategies" (Ahmadi, Ismail & Abdullah, 2013, p. 238). Comprehension is an important foundational skill for the reading process because it develops learner abilities of information collection, absorption of knowledge, and engagement and motivation with complex social practices and accordingly, thorough understanding of the text (Nunan, 1999). According to the current study, comprehension can be defined as a combination of previous researchers' definitions. It is a complex process in which readers can understand text meanings by utilizing reading strategies, prior knowledge, vocabulary



background, and organize the text by dividing paragraphs in a way that help students recognize and identify main ideas.

Reading and reading comprehension are related and language learners' main struggle pertains to comprehension due to certain aspects of reading such as cultural background, lack of vocabulary knowledge, or problems with sentence structures. There are different factors that may hinder ESL/EFL learners' reading comprehension. One factor may be related to the text itself, especially if the text has a difficult language level, lexicon, structure, or underlying meaning that the author has tried to convey. Learners might face difficulties in comprehending the text materials if they are not able to decode the written reading materials (Iwai, 2009). Language learner readers might also face comprehension problems when they skim and scan for the main ideas or explore and regenerate the author's intended meanings. Furthermore, comprehension depends on the semantic background and reading proficiency of the reader (Goodman, 2000), which may cause further comprehension problems. Familiarity and text background knowledge are some of the most significant hinderances for ESL/EFL reading comprehension (Carrell, 1983a; Floud & Carrell, 1987). For example, if the writer and the reader speak the same language and have similar life experiences and expectations, the reader's interpretation and comprehension can reach an optimum level. In contrast, if the writer and the reader speak different languages and have varying life experiences and dissimilar cultural backgrounds, the reader may face difficulties with text interpretation and comprehension. Accordingly, instructors in EFL and ESL contexts need to consider language learners struggle with comprehension in teaching by providing attention to certain aspects of reading such as reading strategies, language learners' prior knowledge, vocabulary background, and text complexity.

## **History and Approaches to Reading Models**

Historically, reading skills and processes have gained much attention in second language classrooms. During the early decades of the 20th century, the Grammar-Translation method was one of the most common reading approaches. This approach overwhelmed learners with enormous amounts of memorization and translation. Second language learners followed a rote instructional method of reading that required them to read the text, complete grammar exercises, and respond to comprehension questions, both orally and in writing. During the fifties, the instructors shifted their attention from reading to speaking and listening, hence, the Grammar-Translation method was replaced with the audiolingual approach. Although reading remained in third place in terms of importance in language skills during the sixties, followed by writing, it was seen as foundational support for grammar and vocabulary acquisition (Liontas, 2002).

Following this era, researchers' focus shifted to emphasis on reading skills as an important part of the meaning-making process (Goodman, 1967; Smith 1971). Both Goodman (1965) and Smith (1971) were looking at reading "in its natural state, as an application of a person's general cognitive and linguistics competence" (as cited in Pearson, 2009, p. 11). They did not compare reading to comprehension because they argue that reading is comprehending and reading without comprehending is not reading. The most influential movement in the history of reading, schema theory, occurred during the 1970s. During this movement, the focus of reading shifted to characteristics of the text and background knowledge students brought to the reading task. Learners who were focused on the structure of the text rather than the content failed to comprehend the text (Pearson, 2009). During the 1980s, research attention focused on reading in second and foreign languages through various books, articles, and language journals (e.g. Alderson & Urquhart, 1994; Bernhardt, 1991a, 1991b; Grellet, 1981; Ulijn, 1977; Ulijn & Kempen, 1977;

Swaffar, 1991 as cited in Liantas 2002). However, this does not mean that researchers were not focused on the reading process, or that there were no scholarly pieces from which researchers could deduce a reading process model. In fact, there was no attempt to create reading models that conceptualized knowledge and theories about the reading process (Samuels & Kamil, 2000).

Research on reading is over a hundred years old; however, a history of earnest attempts to build a model for reading that describe the reading process. Based on various views concerning the nature of the reading process during the last four decades, three reading models have emerged to explain reading and comprehension processes (Liantas, 2002). The first model, traditional theory or bottom-up model emphasizes textual coding (Gough, 1972). The second, cognitive view or top-down model, emphasizes the role of background knowledge to interpret printed text (Goodman, 1967; Smith, 1971). The third, metacognitive view or interactive model to reading (Rumelhart, 1980; Stanovich, 1980; Carrell, 1983a, 1983b), involves the reader's thinking, engagement and control of the text for better comprehension.

The traditional view, or bottom-up model of reading process, was revived by Gough's (1972) view, however, it has been commonly known since the 1960s. According to the bottom-up model, "reading starts with simple letter identification and goes from there to sound-letter correspondences" (as cited in Pearson, 2009, p. 9). Readers decode the text word by word and link words into phrases, and then sentences (Parded, 2006 as cited in Pearson, 2009). They basically build the text and the author's intended meanings from the smallest textual unit (words and letters). The bottom-up approach puts more emphasis on phonics, vocabulary and word recognition for the understanding of the whole text (Van Duzer, 1999). The comprehension process based on the bottom-up model demands resources. In this model, reading comprehension issues were resolved by deriving meaning from print and decoding text (Carrel, 2000). To achieve better

comprehension, readers need fast and automatic execution of word recognition (Samuels, 1994). Therefore, “educators should aim at helping learners automatize lexical access through a great amount of repeated exposure to print” (Taguchi, Gorsuch, & Sasamoto, 2006, p. 3). The main assumption about this model is that poor readers have problems with text decoding (Purcell-Gates, 1997) and unaware of high-level processes, such as inferencing, more often than fluent readers (Stanovich, 1980). According to Eskey (1973), the bottom-up model was not entirely adequate for the reading process because it underestimated the readers’ role and interaction with the text (as cited in Carrell, 2000). Theorists opposed to the bottom-up model understand comprehension “is in the reader’s mind and is used to figure out letters, words, and sounds” (Pearson, 2009, p. 9).

The cognitive view or top-down model was introduced by Goodman in (1967). Goodman (1967) viewed reading as a “psycholinguistic guessing game” (as cited in Carrell, 2000, p. 2). The primary focus of this model is on readers’ expectations and schemas about the text. Then, readers use their vocabulary knowledge to decode words and confirm their expectations (Aebersold & Field, 1997). Through this model, readers use reading skills such as making inferences and predictions to construct meaning from texts. This approach revolutionized the way students learn to read by focusing on connecting information from the text to their prior knowledge, instead of emphasizing extraction of meaning from the text (Smith, 1994). According to Fries (1963), “a failure to relate the linguistic meaning of a reading passage to cultural factors would result in something less than total comprehension” (as cited in Carrel, 2000, p. 2). As a result, the reader in this model is an active participant in making meaning. In this sense, reading involves a cognitive process in which the reader’s background knowledge facilitates the construction of new meanings. Thus, reading becomes more of a dialogue between the reader and the text, and both the reader and the author of text are involved in the reading process and comprehension (Tierney & Pearson,

1994). Reading becomes more than constructing meaning from printed text and decoding words; it becomes a matter of making sense of written language by communicating the reader's prior knowledge and expectations (Smith, 1994). Specialists in second language learning viewed second language readers as active information processors (Clarke & Silberstein, 1977; Clarke, 1979; Mackay & Mountford, 1979 as cited in Carrell, 2000), who make anticipations based on their prior experiences while reading and sampling only parts of the actual text (Carrell, 2000). Therefore, some researchers believe that the top-down model is appropriate for fluent readers who do not have problems with decoding words and using the text as a prompt to activate their reading strategies (Eskey, 1988; Stanovich, 1980).

The interactive reading model was introduced by Rumelhart (1977) and Stanovich (1980). This model is influenced greatly by Goodman's (1967) and Coady's (1979) psycholinguistic model that includes the following five elements: prior knowledge, word recognition, phonemic features, graphemic features, and metacognition (Eskey, 1988). The interaction between these elements leads to comprehension. Rumelhart (1977) and Stanovich (1980) recognize the interactive model as an interaction between the top-down and bottom-up processes. This model assumes that proficient readers have the ability to decode words, interpret texts (Eskey, 1988), and rely on context (Rumelhart, 1980). Readers might face obstacles with the comprehension process when they miss a piece of information since comprehension depends on both graphic information and thoughts from the reader's mind. This has resulted in disputes between researchers about the choices of authentic texts and the assessment of text comprehension (Johnston, 1983; Lee, 1986; Meyer, 1985; Swaffar, 1991; Nyikos, 1992 as cited in Liontas, 2002). Each reading model has a certain perspective and justification for the students' reading and comprehension process. Current approaches to the second language (L2) reading process assume that reading comprehension is

interactive and involves both bottom-up and top-down models (Alsamadani, 2009). Therefore, teachers who have the objective to enhance comprehension in their reading classroom will commonly adopt the interactive approach (Alsamadani, 2009) to encourage ESL/EFL learners' active interaction with the text.

### **Metacognitive Strategies and Reading Comprehension**

Metacognition can be defined as thinking about thinking, that is, a person's ability to think about what they already know and what they need to know to comprehend the text beyond the simple process of recalling and describing events (Anderson, 2008). The term metacognitive was first introduced by Flavell (Schmitt, 2005). Flavell defines metacognition as "the active monitoring and consequent regulation and orchestration of [metacognitive] processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective" (Flavell, 1976, p. 232). Flavell (1976) and Brown (1978) define metacognition as "knowledge about cognition and regulation of cognition" (as cited in Baker & Beall, 2009, p. 375). Flavell (1976) proposed a model of cognitive monitoring which includes four subdivisions: metacognitive knowledge, metacognitive experiences, goals (or tasks), and actions (or strategies). Based on his cognitive model, researchers identified dimensions of metacognition which serve as the basis of how metacognition influences learning (Baker & Brown, 1984; Paris & Winograd, 1990), in other words, the regulation of cognition (as cited in Baker & Beall, 2009). Other researchers shed light on the importance of metacognitive reading strategy awareness in the area of reading comprehension. Metacognitive reading strategy is defined as "the perceived use of reading strategies while reading" to enhance comprehension (Flavell, 1979; Pressley, 2000 as cited in Ahmadi, Ismail, & Abdullah, 2013, p. 241).

Metacognitive reading strategies refer to particular goal-directed mental processes that adjust and control readers' attempts to construct meaning in order to comprehend the text (Afflerbach, Pearson, & Paris, 2008). Metacognitive learning strategies are higher-order skills that entail different learning strategies: planning, monitoring and evaluation (Baker & Brown, 1984; Chamot & Kupper, 1989; Oxford, 1990; Pintrich, 1999 as cited in Hong-Nam & Page, 2014). These three metacognitive strategies are used before, during, and after reading (Veenman, Van Hout-Wolters, & Afflerbach, 2006). According to Zare-ee (2007), the first strategy of planning (before-reading) involves utilizing appropriate strategies such as predicting and sequencing, or the allocation of resources, such as focusing attention before beginning a task. This mental process enhances readers' refinement of a plan or the integration of their plans with other developing ideas about the text and preparation for how to react to the text, a process that fosters the comprehension process. The second strategy, monitoring strategy (during-reading) keeps readers' comprehension on track. It enables learners to check if the available resources are sufficient and if the available resources are utilized according to the plan (Slife & Weaver, 1992). Lastly, evaluation (after-reading) is defined as appraising the conclusion from the individual's point of view and reevaluating the conclusion. It involves comparing the actual reading text against the individual learner's strategic plans. Evaluation focuses on what goals students set prior to reading, what they end up accomplishing, and how they achieve their goals (Ahmadi, Ismail, & Abdullah, 2013). These learning strategies can either be conscious, unconscious, or automatic and involve learning tasks by "attending to and evaluating the degree to which new information is being understood, integrated, and retained" (Flavell, 1979; Taraban, 2004 as cited in Chevalier, Parrila, Ritchie, & Deacon, 2015, p. 2).

Metacognitive knowledge is important for reading comprehension. Metacognition is a critical component of reading that facilitates ESL/EFL learners' reading comprehension (Mokharti & Reichard, 2002; Mokhtari & Sheorey, 2008; O'Malley & Chamot, 1990). The more metacognitive functions second language learners (L2) utilize in reading, the more learning and comprehension of English content they acquire. Therefore, readers need to increase their metacognitive awareness and knowledge, because "metacognition contributes to both the acquisition of L2 reading and reading strategies" (Hong-Nam & Page, 2014, p. 197). Researchers found positive influences of MS on reading comprehension for language learners. In one study, Zhang and Seepho (2013) investigated students' use of metacognitive strategies and the relationship between the use of MS and reading comprehension. The participants were 33 third-year English major EFL college students from Guizhou University in South China. The data was collected and analyzed through Metacognitive Strategy Questionnaire (MSQ), semi-structured interviews, and a reading comprehension test. The results showed a significant positive correlation between metacognitive strategies and reading comprehension. Students who used more metacognitive strategies achieved higher scores in reading comprehension. Additionally, Wen (2003) found that EFL students with high reading comprehension levels utilize metacognitive reading strategies. Wang, Spencer, Minjie and Xing (2009) and Ahmadi, Ismail and Abdullah (2013) also found that EFL learners who used metacognitive reading strategies achieved success and higher reading comprehension levels in their reading and learning programs

In another study, Rezaie and Naeini (2015) examined the performance of Iranian EFL students in reading comprehension tests and their patterns of using cognitive and metacognitive learning strategies. They conducted the study on 190 Iranian intermediate-level English learners, which included 120 females and 70 males. They found that students with higher scores in reading



proficiency tests tend to use metacognitive strategies such as planning, monitoring and evaluation while test takers with lower performances did not use such strategies. Takallou (2011) also examined the effect of metacognitive reading instruction on reading comprehension regarding authentic and non-authentic reading texts in an EFL context. The participants were 93 EFL Iranian students from the University of Kermanshah. The data were collected through a questionnaire and reading comprehension tests. The experimental group received instruction on the planning and self-monitoring strategies. Results showed that the experimental group performed better on the reading comprehension tests compared to the control group. In contrast, a study conducted on Indonesian EFL students found that regardless of students' increased use of metacognitive strategies, there was no statistically significant improvement in their reading comprehension (Pammu, Amir, & Maasum, 2014).

In Saudi Arabia, few studies have examined the influence of MS on reading comprehension. Ismail and Tawalbeh (2015) conducted a study to investigate the effectiveness of metacognitive reading strategy programs for improving EFL learners' comprehension levels with lower achievement. The study participants were 21 Saudi female students in their second year of college. The instructor explained metacognitive reading strategies twice a week and encouraged students to read texts and answer comprehension questions. A quantitative approach was used, and the data were collected based on questionnaires, pre-tests, and post-tests. The results showed significant differences between the pre-test and post-test mean scores of the metacognitive reading strategies and English reading comprehension. In another study, Alsamadani (2011) investigated the relationship between metacognitive reading strategies and reading comprehension among Saudi EFL students. He found that reading strategies and other factors such as vocabulary size and time on task improved reading comprehension. However, more research needs to be conducted on

pedagogical methods of teaching MS to EFL college students in Saudi Arabia. Al-Nujaidi (2003) found that Saudi EFL college language learners had low comprehension levels because they faced struggles with utilizing strategies such as inferencing, evaluation and summarizing. He found that high and low proficiency level students used supportive strategies more frequency and performed better on comprehension questions related to superficial text information that required strategies such as scanning and skimming.

As some studies found positive results of MS on reading comprehension in Saudi Arabia, Meniado (2016) found negative results. He investigated the relationship among metacognitive strategies, reading comprehension and reading motivation on 43 male Saudi EFL students. The results showed no statistically significant correlation between metacognitive strategies and reading comprehension but did show a statistically significant correlation between strategies and reading motivation. Alsamdani (2009) also found that the types of reading strategies used by Saudi learners had no influence on their reading comprehension. His findings imply that “there seems to be no simple or linear relationship between the use of reading strategies and reading comprehension” (Alsamdani, 2009, p.117). Shaikah (2005) had found that even training Saudi learners on how to use the strategies did not help in improving their reading comprehension. Accordingly, more research is needed to examine the influence of MS on reading comprehension for female and male Saudi college students at the intermediate and beginner English language programs.

Concerning the types of metacognitive strategies English language learners tend to use for reading comprehension, researchers show that according to the language proficiency level, EFL students tend to utilize planning strategies, dictionary and translations more than metacognitive strategies. In one study, Kasemsap and Lee (2015) aimed to discern the discrepancies in the use of reading strategies between higher and lower level English language learners. The participants were

162 EFL vocational college students who majored in accountancy and were enrolled in a regular English course. The results showed that lower-skilled reading students utilized cognitive strategies (memorizing and retrieval strategies) more often than metacognitive strategies (planning, monitoring and evaluating). Lower level students tend to use more translations and dictionaries. In contrast, higher-level students utilized strategies such as previewing, using prior knowledge, making connections and asking oneself questions. In another study, Zhang and Seepho (2013) found that EFL Chinese students tend to apply the planning strategy more than monitoring and evaluation. Karbalaei (2010) also explored whether there were any significant differences between metacognitive awareness strategies and the perceived use of reading strategies between Indian ESL college students and Iranian EFL college students. On one hand, Karbalaei found that Iranian EFL students tend to use the “bottom-up” strategies and references materials, such as dictionaries, which interfere with their ability to comprehend the text. On the other hand, he found that Indian ESL learners have more awareness of global reading strategies and total metacognitive reading strategies. Indian ESL students usually use the “top-down” reading strategies such as paraphrasing, taking-notes, and summarizing. Both ESL and EFL groups inclined to use the limited types of problem-solving strategies, such as re-reading or reading slowly, because they were unaware of other types of metacognitive reading strategies. As shown in different studies, EFL learners tend to use more supportive strategies such as the planning, use of context, or translations more than cognitive strategies that involve monitoring and evaluation of the text.

Some EFL researchers’ justification for the limited use and awareness of metacognitive strategies, especially monitoring and evaluation, among EFL learners while reading is due to reading instruction that is characterized by the traditional comprehension-testing model (Chun, 2015; Pei, 2014). Chun (2015) explored how Taiwanese EFL learners perceive the global,

supportive, and problem-solving reading strategies when they read online. The results revealed that advanced language learners use more global strategies and problem-solving strategies, such as contextual clues, critical evaluation, and visualization of what they had read. In contrast, language learners at a lower level and at the beginning proficiency level tend to use supportive strategies such as dictionary hyperlinks. Pei (2014) found negative results regarding direct instruction of metacognitive reading strategies in EFL contexts. Pei investigated the impact of explicit instruction of metacognitive reading strategies on reading comprehension and the influences of instruction in enhancing EFL learners' metacognitive awareness. The participants were 66 Chinese freshmen students at Tianping College. The quantitative data showed no significant results between the two groups. The common theme for the qualitative data through interviews showed that students "do not appreciate the reasons why such strategies are useful and do not show interest or enthusiasm in the instruction" (p. 1151). Students complained that they struggled with reading comprehension and did not see improvements with their reading ability or comprehension level (Pei, 2104). Al-Nujaidi (2003) highlighted in his study that as an EFL instructor in Saud Arabia he also found that the focus of teaching reading materials and assignments is on English language structure and vocabulary. To achieve better reading comprehension, students need strategies to help them with text comprehension.

In summary, metacognitive strategies (MS) have shown positive influences on reading comprehension, however, studies have revealed that EFL learners have problems with utilizing different MS, especially monitoring and evaluation strategies, more than ESL learners. Based on the literature review, EFL learners' limited awareness of MS is due to insufficient MS teaching methods and sparse practice opportunities of reading strategies. Accordingly, EFL instructors need assess students' reading strategy awareness based on students' knowledge of commonly applicable

strategies. Instructors must strive to and create pedagogical methods of teaching reading skills and MS to encourage student utilization of reading strategies other than planning, dictionaries, and translations to improve comprehension.

### **Use of Discussion and MS to Promote Reading Comprehension**

Discussion is a strong pillar for supporting communication skills and developing higher levels of reading comprehension (Alvermann, Dillon, & O'Brien, 1987a). Pedagogical researchers have mentioned multiple definitions of discussion (Landon, 1899; Bloom, 1954; Bridges, 1997). Landon defines discussion as an informal chat with no “overt tones of formal instruction” (Alvermann, Dillon, & O'Brien, 1987a, p. 1). The teacher's role in this case is to guide students by posting questions to draw their attention to the text. Students are free to share their thoughts and questions about unfamiliar ideas. Bloom (1954) defines discussion as “cooperative attack on a common set of problems, based on a common set of data, materials, and experiences, in which the problem is pursued to as complex and deep a level as possible” (p. 38). Bridges (1979) defines discussion as individuals' response and presentation of their points of view to develop their understanding and knowledge of the discussed topic. Landon's definition of discussion will be utilized for the purpose of the current study. In the current study, students have informal chats to discuss text ideas. The teacher's role during discussions is to guide the class and post MS structured questions to keep students focused and to encourage them to use reading strategies.

Discussion is an important communication tool that can enrich and refine learners' understanding to promote reading comprehension. It improves their understanding by viewing facts from different perspectives based on others' interpretations. Sharing new perspectives provides learners with opportunities to reinforce their long-term memory and enhance recollection of new information. A peer collaboration paradigm involves students working together to achieve

certain goals without a tutor's pressure (Manion & Joyce, 1997). Researchers agree that establishing group-oriented activities often create "collateral or untrained forms of peer management, tutoring, or modeling behaviors" (Kohler & Strain, 1990, p. 444). When learners read a text, they usually need clarification for certain ideas. Peer discussion provides learners with clarifications and increases their vocabulary knowledge. Learners might correspondingly refine their comprehension through argumentative and contradictory opinions. Discussion and presentation of different points of view help learners clarify their contradictory thoughts and reach a maximum comprehension of the text (Alvermann, Dillon, & O'Brien, 1987b). Hence, discussion among peers has positive influences on learners' reading comprehension.

Research in foreign language acquisition suggests that students using online chat discussion communicate and produce better discussions than students in face-to-face interactions. They produce more complex words, sentences, and sentence structure which enhance their language learning (Kern, 1995). Text-based or chat-based discussion creates a different learning environment that gives students a chance to disagree with each other, and to present and test hypotheses. Text-based discussion alleviates learners' isolation and encourages them to communicate and use the language (Blake, 2002). Smith (2003) examined the influence of task type (jigsaw or decision-making) on students' negotiation within a computer-mediated environment. He also investigated computer-mediated negotiation compared to face-to-face discussion, and learners' engagement in negotiation when they face new lexical items. Negotiation between students was conducted through the Chat Net program. The participants were 14 intermediate EFL English language learners. The study concluded that during the Chat Net program task, students negotiated more when they faced problems with understanding or met new

lexical items. The written format of the text-based chat enhanced students' understanding of text information, which is considered to be an important construct for successful L2 language learning. Numerous other studies have also shown that interaction through chat or text-based forms increases learners' attention and comprehension of the text. (Chen, 2008; Kitade, 2000; Shekary & Tahririan, 2006, as cited in Golonka, Bowles, Frank, Richardson & Freynik, 2014).

Concerning MS and discussion for English language learners to improve reading comprehension, there are a few studies that examine teaching metacognitive strategies and reading comprehension through discussion. Most of these studies had limitations, such as not examining different MS stages through discussion (planning, monitoring, and evaluation), not revealing what type of MS questions were used to influence student outcomes, and not focusing on improvement of reading comprehension skills. For example, only one study by Liu, Ko and Wu (2014) examined the planning strategies with group discussions to improve reading in Chinese. Researchers created a reading system to investigate how students acquire reading strategies through online discussions. The researchers' focus was instruction of the prediction strategy in the Chinese language. The participants were 110 fifth-grade Chinese students. The research design utilized three groups: prediction-discussion group, prediction group, and discussion group. The prediction-discussion group had the opportunity to use the prediction strategy with discussion in pairs within an online chat room. The prediction group had the online prediction strategy instruction without discussion. Whereas, the discussion group used regular classroom discussion without prediction instruction. The results revealed that the online prediction strategy instruction without discussion improved students' reading comprehension more than the prediction strategy with discussion. Students who used the prediction strategy and discussion performed slightly lower than students who only

utilized the prediction strategy instruction. The researchers found that dual learning activity and cognitive overload impacted the prediction-discussion group's reading comprehension.

While the previous study focused on students' utilization of the planning strategies to enhance reading comprehension for Chinese language, other studies explored English language learners' utilization of MS-based discussion, for purposes other than improving students' reading comprehension (Park & Kim, 2011; Lam, 2009). Lam (2009) conducted a study to investigate the effects of MS discussion on students' learning performance and the application of strategy use for oral English language task communication. The participants were 40 ESL students from Hong Kong between 13 -14 years of age. They were divided into control and experimental groups. The experimental group applied MS discussion and the control group had no MS discussion. Data were collected from questionnaires, observations, discussion performance, and interviews. The study demonstrated that the experimental group had higher utilization of the reading strategies and outperformed on their learning tasks. In another study, Park and Kim (2011) conducted a study to examine college-level ESL students' use of reading strategies and hypermedia resources during an online dialogue and reading activities. The participants were 10 low-intermediate to high-intermediate level ESL language learners at a language institute. The results showed that students applied the same reading strategies they used for printed books, such as activating prior knowledge, to set their purpose and plan for the reading. Students also accessed the hypermedia, especially videos and illustrations, more than audio to understand the online texts. The results showed that participants have various preferences regarding the use of hypermedia and hypertext resources in an online learning environment.

The above-mentioned studies showed that collaboration and discussion have influences on language learning, however, but there is still a lack of research about integrating various



metacognitive strategies (MS) with discussion and collaborative learning to improve English learners' reading comprehension. There is also a gap in research about exploring MS-based discussion on ESL/EFL learners' reading comprehension.

### **Instructional Technology and Reading Comprehension**

Technology has an important role in enhancing literacy development for students learning English (Cummins, Brown & Sayers, 2007). Technology enhances authentic exposure to the target language input through multimodal features that contain text, audio, and videos about the language and culture. New types of texts include various semiotic modes such as audio, videos, illustrations and hypertexts (Kim & Park, 2011) that might help in enhancing English language learners' reading comprehension. Dreyer and Nel (2003) demonstrate that many South African students who register for undergraduate study are underprepared for university level academics due to low reading ability, which hinders their academic success. They state that, "in order to meet the reading needs of students in the 21st century, educators are pressed to develop effective instructional means for teaching reading comprehension and reading strategy use" (p. 349). The concept of reading a text has changed as technology has entered everyday life, making it more logical to use such technologies to communicate with the world and to transform it (Kellner, 2001). Technology can arouse students' interest in learning by letting them experience a change from routine lectures in the classroom (Lin, 2010). There are various positive results in existing research for integrating technology into language learning curriculum to enhance reading comprehension.

Some studies have shown the positive influences of utilizing technology and reading strategies for language learners' reading achievement. Alshumaimeri and Almasri (2012) investigated the effects of WebQuest on male Saudi EFL students' reading comprehension performance. They conducted the study on 83 EFL male students in their first-year preparatory

program over four weeks. The researchers designed four WebQuests that included a teacher page and a student page. Students worked in small groups and the teacher scaffolded the learning process to reduce instructor's influences. Each WebQuest consisted of an introduction, a task, an activity, and evaluation. The study's findings revealed that students significantly improved their reading comprehension using WebQuest and collaborative learning. In another study, Tsai and Talley (2014) examined the influence of Moodle-supported strategy instruction on reading comprehension and reading strategy use. The participants were 114 EFL Chinese students in Southern Taiwan. A reading strategy training was integrated into the Moodle system that included problem identification, monitoring comprehension, inferencing, summarizing, transferring, resourcing, and questioning for clarification. The experimental group achieved higher scores in their reading comprehension post-test. The results showed that the Moodle-supported strategy system had positive effects on reading comprehension.

While previous researchers examine the effectiveness of utilizing technology on students' reading comprehension, other studies investigated the effectiveness of using the interactive features within a technology environment to enhance comprehension (e.g., electronic text, hypermedia, glossing, visual aids). In one study, Proctor, Dalton, and Grisham (2007), examined the influence of integrating electronic texts with hypermedia aids to promote strategic reading (e.g., predicting, questioning, using schema, and monitoring for meaning) and enhance comprehension. The study participants were 30 Spanish ELL students. They read narrative and informational hypertexts through pop-up books with embedded vocabulary learning and comprehension strategies support. Researchers found that students use the technology features when they struggled with reading comprehension for a more meaningful interaction with the text. In another study, researchers argue for the benefits of multimedia glossing to enhance reading

comprehension for foreign language learners. For example, Lomicka (1997) examined the influence of multimedia glossing for second semester French students to enhance their reading comprehension. The student participants were divided into three groups: full glossing, limited glossing and no glossing. The results showed that full glossing and limited glossing groups outperformed the no glossing group in their reading comprehension scores. Other studies have also examined the influences of integrating multimedia glosses on vocabulary acquisition and reading comprehension and identify positive results in improving students' comprehension (Al-Seghayer, 2001; Yanguas, 2009). Additionally, researchers explore the effectiveness of employing computer-generated visuals materials with advance organizers to enhance EFL learners' reading comprehension (Lin & Chen, 2007). The participants were 115 EFL learners at an intermediate level from a vocational university in Taiwan. They were divided into four groups: static visual alone, animated visual alone, animated visual and descriptive advance organizer, and animated visual with question advance organizer. The most significant finding was that animation is more effective when integrated with question advance organizer because it enables students to better engage with the content, activate prior knowledge and help to think about the content and structure of the text.

While some studies showed positive results for integrating technology with reading strategies and hypermedia features to help learners achieve better comprehension, other studies demonstrate negative results for using technology in reading (Juan & Madrid, 2009; Tseng, 2010). For example, Tseng (2010) examined EFL perceptions regarding how online reading affects their reading comprehension. The participants were 88 intermediate level freshmen EFL language learners at a university in northern Taiwan. The findings revealed the main factors that affected EFL learners' hypertext reading were font size, web searches, and background color. Tseng found

the main challenges that distracted students from their reading comprehension skills included inability to take notes or failing to underline text and skipping lines. In another study, A. Altay and I. Altay (2017) investigated the effects of online reading tasks on EFL learners' reading comprehension, and the role of metacognitive strategies on their reading test scores. The participants were 51 Turkish students in tertiary level English course. Researchers collected data in 6 weeks through pre- and post-reading comprehension tests and a reading strategies questionnaire. The findings showed that there were no significant differences in students' reading scores between their pre- and post-tests. Students' reading comprehension was not affected by either the online reading task or the reading strategies within the online tasks.

Aligned with previous negative results, more studies examined the influence of technology on reading comprehension. Juan and Madrid (2009) investigated the influence of hypertext on EFL students' reading comprehension and the reading strategies that were implemented by students to enhance their comprehension in comparison to the printed book. The participants were 50 Spanish college students at the Jaume University in Castellón, Spain. The findings revealed that hypertext had no influence on the overall reading comprehension and did not promote learners' application of the reading strategies. Shang (2016) also explored how metacognitive strategies, hypermedia annotations, and motivation enhanced reading comprehension in a hypertext environment. The participants were 37 EFL English major students from Taiwan. The results revealed that there was no significant relationship between metacognitive strategies and hypermedia annotations and that they did not contribute to the comprehension of the hypertext. However, there was a significant relationship between metacognitive strategies and motivation in a hypertext environment.

This section provided a review of studies that examined the influence of instructional technology on reading comprehension. It showed discrepancies regarding the effectiveness of

technology tools and the use of appropriate technologies based on EFL learners' needs to better utilize reading strategies and multimedia features to improve comprehension. More research is needed on different technology tools to assess the appropriate technology for English learners and prove the benefit of using technology in reading classrooms to improve learners' comprehension. The following sections provide background information of e-book as a digital environment and a synthesis review about the e-book systems as a technology tool for reading comprehension.

### **E-books as a Digital Reading Environment**

E-texts or electronic versions of texts play an essential role in today's digital age (Godwin-Jones, 2003). Early in 1971, Michael Hart took the initiative of utilizing texts in the public domain as a digital library and his project is considered to be the oldest digital library. In 1998, Rocket and Softbook were launched as digital e-book readers and provided e-paper displays that reduced eyestrain. In 2007, e-books shifted e-reading into platforms and turned digital books into portable devices (Huang, 2013). During that time, Amazon released its first Kindle e-book reader and since then, consumers have had benefit of reading on digital devices (Stone & Rich, 2009 as cited in Huang, 2013). Other companies such as Barnes and Noble and Sony have released new versions of e-book readers. Recently, interactive e-books have emerged as a new instructional technology tool in classrooms. They have numerous advantages over traditional printed books with their multimodal environments, browsing, text searches and various other functions that provide learners with input for the learning process (Huang, 2013).

In recent years numerous studies have investigated the advantages of implementing e-books or digital texts in education (Grimshaw, Dungworth, McKnight, & Morris, 2007; Kang, Wang, & Lin, 2009; Korat & Shamir, 2008; Korat & Or, 2010; Lee, 2017; Woody, Daniel, & Baker, 2010). Schugar, Smith and Schugar (2013) confirmed that "e-books have the potential to

change the way our students read and consume text because of their interactivity and convenience” (p. 1). E-books can connect various types of presentation for learning materials and can present materials with different formats, either auditory or visual, including sounds, music, oral reading, writing texts, glossing, animation and videos. They might link animation with sounds, written text with oral reading and videos with subtitles. Researchers have found that in terms of learning, e-book features can create an attractive and fun learning context that “encourage students’ creativity and learning autonomy” (Embong, Noor, Hashim, Ali & Sharri, 2012, p. 1804). Larson (2010) found that digital texts “provided new opportunities and extended possibilities for individual engagement with and interpretation of the text” (p. 21). E-books can provide teachers and students with accessibility for various materials, extra practice, and heightened engagement for the students in learning activities through web-based or published interactive e-books.

E-books also have the potential to facilitate the evaluation process and scaffold the learning process. Teachers can keep track of students’ engagement level and language skills progression to redesign the lesson based on student needs (Embong, Noor, Hashim, Ali, & Sharri, 2012). Interactive e-books have the software capability to record and report students’ results. They can report students’ responses and every single interaction a student has done. E-book systems can be programmed to provide positive feedback to motivate students in learning engagement and to adapt to text difficulty based on student needs (Sung & Ting, 2017). The e-book learning environment is still a novelty learning environment for which researchers and instructors in ESL/EFL context need to consider the e-book design and content materials for an effective reading learning. The following section highlights on the e-book as a learning environment for reading comprehension.

## **E-book as Digital Environment for Reading Comprehension**

With the increasing use of tablets, notebooks, computers and smart phones, digital learning is becoming more popular and motivating for today's generation (Wu & Chen 2011). Researchers argue that if interactive e-books are customized and designed to target the course objectives, learners' needs and broader cultural contexts, they will prove to be more effective for English language learners (Bikowski & Casal, 2018). Some studies have investigated the influence of using different e-book devices (Kindle, Nook, Sony reader) as either e-books portable document format (PDF) or interactive e-readers for digital reading purposes (Marmarelli & Ringle, 2010; Princeton, 2010). This section presents results from studies that investigate the use of the e-book as portable document format (PDF) and interactive e-books.

Both the PDF e-book and printed book are slimier due to the absence of interactive features; hence, researchers argue about the advantages of PDF e-books in regard to students' reading comprehension and satisfaction levels. Princeton's piolet study (2010) was based on three graduate-level courses from the Woodrow Wilson School of Business and International Affairs in the United States on the usability of Kindle DXs for teaching reading skills. The findings showed that students with Kindle DXs reported no effect on their comprehension. Ninety-four percent of students reported that the only advantages were reduced printing and photocopying. In another study, Fraser and Abbot (2016) investigated the influence of using the Sony reader as an e-reader device in an extensive English reading program (EERP) for ESL learners' self-perceived gains in reading comprehension, vocabulary, speed, and enjoyment when compared with their reading of printed-books. The participants were 21 adult ESL intermediate-level students enrolled in an intensive English language program in Canada. The research design was a mixed-method approach and data were collected through a background questionnaire, teacher's observation field notes, and

a post-EERP questionnaire. The results showed that the extensive reading programs using the Sony reader increased students' enjoyment, vocabulary knowledge, speed, and comprehension. However, Fraser and Abbot (2016) stated that the improvements in vocabulary and comprehension are possibly due to the EERP as previous experimental studies of paper-based ERPs which have found that extensive reading programs enhance learners' vocabulary (Horst, 2005; Webb & Chang, 2015), reading speed (Beglar, 2012; Bell, 2001), and reading comprehension (Yamashita, 2008).

With gradual development in the field of technology, PDF e-book systems have started to integrate interactive features in the e-reader devices such as highlighting, taking notes or annotations to help students enhance their comprehension. However, these e-book devices still lack the pedagogical content reading features in their design such as the integration of metacognitive strategies, to help students with reading comprehension struggles. For example, H. Schugar, J. Schugar and Penny (2011) compared students' comprehension levels, critical reading, and use of study skills in reading between Nook and printed books in an English classroom. The participants were 30 undergraduate students in their first and fourth years in the Mid-Atlantic region of the United States. The Nook devices with their basic interactive features such as highlighting and taking notes, were used for digital reading purposes. The research design was mixed-methods and data were collected through pre- and post-surveys and four written responses that were coded qualitatively and analyzed quantitatively. The results showed no differences in students' reading comprehension levels between the e-reader and traditional book. Researchers found that students utilized active reading skills such as highlighting and taking notes more in the printed book, which enhanced their critical reading skills more than in the Nook device. A recent action research study has been conducted by Bickel (2017) to examine how interactive features in e-books contribute to learners' comprehension and vocabulary knowledge when compared to



traditional printed texts, but like the previous studies, the focus was only on animations, videos, and audio, and lacked the implementation of reading strategies. The participants were 12 third grade native English speakers who participated in an intervention pull-out program to enhance their reading skills. All participants had to read storybooks in both modes: interactive e-books and traditional printed books. The results did not show significant results regarding the enhancement of reading comprehension from interactive features in the e-books over the traditional printed book. Observations showed that interactive e-book systems increase students' motivation and engagement more than the printed book.

Researchers explored the effectiveness of integrating concept mapping as an interactive feature within the e-book system for Chinese native speakers (Hwang, Kuo, Chen, & Ho, 2014; Ting & Chen, 2017). They conducted a study on 66 Taiwanese students in the Sixth grade. The qualitative findings revealed that students were frustrated by the digital concept mapping. In another study, Ting and Chen (2017) found positive results regarding the integration of concept mapping as teaching strategy within the e-book system to enhance comprehension of classical Chinese. The participants were 70 Chinese vocational college students from a public university. The qualitative findings through interviews confirmed that students found the e-book learning system with its digital concept mapping feature conducive to learning. As shown in studies discussed, that the focus was on examining the effectiveness of e-book features such as annotations, audios, or videos on reading comprehension, however, the educational needs of language learners are more than just multimedia features.

### **Metacognitive Strategies and Collaboration within E-books Learning System**

This focused literature review examines the current pedagogical methods of teaching reading comprehension for English Language learners within the e-book learning systems. It

specifically explores the findings and existing gaps in research concerning the integration of metacognitive reading strategies and collaborative learning in various e-book learning systems and the multimedia e-book features believed to improve ESL/EFL learners' reading comprehension.

A review of existing scholarship revealed that only one study, thus far, has investigated the influence of metacognitive strategies as a feature in an e-book learning system to enhance students' reading comprehension in Arabic language (Al-Salem, 2017). Al-Salem (2017) examined the influence of integrating metacognitive strategies in an e-book system to improve Arabic language reading for deaf students in comparison to a traditional printed book. The students were 18 Saudi freshmen college students using the e-book system individually. The research design was a quantitative method which divided the participants into an experimental and a control group. Data were collected through pre-test, post-test, and a Likert Scale survey. The experimental group with metacognitive strategies integrated into the e-book system achieved higher scores in their post-test reading comprehension. This group's engagement level was also higher than the control group who applied the metacognitive strategies through a traditional printed book. According to the Likert Scale survey analysis students found that integrating the metacognitive strategies through the e-book system was helpful and more interesting for them than practicing the strategies through the traditional method of learning from a printed book. This study is the only study that has been conducted in Saudi Arabia using the e-book for reading comprehension, but the target language was in Arabic. No studies have been conducted using the e-book learning environment to teach English reading comprehension with MS for Saudi EFL learners.

Field researchers have been examining the influence of e-book learning systems by integrating different interactive features to enhance reading comprehension. Most studies have more heavily implemented e-book learning systems as individual learning tools for native speakers

than for English language learners (Huang, Liang, Su, & Chen, 2012; Hwang, Kuo, Chen, & Ho, 2014). For example, researchers examined the effectiveness of interactive e-books in comparison to printed books in reading accuracy for students learning Chinese as a native language (Huang, Liang, Su, & Chen, 2012). The participants were 166 Chinese elementary students using the e-book learning system individually. The interactive features in the e-book system include annotation, bookmarks, content searching, learning process tracking, teachers' notes, video clips, and calligraphy writing. The mixed-methods findings showed that there were no significant differences in reading accuracy between the experimental group with interactive e-book use and the control group with traditional printed book utilization. The qualitative results revealed that the e-book learning system was more appealing to the participants than the printed book. In another study, Karemaker, Jelley, Clancy, and Sylva (2017) investigated the effect of three different types of e-book learning systems with different features for English native speakers' reading skills. They explored the influences of integrating an e-book (e-friend) with illustrations, audio, questions, highlighters and an e-book (e-dictionary) with a built-in dictionary feature as opposed to a PDF e-book with illustrations only. The participants were 90 British elementary students learning English as a native language and using the e-book system individually. Students were divided into three groups based on e-book type and quantitative data were collected via pre- and post-tests. The study concluded that students with the "e-friend" outperformed students with "e-dictionary" but not the PDF e-book in reading comprehension. The e-friend group answered more comprehension questions because the e-friend scaffolded reading questions in its e-book system. Hence, the e-book with its multimedia features showed enhancement in students' reading comprehension more than the traditional PDF e-book.

In contrast to the e-book studies with native speakers, there are only a few studies that have examined the influence of multimedia e-book learning in ESL/EFL contexts. Larson (2010) examined how digital reading devices with interactive reading features support primary readers as they respond to digital texts. The participants were two second grade ESL girls; one from Spain and one from China, who were using the digital books individually. The research design was a qualitative case study; the data were collected through field notes, interviews, and students' digital notes or markups. The digital devices used included: Amazon, Kindle, Nook, Sony reader, Cybook, and iPad. These e-books included features such as adding notes, adjusting the font size, listening to parts of the story, searching for keywords, and a built-in dictionary. The results demonstrated that digital reading promotes second graders' literacy and connection with the text. The feature of adding notes enhanced their literature responses by retelling personal commentary, relating the text to their prior experiences, or questioning.

In another study, Kao, Tsai, Liu, and Yang (2016) investigated the difference in story comprehension between students who read highly interactive storybooks and students who read storybooks with less-interactive features. The participants were 40 fourth-grade EFL elementary school students in Taiwan using the digital storybooks individually. The less-interactive features included narration and animations, but the highly interactive features provided learners with the ability to control their own reading process, prompts, and feedback. The results exhibited that students in the high interactive storybook features group outperformed the low interaction group on literal and critical comprehension questions, but not on inferential comprehension. Additionally, Sung and Ting (2017) intended to improve English language learners' reading comprehension skills and motivation by integrating a distinct interactive e-book learning system. The researchers added a guidance system feature to the e-book to change the text's difficulty based

on students' reading level. The participants were 166 freshmen EFL students from a public university in Taiwan who used the e-book learning system individually. Students were divided into two groups: experimental group with a guidance system and control group without the guidance system. The results indicated that such a guidance system enhanced students' reading comprehension and increased their motivation level in learning a new language.

As shown in the above-mentioned research studies, most of the research focuses on implementing e-book at an individual level; however, a few studies do focus on collaborative learning to enhance reading comprehension. One study by Huang (2013) examined EFL students' perceptions toward integrating an e-book reading site into their reading curriculum to explore how it affected the reading process, the strengths, and the weaknesses of the e-book program. The participants were 67 EFL freshman students from Taiwan enrolled in an English joint program. In this study, a collaborative journal post discussion was integrated into a web-based e-book site which revealed positive effects on students' content reading and learning in English. The researcher created a web-site and uploaded e-books in a PDF or Kindle format about various topics. Students were required to complete a minimum reading of one book per week and respond to the journal post discussions on the website by writing their justifications for choosing the book, the knowledge they gained from the reading and their recommendations to their classmates about the book they had read. The research design was mixed-methods and data was collected from surveys and semi-structured interviews. Since the journal posts was not mainly for text comprehension, the results did not show enhancement on participants' reading comprehension. The results also revealed that participants regarded the online discussion board as the best function, followed by the online dictionary and audio function.

Other studies have integrated collaborative learning via classroom group discussion as a follow-up practice after the e-book reading session and found that collaborative discussions enhanced students' reading comprehension (Chou, 2015; Lin, 2010). In one study, Chou (2015) investigated the effect of integrating reader response theory with e-book learning as a pedagogical approach to encourage EFL language learners to engage in reading books with less intensive reading purposes. He used collaborative discussion as a follow up activity after reading the digital e-books. The participants were fifteen EFL undergraduate students from Taiwan learning English in a literature course at the university language center. The e-book was web-based with no interactive features and students were required to use the e-book for only digital reading purposes. The research design followed a qualitative approach and data were collected through monthly reports and collaborative classroom group discussions. After reading the required materials in the digital e-book, students wrote monthly reports responding to the teachers' sequence of questions in English and submitted their reports. As a follow-up activity, students shared information about the text, their questions, prior experiences, or experiences with reading on a digital e-book. The results showed that group discussion activity assisted students in clarifying some questions, making predictions, and sharing thoughts and feelings based on prior experiences, which considerably enhanced their reading comprehension.

In another study, Lin (2010) examined the influence of e-book learning on students' attitudes in different dimensions of reading: cognitive, affective and conative elements. The e-book features included animation, sounds, and illustrations. The participants were 109 EFL students in ninth grade using the digital e-book reading individually for 10 weeks. Students were required to read four e-books per week and participate in a ten-minute classroom group discussion once a week. The research design was mixed-methods and data were collected through an attitude

scale test, teachers' notes and students' feedback. The discussion activity showed positive influences on students' reading comprehension.

Based on previous discussion, the existing research focuses more on the influence of different interactive features within the e-book system in enhancing language learners' reading comprehension (e.g., annotations, videos, dictionary, taking notes, concept mapping). English language learners need more than just multimedia features to understand the text content in English. There is also a demand for further research about integrating discussion and collaborative learning related to text content as an interactive feature within the e-book learning system to enhance ESL/EFL learners' reading comprehension. This integration would be particularly beneficial for lower and intermediate language proficiency level students to improve their utilization of reading strategies and comprehension. Therefore, combining metacognitive strategy-based discussion and collaborative learning within a multimedia e-book learning environment will contribute to research in the field of second language acquisition, English as a foreign language, and instructional technology.

### **Chapter Summary**

This chapter presented the theoretical framework of the study, a review of literature and the gaps in research. Based on the review of literature, there is a gap in research on the appropriate pedagogical methods for teaching the metacognitive strategies (MS) for intermediate and lower language levels specially the monitoring and evaluation strategies in EFL contexts. More research is needed on the influence of teaching MS through discussion and collaborative learning on EFL learners' comprehension and their utilization of reading strategies and comprehension. Further research is necessary to examine the appropriate and effective technology tools that combine multimedia learning features with appropriate pedagogical method to teach reading skills to

English language learners. As technology learning environment for reading comprehension, the e-book learning system lacks appropriate content design for ESL/EFL learners to improve their comprehension. In Saudi Arabia, no research has been done on the influence of teaching MS through structured discussion questions and collaborative learning on EFL learners' utilization of reading strategies and reading comprehension within a multimedia e-book dialogic environment. The next chapter presents the methodology and research design of this study.



## **Chapter 3: Methodology**

### **Overview**

Reading and reading comprehension is a complex process for English language learners because they face struggles with interpreting and understanding the text ideas. Utilizing MS reading strategies will help learners of English as a foreign language (EFL) stay focused on text information and will reduce reading comprehension obstacles resulting in better reading comprehension levels. However, the literature review showed discrepancy regarding the influence of MS on reading comprehension and lack of pedagogical methods for teaching the metacognitive strategies (MS) in ESL/EFL contexts. The current study examined the pedagogical method of teaching the MS through structured discussion questions and collaborative learning to encourage EFL learners practice using the reading strategies and improve comprehension.

### **Research Design**

To address the research questions, consistent and coherent research approaches were employed to integrate various elements of the research study (Trochim & Land, 1982). The research design is a systematic plan set by the researcher that includes details about the researcher's set of techniques and procedures used to achieve the experimental study objectives (Glatthorn, 1998). The proposed study adapts a mixed-methods design. The mixed-methods approach “involves combining or integration of qualitative and quantitative research and data in a research study” (Creswell, 2014b, p. 14). In the present study, the researcher employs both quantitative and

qualitative research methods in order to provide “a better understanding of the research problem and questions than [using] either method by itself” (Creswell, 2008, p. 552).

Mixed-methods is used to “simultaneously collect both quantitative and qualitative data, merge the data, and use the results to understand a research problem” (Creswell, 2008, p. 557). The triangulation design assisted the researcher in compensating for the weakness of one form of data collection (Creswell, 2008). A qualitative study is utilized to compensate for any shortcomings that may occur in the quantitative findings. The study follows the explanatory sequential mixed-methods model. It is considered explanatory because “the initial quantitative data results were explained further with the qualitative data” (Creswell, 2014b, p. 15). The method is sequential since the initial quantitative phase is followed by the qualitative phase (Creswell, 2014b). The researcher used this model to first conduct the quantitative part of the study then build on the quantitative results with the help of the qualitative methodology to provide further insight and deeper analysis. The current study implements a quantitative approach to examine the researcher’s alternate hypothesis listed in Chapter 1 and investigate the research questions. A triangulation mixed-methods was employed for the third research question to explore students’ perceptions toward the effectiveness of the e-book system on their overall reading comprehension.

Through this design, the researcher plans to investigate the impact of metacognitive strategy-based discussion on students’ utilization of reading strategies within a multimedia e-book dialogic environment. It also investigates the impact of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners’ reading comprehension. EFL learners’ perceptions regarding the effectiveness of using a multimedia e-book dialogic environment on their overall reading comprehension were also gathered and analyzed. To acquire comprehensive results, three central research questions were posed.

1. Does metacognitive strategy-based discussion and collaborative learning impact EFL learners' application of reading strategies within multimedia e-book dialogic environments?
2. What is the impact of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners' reading comprehension?
3. How do EFL learners perceive the effectiveness of a multimedia e-book learning environment on their overall reading comprehension?

### **Context of Inquiry**

The study was conducted at an all-female university because the university education system is not co-ed in Saudi Arabia. Since the researcher is a female, she contacted the chairperson of the English Language Institution (ELI) at a female Saudi university to obtain permission to use their students as subjects for this experimental study. The study was conducted on four classes that were assigned randomly by the university chairperson. After completing the treatment, individual interviews were completed with participants who wished to voluntarily participate in the interview process. The researcher conducted the interviews at the Saudi university either in the classroom or the library based on participants' convenience of time and place.

### **Study Participants**

The study participants were 115 EFL female college-level students who were enrolled in the English Language Institution in a Saudi university. Participants were recruited for data collection based on the classes assigned by the chairperson from the university in Saudi Arabia. They were freshman intermediate-level female students in the preparatory year program who were placed at a language proficiency level based on the Oxford Online Placement Test (OOPT). All

Saudi college students are required to take OOPT placement test prior to completion of the admission process in order to be placed in programs according to their proficiency level. The decision to use intermediate proficiency level students for this study was based on the literature review gaps, the expected outcome, and the students' ability to participate in the study. The metacognitive strategy-based discussion questions, collaborative responses, and required interaction between students to achieve improved comprehension was best suited for intermediate level language learners. This decision was also approved by subject-matter experts from the ELI, who have exposure to the students' language proficiency level and their ability to participate successfully in the study. After completing the study treatment, EFL instructors asked for student volunteers to participate in an individual interview and an e-book Learning Experience questionnaire about the effectiveness of using a multimedia e-book learning environment on their overall reading comprehension. Thirteen students voluntarily participated in the interview and ninety-four students completed the questionnaire.

There were several factors that influenced determination of the sample size for the quantitative study. The desired power, alpha level for controlling Type 1 error, the effect size, tests, and number of variables used in data analysis are all important factors that influence the decision regarding the most suitable sample size (Stevens, 1996). G-power software was used to determine the approximate sample size to conduct the study with a power of 0.8, alpha level of 0.05, effect size of 0.5, and group size ratio of 1:1:1:1. A right-tailed hypothesis test was performed from the data obtained. The one-tailed calculation in G-power was chosen and based on the G-power software; the required sample size was 102. The Institutional Review Board (IRB) from a U.S university and a Saudi university provided approval to conduct the study.

## **The Treatment: E-book System and Learning Materials**

The researcher used a multimedia web-based e-book learning system and designed the content learning materials for the e-book during Summer 2018. A web-based e-book software, iMapbook, in HTML5 format, designed by a team of developers, was used to deliver a multimedia e-book with embedded audio-visual media and collaborative learning features. This software is designed to support data collection, subject and investigator authentication, and data reporting through secure server storage. The design and content materials of the e-book all target English language learners' needs for better reading comprehension. The purpose of this technology tool was to create an instructional reading environment to provide students with more practice opportunities during the formal class time by engaging them in online reading sessions during formal class time.

The content materials for the multimedia e-book learning environment was adapted from the English Unlimited Special Edition book by Rea, Clementson, Tilbury, and Hendra which is used as the main textbook at the English Language Institution (ELI) in the Saudi University. The rationale for choosing the instructional materials from this text was to conduct the study for an hour-long session during the formal reading class time. The researcher transformed text lessons from the required textbook into a multimedia e-book with the integration of metacognitive strategy-based discussion and collaborative learning activities. The selected reading lessons were decided and arranged in co-operation with the ELI's faculty members to match their academic school calendar.

The e-book MS discussion questions were adapted from K.D Tanner as shown in Table 1. The questions were adapted and developed with the assistance of a subject matter expert from an

English Language Center at a U.S. university in Florida and EFL faculty members from the Saudi university. The questions were developed to promote students' utilization of metacognitive reading strategies. Great care was taken to ensure the questions were an appropriate fit for the ELI intermediate college-level Saudi students. These adapted questions were used in a pilot study; the result details are discussed in the next section. Table 1 presents the adapted metacognitive strategy-based discussion questions used in the study to promote MS discussion within the multimedia e-book dialogic environment.

**Table 1.** Adapted Metacognitive Reading Strategies Questions.

<b>Phases</b>	<b>MS Strategies</b>	<b>Guided Questions</b>
<b>Planning: Before- Reading</b>	Know/want to know	<ul style="list-style-type: none"> <li>• What do I already know about this topic?</li> <li>• What questions do I have about this topic?</li> </ul>
	Prediction	<ul style="list-style-type: none"> <li>• What do I expect to read about in this text?</li> </ul>
	Look forward/keep reading	<ul style="list-style-type: none"> <li>• What is the most confusing in this paragraph?</li> <li>• What can I do if I don't understand?</li> </ul>
<b>Monitoring: During - Reading</b>	Restate in your own words	<ul style="list-style-type: none"> <li>• What information in this paragraph is important to remember?</li> </ul>
	What is the purpose/ connection	<ul style="list-style-type: none"> <li>• Does this paragraph:               <ol style="list-style-type: none"> <li>a. Support the idea of the previous paragraph by connection: providing explanation/example?</li> <li>b. Contradict the idea of the previous paragraph?</li> <li>c. Introduce a new idea</li> </ol> </li> </ul>
<b>Evaluation: After- Reading</b>	A Summary in 3-4 sentences	<ul style="list-style-type: none"> <li>• What was the article/passage/text about?</li> </ul>
	A Reflection	<ul style="list-style-type: none"> <li>• What was most interesting in the passage?</li> <li>• What did I learn today that was familiar?</li> <li>• What did I learn today that was in contrast with previous beliefs?</li> </ul>

The e-book system has a generator program that distributes students into groups of five to participate collaboratively during the e-book sessions. The metacognitive strategy-based discussion was implemented in the e-book design through a number of steps. First, students begin their interaction within the e-book system with the Planning strategies stage by watching a video or examining an illustration shown on the first web-page of the e-book (see Appendix F).

Based on the posted discussion question, students think about what the illustration or video triggered in their mind, what they already knew about the topic, what the topic reminded them of, or what they expected to read in the text ( see Appendix F for collaborative learning samples) for collaborative learning samples). The experimental collaborative groups move to the discussion board to type their responses and discuss the planning strategy questions with their classmates. In comparison, the individual control groups brainstorm and respond to the planning strategy questions individually by typing their answers into a textbox (see Appendix F for individual learning samples).

After the Planning strategies stage, all groups move on to the text and start reading. The text includes hyperlinks to a glossary for vocabulary based on results of a questionnaire about difficult words posed to Saudi EFL students under supervision of the ELI faculty. After reading the text, both groups (collaborative and individual) click the “Next” icon “>” to access the first paragraph of the text and start the Monitoring strategies stage. This stage use strategies such as look forward/keep reading, restate in your own words, and/or what is the purpose or connection between paragraphs, as illustrated in ( Appendix F).The collaborative groups discuss the monitoring strategy questions with their classmates through the discussion board, while the individual groups respond individually by typing their answers in a textbox. During the Monitoring stage, students read and think about the details of each paragraph. Each paragraph has its own

discussion board with posted questions for students to think about. After discussing and analyzing all the paragraphs during the Monitoring stage, all groups move on to the Evaluation strategies stage. Students summarize and evaluate the text based on their interest or point of view and type their response on the discussion board or in the textbox.

### **Pilot Study**

Prior to the dissertation experiment, in August 2018, the researcher designed a multimedia e-book demo and conducted a reading session for ten intermediate-college-level Saudi English language learners at an English Language Center in the USA. The learning materials of the e-book demo were adapted from the intermediate level textbook at the ELI in a Saudi university and are the same as the actual dissertation experiment. The purpose of this pilot study was to test the session's time span, design, collaboration and discussion board features, and data collection instruments (two questionnaire links and a comprehension test). It was also assessed whether the content materials, adapted MS questions, glossing, and videos meet students' reading level or not.

The pilot study helped gain insight regarding the effectiveness of the e-book design and content materials. Participants were observed moving from one web-page to the next to ensure they did not encounter problems. Students were asked if the adapted MS questions were easy, difficult, or matched their level, and if they helped them improve their reading comprehension. It was ensured that the data collection instruments worked as planned to obtain the complete data during the actual experiment, since all research data were collected and reported online (SORS survey, e-book Learning Experience questionnaire, final comprehension test). This pilot study assisted in identifying possible strengths and avoiding shortcomings prior to conducting the actual experiment. Overall, students enjoyed using the multimedia e-book. The e-book learning experience questionnaires and discussions showed that all of the e-book features (video, glossing,



discussion boards, and illustrations) along with the implemented reading strategies increased students' level of reading comprehension. According to the participants, the discussion boards, videos, glossing, and illustrations were helpful features in the multimedia e-book and assisted in understanding the text ideas. Participants revealed that the MS discussion questions kept them focused and urged them to think while reading the text. They explained that reading is one of the most difficult skills in English language classes. However, the combination of metacognitive reading strategies-based discussion and collaborative learning made helped students remain focused and motivated to actively read and try to understand the text.

In regard to improvement suggestions about the reading materials, MS discussion questions, and e-book design, students recommended simplifying some words in the MS questions such as “expect” and “contradict”. They also suggested adding more words to the glossary. In accordance with participants suggestions, identified difficult words were added to the glossary. All design aspects including discussion boards, collaboration and group division, saving data, questionnaires and the test functioned flawlessly.

## **Phase I: Quantitative Research Design**

### **Instruments**

*Background information questionnaire.* The background questionnaire was designed to gather information about the participants' background and language experiences (see Appendix A). It includes questions regarding the participants' age, years of studying English in Saud Arabia and outside the country, hours spent on reading, and type of reading materials. This background s questionnaire included six items that provided vital data about the participants' English language and reading background. The validity of the background check survey was considered. The questionnaire was shown to panel reviewers, who are subject-matter experts, from the English

Language Institution in the Saudi university and other reviewers from the SLA field at a U.S. university.

**SORS.** The Survey of Reading Strategies is an instrument developed by Mokhtari and Sheorey (2002) to measure adult ESL learners' awareness of metacognitive strategies and use of reading strategies while reading for academic purposes (see Appendix B). The authors granted permission to the researcher to use this survey. The instructor can use SORS as a baseline for assessing and monitoring the type of strategies that are commonly used by EFL students. Through SORS, researchers and instructors can investigate the influences of teaching metacognitive strategies on reading comprehension by examining students' responses, such as reading to answer test questions or reading to research for certain topic information (Mokhtari & Reichard, 2002). It has been applied by ESL and EFL researchers around the world. It has been administered in Hungary (Sheorey & Baboczky, 2008), Japan (Sheorey, Kami-mura, & Freirmuth, 2008), Bahrain (Malcolm, 2009), Iran (Kamran & Maftoon, 2012; Rastegar, Kermani, & Khabir, 2017), U.S (Iwai, 2009) and China (Pei, 2014).

SORS (The Survey of Reading Strategies) was used to obtain insight on Saudi EFL students' awareness of metacognitive reading strategies before and after being exposed to the treatment (see Appendix B). The inventory survey used a five-point Likert scale. Participants were asked to respond to each statement by selecting one of the following five choices: 1 (I never or almost never do this), 2 (I do this only occasionally), 3 (I sometimes do this, about 50% of the time), 4 (I usually do this) and 5 (I always or almost always do this). This inventory was used as a source to create a general baseline about the participants' awareness of metacognitive reading strategies. The inventory was an indication that students were aware of the strategy before exposure to the treatment, and how much they improved their utilization of the strategies after

being exposed to the treatment. The administration time for the SORS inventory was between 10 to 12 minutes, depending on the students' reading ability and grade level (Mokhtari, Sheorey & Reichard, 2008).

The reliability of SORS survey was examined. Previous studies, such as Mokhtari and Reichard (2002) report Cronbach's alpha coefficient, an index of internal consistency reliability, for SORS as 0.89. Iwai (2009) also reported a high Cronbach's alpha in a study about metacognitive awareness and strategy use in academic English reading among ESL adult students. The participants were 98 ESL language learners; 21 from the English language institution, 22 undergraduate students and 55 graduate students. Iwai reported SORS total for Cronbach's alpha as 0.93. Based on these high Cronbach's Alpha values reported by previous researchers, the reliability of SORS surveys has been adequately verified. However, Anderson (2003, 2004) conducted a study about metacognitive awareness and reading strategy on ESL language learners using the SORS survey instrument. The participants were 260 students from Costa Rica and 260 students from the United States. The SORS overall report result showed a Cronbach's alphas to be 0.74, which is not considered sufficiently high. The current study checked the internal consistency reliability of SORS responses that were measured on a Likert scale by running a new Cronbach's alpha statistic. The alpha coefficient for the 26 items was 0.88, which is considered a high level of reliability (Mueller, 1989). The questionnaire was presented to a panel with three reviewers from the SLA field at a U.S. university and three other experts from the ELI at the Saudi university to ensure accuracy and clarity.

***A reading comprehension test.*** The reading comprehension test is a major instrument for measuring students' reading comprehension. The International English Language Testing System (IELTS), a reliable test of language proficiency for ESL/EFL language learners, was used. The test

consists of three passages and a total of 17 multiple choice questions for one point each. The test provided information about the students' reading comprehension achievement after being exposed to the treatment. The instructor at the Saudi university ELI administered the reading comprehension test for an hour-long session. In regard to the reading comprehension tests' merit, the IELTS test shows high reliability and validity and is a common test for ESL/EFL students who intend to study in Canada and the United States (Pierce, 1994).

***E-book learning experience questionnaire.*** The researcher designed an e-book learning experience questionnaire to collect feedback from EFL participants on the effectiveness of the e-book environment as a technology tool for reading comprehension. The questionnaire had 14 items in a Likert scale design ranging from 1 to 5 (see Appendix D). Participants were asked to respond to each statement by choosing from the five following answers: (1) Strongly agree, (2) Agree, (3) Neither agree nor disagree, (4) Disagree, (5) Strongly disagree. The questionnaire also had 3 open-ended questions to collect additional data and deeper insight regarding students' perceptions of the e-book environment. The questionnaire collected data about the effectiveness of the e-book as a technology tool in improving EFL students' reading comprehension, students' preference for the different multimedia e-book features, and their preferences regarding collaborative learning and discussion through the e-book learning environment. A new Cronbach's Alpha was run to measure the internal consistency and reliability of the questionnaire after collecting the data. The alpha coefficient for the 14 items was 0.82, which is considered a high level of reliability (Mueller, 1989). The validity of the 14 items was approved by showing the questionnaire content to three experts from the field of Second Language Acquisition and Instructional Technology at a U.S. university and three experts from the English Language Institution at a Saudi university.

## Data Collection Procedures

Permission was granted from the director of the ELI at the Saudi University to collect data from students at the intermediate level. All students were in the same academic year and at the same academic proficiency level based on the Oxford University placement test, which is a prerequisite to admission to the university. The students are assigned to classes based on their academic proficiency level. The researcher was assigned to classes by the ELI director as the current study was integrated into the formal classroom sessions.

The data collection period started in September 2018 and lasted five weeks. Data for this phase was collected through a background questionnaire, Survey of Reading Strategies (SORS), an IELTS comprehension test, and Likert scale student Learning Experience questionnaire regarding the effectiveness of the multimedia e-book dialogic environment on students' overall reading comprehension. The ELI instructors of the permitted classes were invited to participate in the experiment study to better explain the study, the purpose of conducting this study and its benefits for the participants. The researcher also trained EFL instructors on how to use the e-book learning system for the reading sessions. Four classes (four groups) were required to participate in this study. The study's quasi-experimental design consisted of four different groups. Each group was exposed to a different treatment depending on the type of the independent variables: Group Structures (Individual/Collaborative) and Metacognitive Strategies Support (Presence/Absence) as shown on Table 2.

**Table 2.** Types of Treatment (Group Structures and Metacognitive Strategies Support).

Group Structures	Metacognitive Strategies Support (MS)	
	MS Presence	MS Absence
Individual	28	27
Collaborative	27	33

Group 1, individual with presence of MS support (IMS+) exposed individually to the e-book environment with the adapted MS questions as shown in (Appendix F). Group 2, individual with absence of MS Support (IMS-) exposed individually to the e-book learning environment with the textbook general comprehension questions. Group 3, collaborative with presence of MS Support (CMS+) exposed collaboratively to the e-book environment with the adapted MS questions as shown (Appendix F). Group 4, collaborative with absence of MS Support (CMS-) exposed collaboratively to the e-book environment with textbook comprehension questions. The study employed five reading sessions for five weeks. All groups had to complete a reading session each week through the e-book learning system.

During the first week, the instructors informed participants that data obtained from this study will be used confidentially for research purposes. The instructors explained the purpose of the background and the Survey of Reading Strategies (SORS) and answered any questions the students had. They made the students aware that there are no right or wrong answers to the survey questions and answered any questions the students had. After answering participants' questions, the instructors administered the background questionnaire (approximately 5 minutes) followed by the SORS inventory (12-15 minutes). Only the CMS+ experimental group had to complete the Survey of Reading Strategies (SORS) as a pre-treatment survey. The researcher then exposed the experimental groups (CMS+ and IMS+) to a modeling session in which the metacognitive strategies were explained. Through this modeling session, students learned what metacognitive strategies are, why they are important in reading, and how they can be used to improve reading comprehension. During the same week, the ELI instructors exposed students to the e-book training session which included creating their login account for the e-book and explained how to use the e-book for reading comprehension sessions.

For five weeks, all groups had to complete one reading session via the e-book learning system on a weekly basis. After completing Session 5 by the end of the last week, all participants had to complete the IELTS reading comprehension test, and a learning experience questionnaire about the effectiveness of the multimedia e-book dialogic environment on their overall reading comprehension. The experimental CMS+ group had to complete SORS survey as a post-treatment survey to examine their reading strategies application progress after being exposed to the treatment.

**Table 3.** Summarized Data Sources Weekly Plan Based on Groups.

Week	Groups	Sessions
1	CMS+ IMS+	➤ Background questionnaire
		➤ SORS (Pre-treatment) for (CMS+)
		➤ MS modeling Session
		➤ E-book 1 <sup>st</sup> Training Session
2	All groups	➤ E-book 2 <sup>nd</sup> Session
3	All groups	➤ E-book 3 <sup>rd</sup> Session
4	All groups	➤ E-book 4 <sup>th</sup> Session
		➤ E-book 5 <sup>th</sup> Session
5	All groups	➤ IELTS final test
		➤ E-book learning experience questionnaire
		➤ SORS (post-treatment questionnaire) for (CMS+)

### Data Analysis Procedures

This study employed a 2x2 between subject factorial design with the four groups assigned from the chairperson at the Saudi University. To ensure the most appropriate parametric test, a normality test was conducted on all relevant variables using the Shapiro-Wilk test together with a quartile-quartile (Q-Q) plot to visually verify normality. A check was completed for outliers as they may have significant effects on the two-way ANOVA and may influence the accuracy of the results (Field, 2013). A Box and Whisker plot of the data was used to check for outlying data points in SORS and the reading comprehension test. Levene's Test was used to

verify the homogeneity of variances between samples being analyzed. After verifying the three afore-mentioned details of the data, the results were analyzed based on the study research questions using the Statistical Package for Social Sciences (SPSS).

The analyses of the research questions were performed by SPSS using a series of two-way ANOVA. The researcher’s justification for performing two-way ANOVA was that she planned to examine the statistical significance of the main effects and interaction of the independent variables: metacognitive strategies support (Presence/Absence) and Group Structures (Individual/ Collaborative learning) on the dependent variable (reading comprehension). A comparison was conducted for the mean differences between the two independent variables that separated the sample into four groups (IMS+, IMS-, CMS+, CMS-). The hypotheses were tested to determine the main and cross interaction effects at  $p < .05$ . significance level. Based on the outcomes, the researcher’s stated hypotheses, listed in Chapter 1, were either rejected or not.

**Table 4.** Summarized Quantitative Phase: Research Questions, Data Sources, Data Analysis, and Study Outcomes.

Research Questions	Data Sources	Data Analysis	Outcomes
1. <i>Does Metacognitive strategy-based discussion and collaborative learning impact EFL learners’ application of reading strategies within multimedia e-book dialogic environments?</i>	SORS Survey (Pre- and Post-treatment)	Paired Sample t-test	Improving utilization of the reading strategies
2. <i>Does metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL improve EFL learners’ reading comprehension?</i>	IELTS Test	Two- way ANOVA	Improving final reading scores
3. <i>How do EFL learners perceive the effectiveness of a multimedia e-book learning environment on their overall reading comprehension?</i>	Questionnaire (Likert scale)	Descriptive statistics	Presenting Saudi learners’ perception



To analyze Research question 1 about the impact of MS-based discussion and collaborative learning on EFL learners' utilization of the reading strategies, the Survey of Reading Strategies (SORS) was distributed for the CMS+ group before and after being exposed to the treatment. SORS survey included 26 items; it is a continuous variable with a range score from 26 to 130. The participants responded to each item based on a Likert scale ranging from 1 to 5. The lowest possible score is 26 and the highest, is 130. The survey was distributed before and after the treatment to provide a baseline regarding students' prior knowledge and applications of the metacognitive strategies before and after the influences of the study treatment. A paired sample *t*-test was used to investigate students' utilization of the reading strategies scores, pre- and post-treatment, through SORS. Prior to the paired sample *t*-test, the assumptions of the outliers and normality for the differences between the pre-treatment and post-treatment scores were examined. Additionally, descriptive statistics, including the mean, standard deviation, and the range of scores for the 26 five-point Likert scale statements was calculated to measure students' awareness of the reading strategies.

For Research question 2, examining the impact of metacognitive strategies (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners' reading comprehension, a two-way ANOVA (Analysis of Variance) test (Field, 2013) was used to analyze the main effects of the two independent variables: metacognitive strategies (Presence/Absence) and Group Structures (Collaborative/Individual learning) on the dependent variable of reading comprehension. ANOVA test was also employed to identify if there was any interaction between the two independent variables (Group structures and metacognitive strategies). Prior to proceeding with the two-way ANOVA test, the three assumptions were tested: (1) normality using Shapiro-

Wilk's normality test for each group of the design; (2) outliers by inspecting the boxplot; and (3) homogeneity of variance using Leven's test.

To analyze Research question 3 quantitatively regarding participants' perceptions about the effectiveness of the e-book system on their overall reading comprehension, descriptive statistics, including the mean, median, standard deviation, and range of scores of the Likert scales questionnaire were reported. The mean and median scores of the e-book's 14-item Likert scale questionnaire results were evaluated.

## **Phase II: Qualitative Research Design**

After the quantitative data were collected, a qualitative study was conducted. In the qualitative phase, data were collected through interviews and open-ended questionnaires to investigate EFL learners' perceptions about the effectiveness of multimedia e-book learning environments on their overall reading comprehension. The following section presents the data collection procedures, data instruments and data analysis of the qualitative phase.

### **Instruments**

*Structured interviews.* Data were collected through forty-five-minute individual interviews of 13 female freshmen Saudi students at the intermediate language proficiency level in a comfortable place based on student convenience. The EFL instructors asked for volunteers who wished to participate in an interview about the e-book as learning environment for reading comprehension. The researcher conducted the interview through structured interview protocol (see Appendix E) that include eleven questions to guide and facilitate the discussion about participants' perceptions toward the effectiveness of the multimedia e-book learning environment on their reading comprehension. The researcher recorded, transcribed, and saved each interview as a data

source. Based on students' ease with language, the interviews were either conducted in English or in the participant's native language, Arabic, to gather accurate and honest information.

*Open-ended questionnaire.* An open-ended questionnaire link was distributed via email to all participants who completed the e-book treatment and wished to voluntarily share their experience regarding the effectiveness of utilizing a multimedia e-book dialogic environment for reading comprehension (see Appendix D). Ninety-four female participants from the English Language Institution in a Saudi university participated in this questionnaire. The open-ended questions were designed to analyze the important emergent themes among participants.

### **Data Collection Procedures**

Prior to the interview, participants were exposed to the study objectives to ensure they understood the purpose and expectations for participation. Students were asked to read and sign the informed consent form (see Appendix I). An individual interview was conducted with each voluntarily participant. Interviews allowed the participants to express their perceptions, feelings, opinions, and experiences with the multimedia e-book learning environment and its interactive features as a technology tool for reading comprehension. Interviews enabled the researcher to negotiate, discuss, inquire, and gain deeper insight for further analysis of EFL learners' perception about the effectiveness of the multimedia e-book learning environment. In addition to the interview, an open-ended questionnaire link was distributed, and results were analyzed.

### **Data Analysis Procedures**

Constant comparative methods were used to analyze the data. Since all the data are based on interviews, thematic analysis was employed to identify, analyze, and find broader themes based on the research question (Braun & Clarke, 2006). The transcribed interviews were used to compile an overview of student experiences with the multimedia e-book learning environment

and its effect on reading comprehension. Strauss' three stages were applied to analyze the data (Strauss, 1987). An open coding data analysis was used by focusing on the participants' words, phrases, and sentences to determine their meaning. After transcribing the data into text, Vivo coding thematic elemental method was used to code "words, paragraphs, and chunks of phrases" that were related to participants' perceptions toward the multimedia e-book learning environment on their reading comprehension (Miles, Huberman, & Saldaña, 2014).

All the quotes, chunks of phrases, words and paragraphs related to student perceptions of e-book learning were listed and combined into a folder. In the second cycle, the large data from the first cycle was condensed into smaller units and engaged in the axial coding by looking for common themes and connections among participant words and phrases (Gibson & Brown, 2009). Themes all participants agreed on were identified through participants use of words, phrases and descriptive opinions. Finally, selective coding was conducted by scrutinizing how the categories for themes were related based on the research question. The most common themes among the participant answers were related to identify the findings.

### **Triangulation**

Triangulation, which is a technique used to facilitate validation of data, was used to verify the qualitative data. Multiple data sources such as students' recorded interviews, questionnaires, member checking, and external audit were employed. The transcribed interviews for each participant were reviewed to determine the accuracy of the research. Participants were asked to check whether the reported findings and descriptions accurately reflected their thoughts and experiences. Participants were asked to further explain any vague thoughts, words, phrases, or ideas. Student interviews conducted in Arabic were translated and transcribed in English. Both the Arabic and English transcription and translation accuracy was verified by two certified

translation centers and three bilingual instructors from the ELI at the Saudi university. Finally, an external audit was conducted by reviewers not involved in the study from the English Language institution in Saudi Arabia.

### **Ethical Considerations**

All participants were informed of the study’s objectives and signed consent forms prior to participation. Participants were given pseudonyms, personal identifying information was disguised, and findings were discussed in aggregate in the research write-up. Consent forms were stored separately from the interview transcriptions and translations for increased privacy. Consent forms were stored in a locked file cabinet in the locked office of the principal investigator (PI). Electronic data, including transcribed interviews, consent forms, and the interview protocol were stored on the PI’s password protected computer. Consent forms and data will be kept for five years after the final report is submitted. At that point, electronic data will be deleted from the password protected computer and consent documents will be shredded.

**Table 5.** Summarized Qualitative Phase: Research Question, Data Sources, Data Analysis, Study Outcomes.

<b>Research Questions</b>	<b>Data Sources</b>	<b>Data Analysis</b>	<b>Outcomes</b>
<i>How do EFL learners perceive the effectiveness of a multimedia e-book learning environment on their overall reading comprehension?</i>	Interviews/ Open-ended questionnaire	Thematic content analysis and descriptive statistics	Saudi learners’ Perceptions

### **Chapter Summary**

This chapter described the methodology of the current study. The study attempts to explore the impact of metacognitive strategy-based discussion and collaborative learning on EFL learners’ utilization of the reading strategies and reading comprehension within a multimedia e-book

learning environment. To achieve the purpose of this study and examine the research questions, a mixed-methods approach of quantitative and qualitative research design was employed. A quantitative approach was applied to examine the impact of metacognitive strategy-based discussion and collaborative learning on students' utilization of the reading strategies.

A pre-and post- survey was distributed, and a paired sample *t*-test was conducted to analyze the survey score results and track usage of reading strategies to examine the influence of metacognitive strategy-based discussion and collaborative learning on students' use of the reading strategies. Furthermore, the impact of metacognitive strategy-based discussion, collaborative learning, the combined use of MS and CL on EFL learners' reading comprehension within an e-book learning environment was examined. IELTS comprehension test scores were used and a two-way ANOVA was performed to analyze the test results. To explore EFL learners' perceptions regarding the multimedia e-book learning environment on reading comprehension, students' learning experience questionnaire was analyzed using descriptive statistical analysis. A qualitative research design was also implemented to gain deeper insight into EFL students' experiences with the multimedia e-book learning environment. For the qualitative study, data from interviews and open-ended questionnaires were analyzed to compensate for any weak points related to the quantitative results. The following chapter presents the study's results of each research question followed by discussions of the findings.

## **Chapter 4: Results and Discussion**

The current study explores the impact of three main objectives related to English as a Foreign Language (EFL) Learners' utilization of reading strategies and improvement of reading comprehension. Firstly, it investigates the impact of metacognitive strategy-based discussion and collaborative learning on EFL learners' application of reading strategies within an e-book dialogic environment. Secondly, it seeks to discover the influence of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners' reading comprehension. Lastly, it triangulates the data to uncover EFL participants' perceptions regarding the effectiveness of the multimedia e-book environment in enhancing their reading comprehension performance. The chapter presents the results of the data analyses and discusses them with regard to relevant literature. The findings and discussion of the current study are based on the posed research questions:

1. Does metacognitive strategy-based discussion and collaborative learning impact EFL learners' application of reading strategies within multimedia e-book dialogic environments?
2. What is the impact of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners' reading comprehension?
3. How do EFL learners perceive the effectiveness of a multimedia e-book learning environment on their overall reading comprehension?

Based on the research questions, four hypotheses are raised:

1. Students learning English as a foreign language are better at utilizing reading strategies after being exposed to the MS and CL treatment.
2. Students learning English as a foreign language who have been exposed to MS achieve final reading scores greater than those who have not been exposed to MS.
3. Students learning English as a foreign language who have been exposed to CL achieve final reading scores greater than those who have not been exposed to CL.
4. Students learning English as a foreign language who have been exposed to the combined use of MS and CL show interaction effects on their final reading scores.

The following are important points: Research Questions 1 and 2 along with all four hypotheses were quantitatively analyzed and the results were reported. Research Question 3 was analyzed using a mixed-methods of quantitative and qualitative approach and the results were reported. For organizational purposes, this chapter is divided into three sections. The first section presents demographic information and expounds on the results and discussion of RQ1. The second section details the results and discussion of RQ2. The third section addresses the results and discussion of RQ3. The chapter concludes with a summary.

### **Demographic Information**

The background questionnaire focused on obtaining information about the study's participants. It collected specifics such as participants' age, number of years of studying English in Saudi Arabia, number of years of English studies outside the country, and self-rating of English language academic level. The questionnaire also gathered data about students' reading such as hours spent reading per week and types of reading materials utilized. The total participants for this



background questionnaire were 100 EFL female students. The questionnaire reported that all participants were in the preparatory college academic year at English Language Institute in Saudi Arabia. The age range for participants was between 19 to 21 years of age. Among 100 students, 70% of students were 19 years old, 24% were 20 years of age, 3% were 18 years of age, and 3% were 21 years old. Regarding the years of studying English in Saudi Arabia, 65% of the participants studied English for 6 to 12 years, 25% for 3 to 6 years, and 10% over 12 years. Around 2% had the opportunity to learn English outside the country for less than a year.

Participants' self-rating of English language level revealed that 80% of participants considered themselves at the intermediate level, 10% assessed themselves as beginners in English, 5% deemed themselves lower than intermediate level, and 5% rated themselves proficient in English. As for hours spent on reading, 40% of participants reported 1 to 3 hours of reading, around 30% spend 3 to 6 hours, 20% spend 6 to 12 hours, and 10% spend 6 to 12 hours reading per week. Participants had the opportunity to choose more than one option for the type of reading materials they use. Around 50% of participants reported reading online for knowledge, 50% read online for fun, 60% use social media for reading, 30% read novels, 10% read magazines, 10% read newspaper, and 60% read for academic purposes.

## **Results and Discussion**

### **Results: RQ 1- Does Metacognitive Strategy-based Discussion and Collaborative Learning Impact EFL Learners' Application of Reading Strategies within Multimedia e-book Dialogic Environments?**

The first research question examined if there were influences of metacognitive strategy-based discussion and collaborative learning treatment in supporting EFL learners to increase

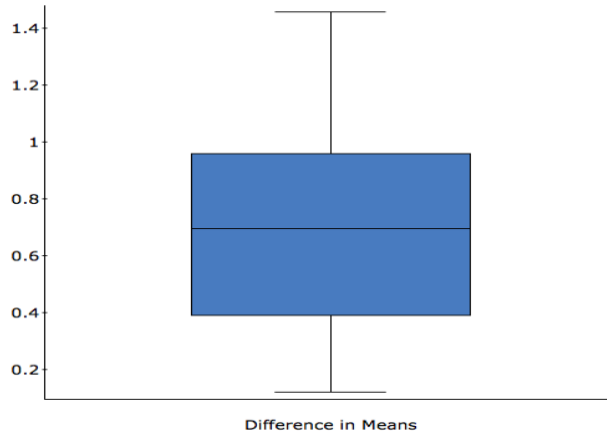
utilization of reading strategies within an e-book dialogic environment. To examine question 1, a pre-treatment and post-treatment Survey of Reading Strategies (SORS) was distributed to the collaborative learning with MS group (CMS+) to obtain data regarding EFL learners' application of the reading strategies. Twenty-six students participated in this survey. Participants' level of utilizing the reading strategies before and after being exposed to the treatment was analyzed. To investigate this question, the first hypothesis was tested: students learning English as a foreign language are better at utilizing reading strategies after being exposed to the MS and CL treatment. To discern if differences between the two distributions, before and after treatment, were statistically significant, a paired t-test was conducted. Table 6 provides a summary of the participants, data source, data analysis and the expected outcome for research question one.

**Table 6.** Relationship Between Research Question 1, Participants, Data Sources, Analysis Procedures, and the Expected outcome.

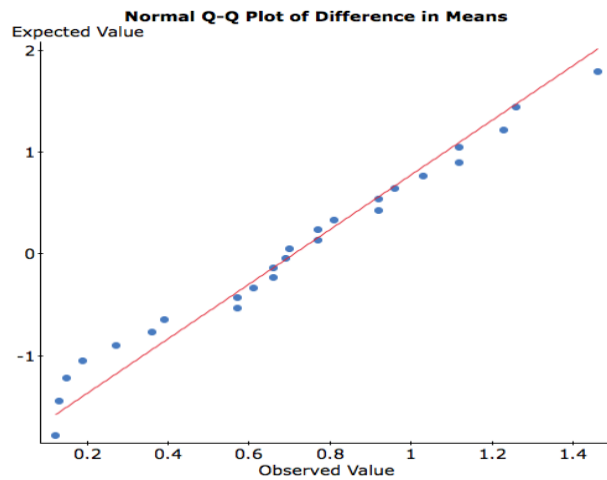
Research Question	Participated Group	Number of Participants	Data Source	Analysis Procedures	Expected Outcomes
<i>Does metacognitive strategy-based discussion and collaborative learning impact EFL learners' application of reading strategies within multimedia e-book dialogic environments?</i>	CMS+	26	Pre/post Treatment SORS	<ul style="list-style-type: none"> <li>• Paired sample <i>t</i>-test</li> <li>• Descriptive statistics</li> </ul>	Increase students' utilization of reading strategies

Before running the *t*-test, the assumptions of the outliers and normality for the differences between the pre-treatment and post-treatment scores were verified. Outliers are defined as “the observation of cases that have a standardized residual of more than 3.3 or less than -3.3” (Alsamadani, 2009, p.96). The researcher tested the outlier using a boxplot as shown in Figure 1. No outlier was identified between pre-treatment and post-treatment questionnaire scores. A

Shapiro-Wilk normality test was employed, and it was found that the difference in means between the pre-treatment and post-treatment scores was normally distributed (Figure 2).



**Figure 1.** Boxplot to check the outliers



**Figure 2.** Scatter plot showing data normality

**Paired sample *t*-test.** A paired sample *t*-test was conducted to determine if significant mean differences exist between SORS scores for participants who received the MS with collaborative learning treatment. The survey included 26 items scaled from one to five. Significant differences were found with  $t(25) = 9.67, p < .05$ , effect size  $\eta^2=1.90$ . Hence, the first hypothesis (students

learning English as a foreign language are better at utilizing reading strategies after being exposed to the MS and CL treatment) was aptly supported Table 7 and Table 8 summarize the paired samples statistics and paired sample statistics of difference respectively.

**Table 7.** Summarized Paired Sample t-test Statistics.

	Mean	SD	SE
Post-Mean	3.9978	.22575	.04427
Pre-Mean	3.2881	.47906	.09395

*Note.* SD = standard deviation, SE = standard error mean.

**Table 8.** Summarized Paired Sample t-test Statistics of Difference in Pre- and Post-Mean.

Mean	SD	SE	95% Confidence Interval of the Difference			df	Sig. (2tailed)
			Lower	Upper	t		
.70964	.37427	.07340	.55848	.86081	9.668	25	.000

*Note.* SD = standard deviation, SE = standard error mean, df=degree of freedom.

**Descriptive statistics.** For further analysis regarding participants’ improvement in utilizing metacognitive strategies before and after exposure to the treatment, descriptive statistics were employed to show the difference in means. Participants in the treatment were exposed to metacognitive strategy-based discussion and collaborative learning before, during and after reading. During the treatment, participants were asked to identify the main ideas of the paragraph, determine the purpose of each paragraph, make connections between paragraphs, and summarize or evaluate the text. The descriptive statistics show that each of the 26 items scaled had a positive change between the pre-treatment and post-treatment mean scores. The mean difference between pre- and post-treatment was 0.709. EFL learners’ scores for utilizing each strategy improved after being exposed to the treatment, as shown in Table 9.

**Table 9.** Descriptive Statistics of the Reading Strategies Pre- and Post-Treatment.

Strategy	Pre-Mean	SD	Post-Mean	SD	Difference in Means
1. I have a purpose in mind when I read.	3.19	1.20	3.88	0.71	0.69
2. I take notes while reading to help me understand what I read.	2.88	1.34	4.00	0.75	1.12
3. I think about what I know to help me understand what I read.	3.76	1.09	4.12	0.82	0.36
4. I take an overall view of the text to see what it is about before reading it.	3.58	1.42	3.73	1.19	0.15
5. When text becomes difficult, I read aloud to help me understand what I read.	3.08	1.35	3.65	1.20	0.58
6. I think about whether the content of the text fits my reading purpose.	3.23	1.24	4.15	0.67	0.92
7. I read slowly and carefully to make sure I understand what I am reading.	3.81	1.17	4.00	0.80	0.19
8. I review the text first by noting its characteristics like length and organization.	2.77	1.39	3.58	1.14	0.81
9. I try to get back on track when I lose concentration.	4.23	0.91	4.36	0.64	0.13
10. I underline or circle information in the text to help me remember it.	4.00	1.30	4.12	0.95	0.12
11. I adjust my reading speed according to what I am reading.	3.12	1.14	3.73	1.12	0.62
12. When reading, I decide what to read closely and what to ignore.	3.31	1.29	3.88	0.95	0.58
13. I use reference materials (e.g., a dictionary) to help me understand what I read.	2.73	1.43	3.65	1.13	0.92
14. When text becomes difficult, I pay closer attention to what I am reading.	3.35	1.16	4.12	1.01	0.77
15. I use tables, figures, and illustrations in text to increase my understanding.	3.08	1.29	4.04	0.77	0.96
16. I stop from time to time and think about what I am reading.	2.85	1.49	3.88	0.86	1.04
17. I use context clues to help me better understand what I am reading.	2.62	1.27	3.88	0.77	1.27
18. I paraphrase (restate ideas in my own words) to better understand what I read.	3.46	1.50	4.12	0.77	0.65
19. I try to picture or visualize information to help remember what I read.	3.88	1.11	4.15	0.83	0.27
20. I use typographical features like boldface and italics to identify the key information.	3.42	1.42	4.12	0.77	0.69
21. I critically analyze and evaluate the information presented in the text.	2.23	1.21	3.69	0.97	1.46
22. I go back and forth in the text to find relationships among ideas in it.	2.81	1.20	4.04	0.92	1.23
23. I check my understanding when I come across new information.	3.54	1.24	4.31	0.74	0.77
24. I try to guess what the content of the text is about when I read.	3.42	1.21	4.08	0.93	0.65
25. When text becomes difficult, I re-read it to increase my understanding.	3.92	1.02	4.31	0.88	0.38

**Table 9.** Continued

Strategy	Pre-Mean	SD	Post-Mean	SD	Difference in Means
26. I ask myself questions I like to have answered in the text.	3.23	1.31	4.35	1.06	1.12

According to the survey score results, the largest difference in mean was  $M= 1.46$  for the reading strategy that stated, “I critically analyze and evaluate the information presented in the text.” It shows that participants were using the analysis and evaluation strategies more after being exposed to the MS and CL treatment. The second largest difference in mean score for reading strategies was  $M=1.27$ , which was using “the context clues to help me better understand what I am reading.” The third largest difference in mean for reading strategies was  $M=1.23$ , which was: “I go back and forth in the text to find relationships among ideas in it.” Making connections between paragraphs is an important strategy for increasing English language learners’ reading comprehension. The connection between ideas and paragraphs is another important reading strategy participants were exposed to for which they showed a positive change in the post-treatment scores. The fourth largest difference in mean for reading strategies was  $M=1.12$ , for the strategy, “I take notes while reading to help me understand what I read.” Since the MS and CL treatment encouraged participants to write more on the discussion board, it provides more chances to improve student note-taking and writing, responses to classmates, and understanding of the text. Another reading strategy, which is detailed as “using illustrations or figures to help me understand the text” showed difference in mean scores,  $M=1.12$ . The mean difference points to the fact that students showed improvement in utilizing what they had learned from exposure to the treatment.

**Table 10.** Relationship Between Research Question 1, Data Sources, Analysis Procedures, and Findings.

Research Question	Data Sources	Analysis Procedures	Findings
<i>Does metacognitive strategy-based discussion and collaborative learning impact EFL learners' application of reading strategies within multimedia e-book dialogic environments?</i>	SORS (Pre- and post-treatment)	<ul style="list-style-type: none"> <li>• Paired sample <i>t</i>-test</li> <li>• Descriptive statistics</li> </ul>	<ul style="list-style-type: none"> <li>• <i>t</i>-test showed significant differences</li> <li>• A positive change in the mean scores</li> </ul>

**Discussion: RQ 1**

The findings indicate that exposing EFL learners to metacognitive strategy-based discussion (MS) and collaborative learning (CL) treatment significantly impacts students' application of reading strategies (planning, monitoring, and evaluation). As discussed in the literature review, the current study focused on training EFL learners to utilize MS that they may find difficult to use (see Table 1), including monitoring and evaluation strategies (Chun 2015; Karbalaei, 2010; Kasemsap, & Lee, 2015). Previous research has shown that EFL learners tend to use supportive strategies in their reading, such as dictionaries, while ESL learners use more “top down” strategies such as paraphrasing, taking-notes, and summarizing (Karbalaei, 2010). Karbalaei (2010) points out that EFL students might not be aware of other types of metacognitive reading strategies. In another study, Chun (2015) found that global, supportive, and problem-solving strategies are used by advanced language learners whereas language learners in lower levels tend to use supportive strategies such as hyperlinks and dictionaries. Kasemsap and Lee (2015) agreed with Chun (2015) and Karbalaei (2010) regarding their findings about EFL learners' application of the reading strategies. They found that college level EFL learners tend to use memorizing, retrieval strategies, dictionaries and translations more than MS strategies (planning, monitoring and evaluating) for reading comprehension.

In contrast to existing scholarship, the result of SORS in the current study show positive changes in Saudi EFL learners' utilization of different reading strategies including monitoring and evaluation strategists. This is an indication that college EFL learners at the intermediate level can learn and apply a range of reading strategies if they are exposed to the appropriate teaching methods and practice to provide them with sufficient training of reading strategies. Students may not be aware of MS, may need more time, and sufficient practice to apply the strategies during a traditional face-to-face class. The e-book dialogic reading environment can be a new method for teaching intermediate level collegiate EFL learners various MS through discussion and collaborative learning. For example, during the "monitoring" stage of this study, students were exposed to metacognitive strategy-based discussion to facilitate identification of main or confusing ideas in a paragraph and make connections between ideas or paragraphs. The study treatment also engages EFL learners to utilize other strategies such as activating their prior knowledge, summarizing, and evaluating text ideas in a dialogic format. The exposure resulted in positive changes in students' average mean score of each strategy mentioned in the questionnaire along with the significant results of the *t*-test. The questionnaire findings reveal that although participants had positive differences in mean score for all 26 reading-strategy scaled items, they achieved better differences in mean score with the MS they learned and practiced during the treatment (see Table 9). Teaching reading strategies to EFL learner through practice and exposure to strategies using discussion and collaborative learning supported their use of a variety of reading strategies.

The current study's results imply that intermediate level Saudi EFL learners can utilize monitoring and evaluation strategies when they are sufficiently trained to use these strategies. It contradicts Dreyer and Nels' (2003) results that successful readers are able to apply the monitoring and evaluation strategies and less professional readers employed only planning strategies. The



current study also opposes Al-Seweed's (2002) results that both high and low proficiency Saudi learners tend to utilize strategies that include guessing, skipping, contextual clues, dictionaries and word-solving strategies. It also showed different results from Al-samadani (2009) who found that Saudi college-level learners utilized planning more than monitoring and evaluation strategies. Al-Nujaidi's (2002) findings also suggest that Saudi learners reported the frequent use of problem-solving strategies. The current study showed that training Saudi EFL learners at the intermediate level helps to utilize MS strategies other than dictionaries, translations, word in context, or figuring out what the word is. Accordingly, the present study's findings confirmed Duffy and Roehlers' (1989) statement that metacognition could be promoted by modeling and practices. The results imply that Saudi learners need effective pedagogical methods of teaching MS and exposing students to practical learning environments that encourage them to apply new strategies and gradually use them in their future academic readings.

**Results: RQ 2- What is the Impact of Metacognitive Strategy-based Discussion (MS), Collaborative Learning (CL), and the Combined Use of MS and CL on EFL Learners' Reading Comprehension?**

This research question explores the impact of three important factors on EFL learners' reading comprehension: 1) metacognitive strategy-based discussion (MS), 2) collaborative learning (CL), and the combined use of MS and CL. To accomplish this inquiry, the following hypotheses were tested:

1. Students learning English as a foreign language who have been exposed to MS achieve final reading scores greater than those who have not been exposed to MS.
2. Students learning English as a foreign language who have been exposed to CL achieve final reading scores greater than those who have not been exposed to CL.

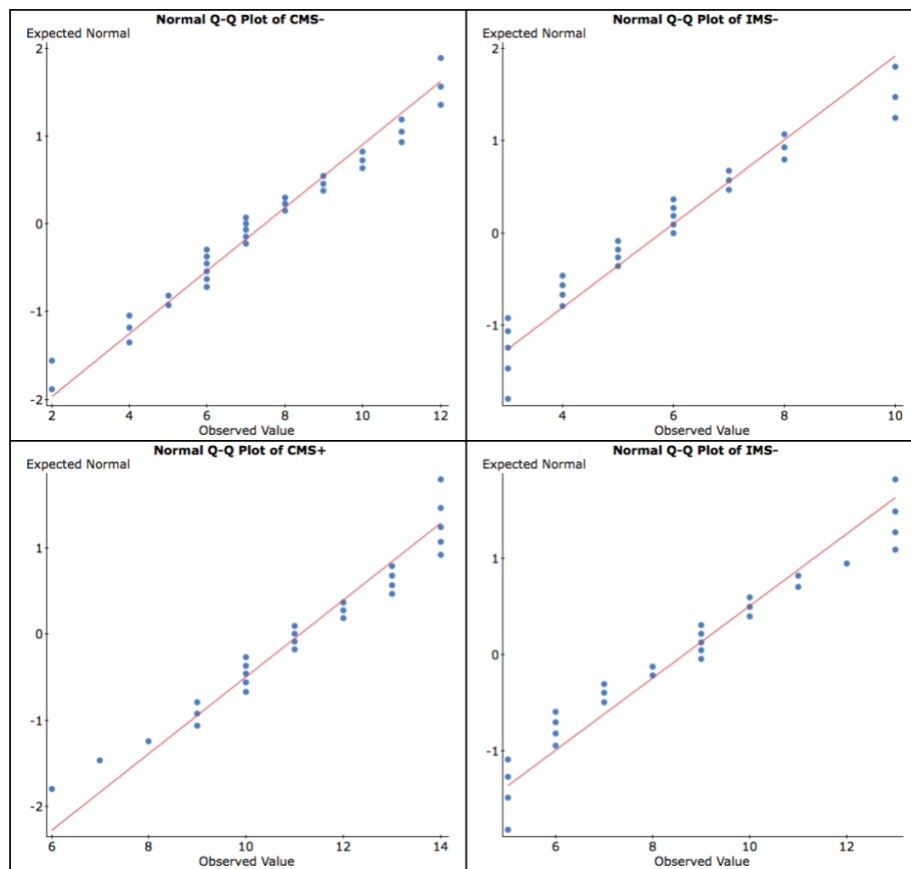
- Students learning English as a foreign language who have been exposed to the use of both MS and CL show interaction effects on their final reading scores.

In order to test the research hypotheses and examine research question 2, a two-way ANOVA (Analysis of Variance) was used to analyze the differences among groups. A two-way ANOVA was used to examine the main effects of Metacognitive Strategy Support (Presence/Absence) and Group Structures (Collaboration/Individual) on EFL learners' reading comprehension. The interaction effects between Group Structures (Collaboration/Individual) and Metacognitive Strategy Support (Presence/Absence) on final reading comprehension scores was also assessed. There were two independent variables with two levels. The first independent variable is Group Structures with two levels: Collaborative/Individual learning. The second independent variable is Metacognitive Strategy Support (MS) with two levels: MS Presence/ MS Absence. The only dependent variable is the final reading comprehension scores. As shown in Table 11, the total number of participants for this research question were 115 students. The collaborative group that was exposed to the metacognitive strategies (CMS+) had 27 participants, while the collaborative group that was not exposed to MS (CMS-) had 33 participants. The individual group exposed to the metacognitive strategies (IMS+) consisted of 28 participants, while the individual group not exposed to the metacognitive strategies (IMS-) included 27 participants.

**Table 11.** Between-Subjects Factors for Participants.

Group Structures	Metacognitive Strategies (MS)	
	MS Presence	MS Absence
Collaborative	27	33
Individual	28	27

Prior to proceeding with the ANOVA test, a validation analysis was performed in order to test the assumptions of the two-way ANOVA. Three assumptions were assessed: (1) normality using Shapiro-Wilk normality test for each group of the design; (2) outliers by inspecting the boxplot; and (3) homogeneity of variance using Leven’s test. As shown in Figure 3, the collaborative groups with metacognitive strategy use (CMS+) and no metacognitive strategy use (CMS-) were normally distributed with Shapiro-Wilk p-values  $>0.05$ . However, the groups of individuals with metacognitive strategy use (IMS+) and no metacognitive strategy use (IMS-) were not normally distributed (Shapiro-Wilk p-values are  $<0.05$ ). The violation of normality in this case was considered acceptable due to ANOVA’s robustness (Field, 2013).



**Figure 3.** Scatter plot to represent data normality

The researcher tested the outliers and found that the only outlier was in the subset collaboration with metacognitive strategy use. This case (#23) was filtered out prior to performing analysis. The homogeneity of variances was also assessed using Levene’s Test of Equality Error Variances. It was found that the variances are homogeneous, as shown in Table 12.

**Table 12.** Summarized Levene’s Test Results to Assess Homogeneity of Variances.

<b>F</b>	<b>df1</b>	<b>df2</b>	<b>Sig.</b>
1.067	3	111	.366

*Note.* Dependent Variable: Reading Score, df= degree of freedom

After examining the assumptions, a two-way ANOVA was performed in SPSS to compare the main effects of the two independent variables: Metacognitive Strategy (MS) Support and Group Structures. The findings revealed that both Metacognitive Strategy Support and Group Structures have influences on EFL learners’ reading comprehension as presented in Table 13. In terms of the metacognitive strategy-based discussion on English as foreign language learners, both groups of individual and collaborative learners with MS scored a higher average mean in their reading comprehension ( $M = 11.11$ ; 8.64) when compared to individual and collaborative groups with no MS ( $M = 7.48$ ; 5.78). As for the influence of group structures and metacognitive strategies support, the collaborative group with MS use achieved a higher average mean scored in their reading comprehension ( $M = 11.11$ ) compared to that of the individual group with MS use ( $M = 8.64$ ). The descriptive statistics are summarized in Table 13.

**Table 13.** Descriptive Statistics Showing the Impact of the Main Effects (Group and Meta-Strategy) on Reading Scores.

<b>Group</b>	<b>Meta-Strategy</b>	<b>Mean</b>	<b>Std. Deviation</b>
Collaborative	Absence	7.48	2.785
	Presence	11.11	2.242
	Total	9.12	3.120
Individual	Absence	5.78	2.207
	Presence	8.64	2.683
	Total	7.24	2.835
Total	Absence	6.72	2.662
	Presence	9.85	2.752
	Total	8.22	3.120

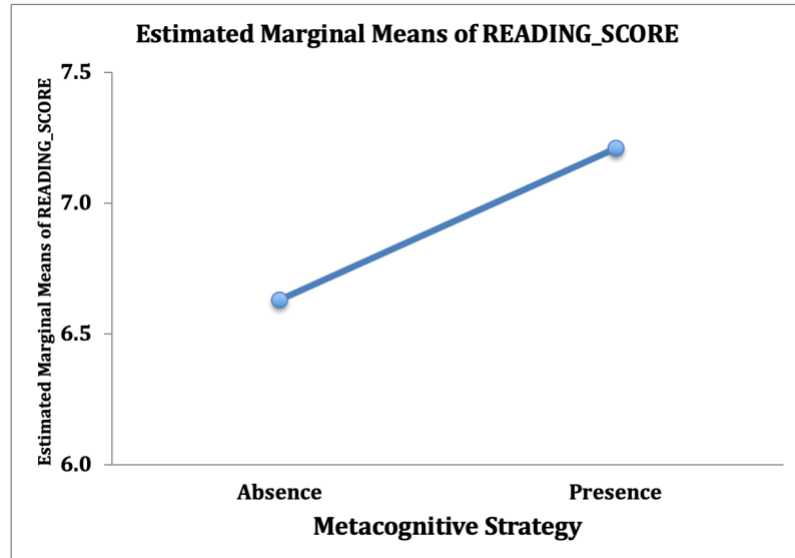
As shown in Table 13, both main effects (MS and Group Structures) were significant with  $p$ -values  $< 0.05$ . The main effect for MS yielded an F ratio of  $F(1, 111) = 47.70$ ,  $p < .05$ , effect size  $\eta^2 = .30$ , indicating a significant difference between presence of metacognitive strategies ( $M = 9.88$ ,  $SD = .34$ ) and absence of metacognitive strategies ( $M = 6.63$ ,  $SD = .33$ ) (see Figure 4). As a result, the first hypothesis was supported: students learning English as a foreign language who have been exposed to MS achieve final reading scores greater than those who have not been exposed to MS. The main effect for Group differences yielded an F ratio of  $F(1, 111) = 19.73$ ,  $p < .05$ , effect size  $\eta^2 = .15$ , indicating a significant difference between collaborative learning ( $M = 9.12$ ,  $SD = 3.12$ ) and individual learning ( $M = 7.24$ ,  $SD = 2.84$ ) (see Figure 5). Therefore, the second hypothesis was also supported: students learning English as a foreign language who have been exposed to CL achieved final reading scores greater than those who have not been exposed to CL. Despite the significance of above results, the interaction effects between the group structures and metacognitive strategy support was not significant with  $p$ -value  $> .05$ , effect size  $\eta^2 = .01$ , as shown in Table 14 and Figure 6. As a result, the interaction hypothesis was not

supported: students learning English as a foreign language who have been exposed to the combined use of MS and CL show interaction effects on their final reading scores. The conclusion of RQ2 entails that metacognitive strategy-based discussion and collaborative learning had positive influences on EFL learners' reading comprehension. Still, more research is required to support the conclusion that learning and applying MS together with CL will improve EFL students' reading comprehension.

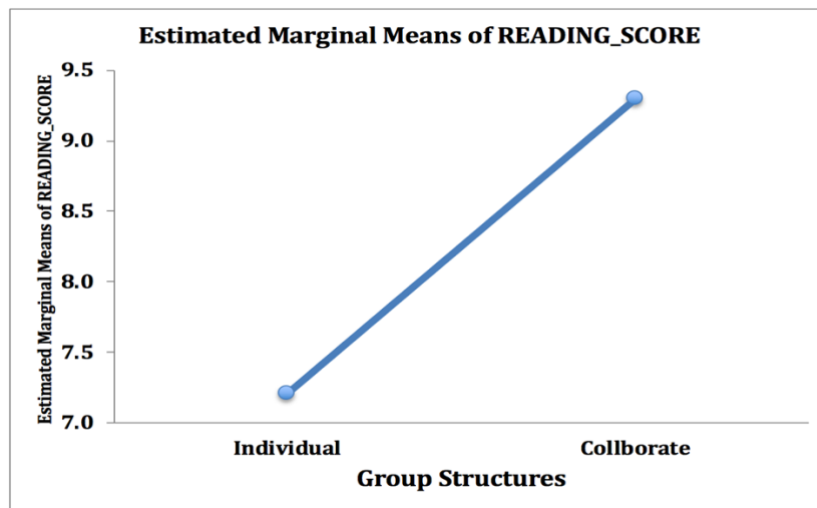
**Table 14.** Showing Two-Way ANOVA Test Between-Subjects Effects (Group and Meta-Strategy).

Source	Type III Sum of Squares	df	F	Sig.	$\eta^2$
Corrected Model	409.561 <sup>a</sup>	3	21.648	.000	.369
Intercept	7781.317	1	1233.887	.000	.917
Group	124.443	1	19.733	.000	.151
Strategy Used	300.786	1	47.696	.000	.301
Group * Strategy Used	4.136	1	.656	.420	.006
Error	700.004	111			
Total	8875.000	115			
Corrected Total	1109.565	114			

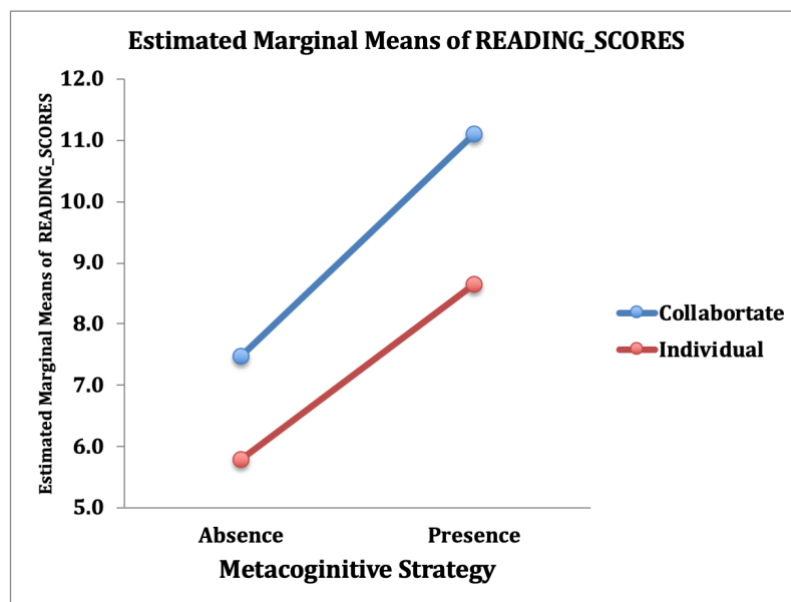
*Note.* R Squared = .369 (Adjusted R Squared = .352), Dependent Variable: Reading Score;  $\eta^2$  = Effect Size



**Figure 4.** Plot representation of the MS (presence/absence) main effects



**Figure 5.** Plot representation of the group structures (collaborative/individual) main effects



**Figure 6.** Plot representation of the interaction effects

**Table 15.** Relationship Between Research Question 2, Data Sources, Analysis Procedures, and Findings.

Research Question	Data Sources	Analysis Procedures	Findings
<i>What is the impact of metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL on EFL learners' reading comprehension?</i>	Final reading test	Two-way ANOVA	<ul style="list-style-type: none"> <li>• MS had significant impact</li> <li>• CL had significant impact</li> <li>• No interaction was found between MS and CL</li> </ul>

### **Discussion: RQ 2**

The current study strives to create a new pedagogical method of teaching metacognitive strategies through discussion and collaborative learning within a dialogic e-book environment to help EFL learners improve their reading comprehension. Three important factors are discussed to address the findings of Research Question 2: (1) the impact of MS on reading comprehension, (2)



the impact of collaboration on reading comprehension, and (3) the impact of the combined use of MS and CL on reading comprehension.

The current study's findings show important issues concerning the impact of MS-based discussion on EFL learners' reading comprehension. It uncovers that MS has significant impact on students' reading comprehension and confirms the results of previous studies (Ahmadi, Ismail, & Abdullah, 2013; Al-Sobhani, 2013; Nejad, 2016; Tarchi, 2015; Zhang & Seepho, 2013). It also contradicts studies that showed negative results of MS on reading comprehension (Alsamadani, 2009; Al-Shaikah, 2005; Meniado, 2016; Pammu, Amir, & Maasum, 2014). Some researchers have shown discrepancies concerning the influence of MS on reading comprehension. Rastega, Kermani and Rastega (2017) found a significant relationship between EFL students' use of metacognitive reading strategies and their reading comprehension achievement scores. Nejad (2016) and Tarchi (2015) concluded that activating students' prior knowledge as one of the MS stages, improved students' reading comprehension. Alsamadani (2011) investigated the relationship between metacognitive reading strategies and reading comprehension among Saudi EFL students and found that reading strategies and other factors, such as vocabulary size and time on task, improved reading comprehension. Other researchers found the use of metacognitive strategies supported students' performance in reading comprehension and reading proficiency tests (Ahmadi, Ismail, & Abdullah, 2013; Al-Sobhani, 2013; Magogwe, 2013; Zhang & Seepho, 2013).

While most research studies found positive results on the influence of MS and reading comprehension, other research reveals opposite results. Meniado (2016) investigated the relationship among metacognitive strategies, reading comprehension and reading motivation on 43 male Saudi EFL students. He found that there is no statistically significant correlation between metacognitive strategies and reading comprehension, however, there is a statistically significant

correlation between strategies and reading motivation. Other researchers conducted a study with Indonesian EFL students and found that regardless of students' increase use of metacognitive strategies, there was no statistically significant improvement in their reading comprehension (Pammu, Amir, & Maasum, 2014). Alsamadin's (2009) study findings revealed that for Saudi EFL learners in college there is no relationship between the use of reading strategies and reading comprehension. Shaikah (2005) also found that training Saudi learners to use reading strategies did not improve their reading comprehension. The current study's results showed the positive impact of MS-based discussion on reading comprehension. It concluded that no matter the group structure (collaborative or individual), utilizing MS increases participants' reading comprehension. The current study also emphasizes the importance of using a pedagogical method by exposing students to MS applications through practice, following guided MS questions, and discussing the text content to improve reading comprehension.

The current study confirms previous studies' finding regarding the positive influence of collaboration on reading comprehension within technology-based environments. Kim (2006) found that students enhanced their reading comprehension through a collaborative computer-based environment. Alshumaimeri and Almasri (2012) also confirmed the influence of collaboration on EFL learners' reading comprehension by creating a WebQuest environment in which students worked on certain tasks and activities. They found significant improvements in students' reading comprehension. However, the combination of MS-based discussion and collaborative learning to improve the reading comprehension skills has not been examined in the literature. Some studies have examined the influence of MS through dialogue for oral language communication or have investigated what type of strategies students use during online dialogues (Kim & Park, 2011; Lam, 2009). As mentioned before, the only study that examined the application of planning strategy

through discussion was conducted to improve Chinese language learners' reading comprehension (Liu, Ko, & Wu, 2014) and found contradictory results to the current study. Researchers found that integrating prediction strategy learning with discussion failed to support students' reading comprehension because discussion caused a cognitive load for students and distracted them from reading tasks. In contrast, the current study's findings showed that collaboration through chat-based discussion had a significant impact on EFL learners' reading comprehension within an e-book dialogic environment and improved students reading comprehension.

Although the current study did not show a statistical interaction between the MS and CL, the tests' mean scores revealed that the group which utilized both the MS-based discussion and collaborative learning achieved the best average reading mean scores among all groups. The justification for not identifying interaction between the main effects is that the relationship between the MS and Group Structures is additive. In other words, students can improve their reading comprehension with metacognitive strategy-based discussion whether they are working individually or collaboratively. Nevertheless, applying metacognitive strategies with collaborative learning will further improve students' reading comprehension.

Different theoretical frameworks are applicable to this study. The cognitive theory was shown through how the appropriate sequence of instruction across structured MS-based discussion questions within the e-book discussion boards enhanced EFL learners' comprehension. A connection to Chapelle's theoretical framework is shown by how MS discussion and collaborative activities promote learners' awareness of text content. The interactionist theory from SLA field, influenced by the views of Russian psychologist Lev Vygotsky (1978), and the IT field (Chapelle, 2013) were also shown through students' interaction and negotiation with peers and interaction with the e-book as technology environment to improve text comprehension. The interactions occur

in a dialogic environment with others. That speech is more than a system of grammatical errors (Bakhtin, 1986) that help students improve their comprehension. The present study's results confirm Bakhtin's (1986) work that through online reading sessions, students can chat about reading tasks, respond to questions and dialogue with themselves, others and the online sources to better understand the text.

**Results: RQ 3- How Do EFL Learners Perceive the Effectiveness of a Multimedia E-book Learning Environment on their Overall Reading Comprehension?**

The researcher intended to examine how EFL learners perceive their learning experience via e-book learning environment and its multimedia features. Research Question 3 was analyzed quantitatively using descriptive statistics for a Likert scale questionnaire, as shown in Table 16, and qualitatively using open-ended questionnaire and interview data.

**Table 16.** Mean and Standard Deviation of E-book Learning Experience Questionnaire.

<b>E-book Learning Experience Questionnaire</b>	<b>Mean</b>	<b>SD</b>
1. The e-book helped me understand the text.	4.06	0.86
2. The e-book's features helped me find the main ideas.	4.17	0.83
3. The e-book's features helped me understand the text's details.	4.33	0.87
4. The video was a helpful feature in the e-book to understand the text.	4.11	0.92
5. The video was the most helpful feature in the e-book to understand the text.	3.97	0.95
6. Glossing (dictionary) was a helpful feature in the e-book to understand the text.	4.09	0.83
7. Glossing (dictionary) was the most helpful feature in the e-book to understand the text.	3.96	1.03
8. The discussion boards in the e-book helped me understand the text's details.	4.17	0.79
9. The discussion questions in the e-book helped me to use more reading strategies.	4.14	0.77
10. The discussion questions were the most helpful feature in the e-book to understand the text.	3.92	1.04
11. It was easy to use the e-book.	4.33	0.80
12. I like the idea of using the multimedia e-book in reading classes.	4.39	0.80
13. Overall, I am satisfied with using the multimedia e-book learning environment to improve my reading performance.	4.25	0.67
14. Overall, I am satisfied with the multimedia e-book learning environment.	4.27	0.84

Students reported high satisfaction on the Likert scale questionnaire about reading comprehension learning experience with the e-book environment, as shown in Table 17. Participants reported an average mean score of  $M=4.06$  for how the e-book environment helped them understand the text. The mean score for participants' overall satisfaction with the e-book environment for improvement of their reading performance was  $M=4.25$ . The highest average mean score of  $M=4.33$  was reported supporting the idea that the e-book's features helped students understand the details of the text. An average mean score of  $M=4.17$  was reported for how the discussion questions posted in the e-book were helpful in understanding the text's details. An average mean score of  $M=4.11$  for the videos and  $M=4.09$  for the glossing was reported as helpful features to understand the text within the e-book.

**Table 17.** Mean and Standard Deviation of the Reading Comprehension Items for the E-book Learning Experience Questionnaire.

<b>Reading Comprehension within the E-book Environment</b>	<b>Mean</b>	<b>SD</b>
1. The multimedia e-book helped me understand the text.	4.06	0.86
2. The multimedia e-book's features helped me find the main ideas.	4.17	0.83
3. The multimedia e-book's features helped me understand the text's details.	4.33	0.87
4. The video was a helpful feature in the e-book to understand the text.	4.11	0.92
5. Glossing (dictionary) was a helpful feature in the e-book to understand the text.	4.09	0.83
6. The discussion questions in the e-book helped me understand the text's details.	4.17	0.79
7. Overall, I am satisfied with using the multimedia e-book learning environment to improve my reading performance.	4.25	0.67

Furthermore, the researcher added three additional questions to the learning experience questionnaire for the collaborative groups regarding their opinion on the discussion board as a feature to help them understand the text (see Table 18). Participants reported an average mean

score of  $M=4.67$  for the discussion board as a helpful feature in the e-book to understand the text. They reported an average mean score of  $M=4.40$  for how the discussion board helped them clarify the meaning and ideas of the text.

**Table 18.** Mean and Standard Deviation of the Collaboration Items for E-book Learning Experience Questionnaire.

<b>Collaboration Questionnaire</b>	<b>Mean</b>	<b>SD</b>
1. The discussion boards were a helpful feature in the e-book to understand the text.	4.67	0.60
2. The discussion boards helped me clarify meanings and ideas about the text	4.40	0.89
3. The discussion boards were the most helpful feature in the e-book to understand the text.	4.38	0.81

Students reported different average mean scores regarding the most helpful features to understand the text (videos, glossing, discussion boards) within the e-book learning environment. Participants reported that the discussion board feature, with an average mean score of  $M=4.75$ , was the most helpful feature within the e-book environment to understand the text. They rated the videos, with an average mean score of  $M=4.05$ , as the second most helpful feature to understand the text. Glossing was rated as the third most helpful feature with an average mean score of  $M=3.99$ . Additionally, RQ3 was analyzed qualitatively to present more findings regarding participants' overall perception of the e-book as a learning environment for reading comprehension. An open-ended questionnaire and structured interviews (see Appendix D and Appendix E) were utilized to examine RQ3 qualitatively. The qualitative data was analyzed by highlighting the emergent themes among participants. Finally, the results across the quantitative and qualitative data are discussed. The next sections present findings from an open-ended questionnaire and an individual structured interview followed by a discussion of the findings.

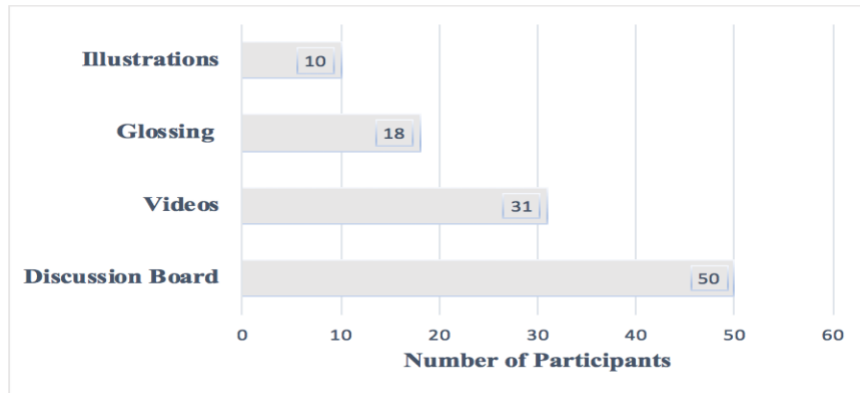
*Open-ended questionnaire findings.* Three important emerging themes were analyzed from the open-ended questionnaire results. The first theme focuses on how participants perceived the e-book environment in general (Like/Dislike; Support/Did not support reading comprehension). Participants described that they liked the e-book environment and stated that it supported their reading comprehension for different reasons. They liked that the researcher explained the strategies during the modeling and training session. They also appreciated having multiple sessions to apply what they had learned through the e-book environment. They highlighted that they are used to the traditional lecture method utilized in reading classrooms whereas metacognitive reading strategy-based discussion through an online e-book environment is a new and effective method for practicing reading comprehension. Participants explained that this environment provided them with engaging opportunities to improve their reading comprehension. The discussion board is a practice setting where students can apply the reading strategies in a fun and interactive educational method through collaboration. They respond to questions and discuss answers with their classmates, which improves their reading comprehension. Furthermore, participants liked the organization of the text within the multimedia e-book environment. They were able to read the entire text, move from one web page to another, read each paragraph separately, and write down what they understood from each paragraph on the discussion board. They described that dividing the text into paragraphs with the strategic questions helped them better understand and remember the text information.

The second theme focuses on how participants perceived the multimedia e-book features (video, glossing, illustrations, the discussion board) effective/non-effective in supporting their application of the reading strategies and overall reading comprehension. Participants categorized their multimedia feature preference according to their application of the reading strategies and

improvement of reading comprehension. This categorization is as follows: discussion board, videos, glossing and finally illustrations (see Figure 7). Through the discussion board, students were able to understand the text better because they could share answers, read their classmates' responses, and ask questions. The students described the discussion board as an online chatroom and a less stressful educational environment. They explained that it was helpful to chat and learn without the stress of grades or wrong answers. Their text knowledge was broadened by collaboration and discussion.

Students found the videos to be the second most effective feature. Videos helped them understand the text by exposing them to general knowledge about the topic before they read the actual text. They further found that videos increased their vocabulary knowledge because they viewed scenes and heard new words that were part of the text. Therefore, when they started reading after viewing the videos, they understood more vocabulary. Students highlighted how the glossing feature helped enhance their text comprehension as there were many new words that would have hindered their understanding of the text. Participants found that illustrations were the feature that helped them the least with reading comprehension. They usually connected the illustrations with the general idea or theme of the paragraph, but it did not help in improving their comprehension of the text's detailed information.





**Figure 7.** Participants’ reporting for the most helpful multimedia features for reading comprehension

The third theme focuses on how participants found that learning the MS reading strategies through a dialogic environment had improved their reading comprehension over time. Participants explained that although reading strategies are an important tool in enhancing their reading comprehension, it is difficult for them to learn or apply these strategies through the comprehension model questions during the traditional lecture class. According to their point of view, the metacognitive reading strategies are time consuming to learn and take practice to be applied in the future. Nevertheless, they found that learning the metacognitive strategies through a discussion question format is a more engaging and fun learning approach. The discussion format helped them think about the text and practice the reading strategies in each session. Participants found the first sessions difficult but with exposure to more sessions and collaboration, applying the reading strategies became easier and their level of reading comprehension improved. They added that more practice of the reading strategies within the e-book environment would be beneficial. Additionally, discussing the questions in a collaborative way through chatting with their peers kept them busy asking questions on the discussion board and responding to their peers without noticing they are

actually learning the strategies. Practicing the MS through discussion and collaboration made time go by faster and students did not become bored as in the traditional classroom.

**Table 19.** Summarized Findings of the E-book Open-ended Questionnaire.

E-book Environment Questionnaire	Findings
Like/Dislike and Support/Did not support reading comprehension	<ul style="list-style-type: none"> <li>• Liked the e-book environment and found it supportive</li> <li>• Liked integrating the metacognitive strategies with the e-book environment for multiple practice opportunities</li> <li>• Liked the collaboration and the discussion board, and supported their comprehension</li> <li>• Liked dividing the text into paragraphs and having comprehensive discussion about each paragraph</li> </ul>
The e-book features (videos, glossing, illustrations, collaboration and the discussion board) Effective/Non-effective in supporting reading strategies and reading comprehension	<ul style="list-style-type: none"> <li>• Discussion board and collaboration were the best features; provided opportunities to ask questions, share information, and read classmates' responses</li> <li>• Videos were effective for comprehending the general idea of the topic and supporting vocabulary learning</li> <li>• Glossing facilitated text comprehension</li> <li>• Illustrations helped with the general theme of paragraphs but not text details</li> </ul>
Administer the reading strategies in a dialogic format	<ul style="list-style-type: none"> <li>• Helped lower level language learners</li> <li>• Encouraged multiple practice of the reading strategies</li> <li>• Chatting and interactive environment made time go by faster</li> </ul> <p>Made the reading class less stressful and a more fun language learning experience</p>

**Interview findings.** This part of the qualitative research study discusses the interview findings by presenting emergent themes among 13 volunteer interviewees from the English

Language Institution at the Saudi university. The following section discusses the four emergent themes followed by tables that summarize the important findings for each theme.

*Theme 1: Benefits of reading strategies for EFL learners to understand the text within the e-book.* All participants agreed that the integration of the reading strategies (before, during and after reading) within the e-book environment helped them understand the text. They found that learning the reading strategies and having ample opportunities to practice applying the strategies during the e-book sessions helped them understand the text and developed their reading comprehension skills over time. The participants explained that the traditional teaching method focuses on reading the text and answering the text-book general reading comprehension questions. It does not provide them with opportunities to understand the text or develop reading strategies for future academic reading comprehension purposes. Participants highlighted that breaking up the text into separate paragraphs in different web pages in the e-book along with the guiding metacognitive strategy-based discussion helped them understand the text better (see Appendix F). Students clarified that they were able to digest the text information at their own pace and had sufficient opportunities and time to apply each strategy according to the guiding question for each paragraph. Participants then confirmed that the metacognitive strategy discussion questions in the e-book helped them better understand the text for different reasons.

A participant, for example, said:

*“The strategies helped me think about the text before I start reading, guided my thinking for better comprehension.”*

Another participant said:

*“I like the way of taking me paragraph by paragraph. The connection between paragraphs helped me follow up, helped me understand the details of each paragraph. Dividing the long text into pieces makes it easy for me to understand the text.”*

First, participants explained that prior to reading they were exposed to the prediction reading strategy as part of the metacognitive planning strategy. They clarified that before reading the actual text, they were exposed to a video or an illustration to activate their prior knowledge and provide them with initial ideas about the text's content ideas. Second, they were given the opportunity to answer guided questions about the video or the picture on the discussion board. These questions helped them activate and share their prior knowledge about the topic and provided them with the opportunity to read their classmates' differing stories, experiences, or expectations about the topic on the discussion board. This stage of the "Planning" reading strategy within the e-book learning environment provided them with initial and general understanding of the text's topic idea. Third, participants stated that they had learned another useful metacognitive reading strategy (monitoring Stage) by making connections between paragraphs during reading. They found that this Monitoring strategy was particularly helpful in developing their reading comprehension. Participants found that by making connections between ideas they were able to keep track of what they had read and what they were going to read next. Participants further explained this by acknowledging that the monitoring reading strategies also helped them identify the main ideas of each paragraph and how the paragraphs supported each other. One participant provided an example of how she connected ideas between paragraphs by saying that "paragraph one could state ideas about the disadvantages of the social media, but the second paragraph could either introduce more disadvantages of the social media or a new idea related to the social media." She found that this strategy worked as a puzzle in completing the whole picture of the text ideas and helped her with comprehending the entire text. In addition to making connections, students stressed the importance of the "Keep Reading" strategy they had learned. The "Keep Reading" monitoring strategy taught them that they should keep reading even if words were difficult or not

glossed. Most of the time the following sentence or statement provided a hint or explanation regarding the word or phrase. This strategy minimized their use of Google dictionary on their phones to look up translations for every word they did not know.

A participant said:

*“I like the connection between paragraphs strategies. It helps me to keep focused and not forget the previous ideas and helps me think about how to connect ideas.”*

Another participant said:

*“All strategies helped me a lot. prediction, want to know, keep reading, summaries, but keep reading teach me to avoid using dictionary all the time.”*

Participants then stated that they found the reading comprehension part the most difficult in exams and had problems with it. They agreed that the continuous practice of before, during, and after reading strategies (planning, monitoring, evaluation) via the e-book learning environment would prove useful. Such sessions, spanning a full semester, would help them improve the application of these reading strategies for future academic reading, as well as midterm and final exams. Lastly, they commented that learning the reading strategies was more engaging through the e-book learning environment. The multimedia features of videos, glossing, illustrations, and discussion board provided them with a fun, motivating and interactive educational environment. They believe that learning the strategies and applying them, especially through collaboration and discussion, keeps them engaged and motivated to read, discuss and respond more to their classmates.

A participant said:

*“The teacher assigns questions from the book and I start looking for answers. So when it comes to the exam I do not have reading strategies to use. I do the same way and look for answer, so my grade is always low and reading part is the difficult section in exams.”*

**Table 20.** Summary of Findings: Benefits of Reading Strategies to Understand the E-book Text.

Most Helpful Reading Strategies Within the E-book Environment	How it Helped in Understanding the Text
Before-reading strategies: Making predictions via videos or illustrations	<ul style="list-style-type: none"> <li>• Activate prior knowledge</li> <li>• Generate initial and general ideas about the topic</li> <li>• Share experiences and stories about the topic via discussion board</li> </ul>
During-reading strategies: Keep reading or making connections between paragraphs	<ul style="list-style-type: none"> <li>• Continue to read even if student does not understand helps to focus on important ideas about text</li> <li>• Help understand the main ideas of each paragraph and the text as a whole</li> <li>• Promote connection of new and previous ideas</li> <li>• Help keep track of what student has read</li> </ul>
After-reading strategies: Summarize or state opinions	<ul style="list-style-type: none"> <li>• Review the text’s main ideas</li> <li>• Generating similar or different individual perspectives on the text aid deeper comprehension of the text</li> </ul>
Keep practicing strategies through e-book multiple sessions	<ul style="list-style-type: none"> <li>• Help in applying these strategies for future academic reading and exams</li> </ul>

*Theme 2: Collaboration and discussion board features within the interactive e-book environment.* Participants agreed that the collaboration and the discussion board were the most helpful features in the interactive e-book. They provided positive feedback and justification of their preference for the collaboration and discussion board within the e-book learning environment. They highlighted that the guided questions in each discussion board helped them focus on the main idea and the text’s details which supported their understanding of the text. The guided discussion

questions were focused on the text and encouraged them to think more critically about the text's details. Participants revealed that in their traditional book and classroom teaching methods, the discussion questions were more general and neither enhanced their comprehension of the text nor developed their application of the reading strategies. The combination of collaboration and the discussion board feature with the guided questions were helpful in increasing their reading comprehension level compared to lecture teaching of the reading strategies or a general discussion about the text.

A participant said:

*“I like how the discussion questions organized my ideas and helped me understand each part of the text not just general ideas. With the traditional book general questions when it comes to the text, I got surprised that I understand only 10 percent of the text.”*

Participants found that collaboration in the discussion board provided them with more opportunities to understand the text's main point and detailed ideas. The collaboration and discussion feature allowed participants sufficient time to understand the text as each of them could read the text at their own pace and write down their own perspective. They could ask questions, receive clarification from their peers about confusing ideas, and read their peers' differing views about each paragraph. Participants explained that the advantages of reading their peers' discussion is that peers usually use simple English words that met their English language level. Peers' simple English language words helped them understand what they missed while reading paragraphs due to difficult vocabulary, grammar or text's content ideas. Peers' simple language encouraged them to write their own thoughts using simple vocabulary without being shy, worrying about making mistakes, or being graded.

A participant said:

*“We share ideas and read our friends’ ideas, which helped me understand the text better. Especially when I get confused with a certain paragraph, my friend explained it in easy words and helped me understand and encourage me to say my own ideas in a different way.”*

Multiple EFL participants explained that students need to take the discussion board seriously and try their best to take advantage of the discussion questions and collaboration to improve their reading comprehension. Students must try their best to answer the guided questions, read their peers’ responses, and respond to their classmates. Otherwise, they will not be able to increase their reading comprehension level as expected.

A participant said:

*“There is a problem with few students who are not taking the discussion board seriously. If they take it seriously it would be great, and every single student will come with an idea which enrich the students understanding of the text.”*

**Table 21.** Summary of Findings: How the Collaboration and the Discussion Board Helped EFL Language Learners Understand the Text.

<b>Collaboration and Discussion Board</b>	<b>How it Helped in Understanding the Text</b>
Guided discussion questions	<ul style="list-style-type: none"><li>• Focus on the text not just general questions</li><li>• Help students think about the text’s main idea and details</li><li>• Encourage them to think more about the text content</li></ul>
Understanding the text’s main ideas	<ul style="list-style-type: none"><li>• Sufficient amount of time to read and understand the text</li><li>• Asking questions</li><li>• Getting clarifications</li><li>• Responding to their peers</li><li>• Peers’ simple language</li><li>• Not worrying about being corrected</li></ul>
Recommendation regarding participation in the discussion board	<ul style="list-style-type: none"><li>• Taking the discussion board seriously</li><li>• Taking advantage of the discussion by reading peer responses and replying to them</li></ul>



*Theme 3: Categorizing the most helpful features (video, glossing, illustrations, or discussion board) within the e-book environment to improve EFL learners' reading comprehension.* Participants categorized the multimedia e-book's features based on their preference for the most helpful features in improving their reading comprehension. Most of them agreed that the most helpful multimedia feature in developing their reading comprehension is collaboration and the discussion board, followed by videos, glossing and the illustrations. Participants provided justifications for categorizing their preference and priorities for the interactive e-book's features. All the participants rated the collaboration and discussion board as the most helpful feature in improving their reading comprehension. They found that the discussion board provided them with ample opportunities to practice applying each reading strategy. Interacting with their classmates was a great educational method to help them understand the text. For example, participants stated that they applied the planning strategies by brainstorming, activating their prior knowledge, and writing all their ideas in the discussion board. They clarified that each one of their classmates explained their ideas about the text, which further helped other students in explaining their own thoughts about the text and clarifying confusing ideas.

A participant said:

*"Discussion board and collaboration is the most helpful feature. The chat helped me understand because I am applying the strategies and whatever I learned from each paragraph by presenting my own ideas and reading my friends' ideas."*

They stated that collaboration and discussion improved their vocabulary and broadened their knowledge about the text content, hence, developing their reading comprehension. For example, if they became confused with the meaning of certain words or an idea, they had the opportunity to ask their classmates or read peer responses to clarify their confusion about the text.

Participants indicated that collaboration and the discussion board encouraged them to express their own ideas using simple words without being shy or anxious about language errors. They further clarified that oral responses for reading skills during traditional classes require more time to think and respond in English. Conversely, on the online discussion board they have sufficient time to read/reread the text and their classmates' responses, while encouraging encourage them to write their own responses without being worried about using the wrong words.

A participant said:

*“I like that all of us are participating in discussing each paragraph. Each one of us is saying her own explanation so I read many answers that open my mind for further comprehension.”*

Participants rated the video feature as the second most helpful feature in developing their reading comprehension. They indicated that the videos were a visual learning method that helped them in building general ideas about the text and understanding new vocabulary before being exposed to the actual text. When it came to the actual reading, they already had an idea about the text topic and any new words. For example, a student explained that in one of the sessions the text was titled, “The Problem with Witnesses”, and the session’s video showed a scenario of being a witness. This video helped her understand what the word “witness” meant before being exposed to the actual text. Other students explained that videos helped make reading comprehension more engaging, motivating and interactive, especially if it contained a story or a thrilling scenario. Some participants rationalized that they were visual learners and watching a video as an interactive feature in the e-book was more helpful in accelerating their text comprehension than just reading a text from a traditional book. Such students preferred learning visually using videos or illustrations rather than just reading a static book.

A participant said:

*“Videos helped me get an idea about what the topic is and learned the meaning of some new vocabularies like the word ‘Declutter’ before reading the text.”*

Another Participant said:

*“Videos helped me understand the background of the topic, so it makes it easy later when I read the actual text to understand new information.”*

A participant mentioned:

*“I am a kind of visual person and videos make me understand what the text generally is about especially when it is engaging through a story or scenario. It is motivating and improving comprehension.”*

Participants rated the glossing feature as the third most helpful interactive feature in enhancing their comprehension followed by illustrations. They stated that glossing is an important feature for them as foreign language learners. They always feel that when they read the traditional book, they need to translate words using Google translator from their phones in order to better understand the text. They keep translating each word, wasting time and losing track of their reading comprehension. With the glossing feature they just clicked on the difficult words and the translation was readily available. They thought glossing saved time and helped them feel relaxed while reading as translations were available whenever they needed them.

Concerning the illustrations feature, participants rated using illustrations as the least helpful multimedia feature in improving their comprehension. They viewed illustrations as a visual and colorful aid for the reading content. They explained that illustrations might provide them with a hint about the title or the paragraph content. One participant noted an example where a picture of strict parents was used. This gave her a hint that the paragraph will be about strict parents or how they deal with their kids. The picture allowed her to create an expectation about what she was going to read. Participants agreed that illustrations can be helpful in reading, but they have to be

combined with other more important features such as the reading strategies, collaboration, and the discussion board.

A participant said:

*“I love the glossing feature. For me I cannot live without translation and using google translator but glossing saved my time from searching and helped me understand the difficult vocabularies.”*

Another participant commented:

*“illustrations helped me understand the paragraph’s general ideas or theme like seeing strict parents.”*

**Table 22.** Summary of Findings: How Different E-book Features Helped EFL Learners Understand the Text.

Helpful Features in the Discussion Board and Collaboration	How it Helped in Understanding the Text
Discussion board and collaboration	<ul style="list-style-type: none"> <li>• Opportunity to practice reading strategies</li> <li>• Understanding the text by asking peers questions and getting clarifications</li> <li>• Reading peers’ responses in simple words</li> <li>• Encourage students to share their thoughts</li> <li>• Improve vocabulary knowledge</li> <li>• Sufficient time to read and discuss</li> <li>• Less stressful than oral responses</li> </ul>
Videos	<ul style="list-style-type: none"> <li>• Build general understanding of the text</li> <li>• Clarify some new vocabulary words to increase reading comprehension level</li> <li>• Better feature for visual learners compared to traditional reading materials</li> </ul>
Glossing	<ul style="list-style-type: none"> <li>• Saves time by not having to look up translations</li> <li>• Stay focused on reading instead of having to look up translations</li> </ul>
Illustrations	<ul style="list-style-type: none"> <li>• Assist in understanding a paragraph’s general theme</li> </ul>

*Theme 4: Advantages of e-book learning environment compared to traditional face-to-face classroom.* Participants enjoyed and recommended the multimedia e-book environment to teach reading skills in Saudi Arabia instead of the traditional lecture style classroom. They explained that the e-book environment was more helpful in improving their reading comprehension skills than the traditional face-to-face lecturing. In the traditional classroom students might learn the reading strategies but do not have sufficient time and opportunities to practice them. The traditional classroom requires more time for teaching and not enough time for students to practice application of reading strategies. Participants clarified that reading comprehension is a difficult skill and without opportunities to practice these reading strategies, their future application of these strategies and their comprehension level will not improve. The integration of metacognitive strategies within the e-book learning environment helped students learn the reading strategies and provided opportunities to apply them. The strategies were presented in guided questions format within the discussion board; each student had the opportunity to practice these strategies by writing a response on the discussion board. The e-book environment with its multimedia features (video, glossing, and illustrations), especially the collaboration and discussion board features, exposed students to multiple practice and application opportunities during the reading sessions. Participants explained that the long-term practice of these reading strategies within the e-book will support future application of the strategies and improve reading comprehension in exams and academic reading.

A participant said:

*“I like that I read each paragraph and then think about the main idea of each paragraph. In the traditional classroom we usually have general questions and then we go to the reading text and then look for just the answers of these questions and ignore the rest of the text. Mostly the questions are general not related to the text, so we answer without understanding the passage or helped me with future application.”*

Another participant mentioned that:

*“I prefer the e-book because it enriched my reading comprehension skills by giving me extra chances to focus in reading each paragraph, utilizing strategies to help me understand, each student participate and present my ideas.”*

Students explained that in the traditional classroom the teacher reads the text, or assigns one student to read the text, after which the instructor asks general questions about the text. Sometimes these general questions are not directly related to the text; therefore, it captures the broader aspects of the topic but does not discuss the text’s content details. As a result, students end their reading session without a comprehensive understanding of the reading text. Participants rarely have the opportunity to participate in regular reading classrooms. Students noted that if they lost track in reading and comprehension of the text, they hesitated to ask questions and ended up having difficulty with text comprehension. Additionally, due to the size and allotted time of the class, students do not have the opportunity to speak unless the teacher calls on them. Most of the time, the teacher reads the text and calls on students to answer questions. Mostly, one or two out of 40 students participate in answering the reading questions while the rest of the class remains silent. Even when the class is divided into smaller groups usually only a couple of students get to participate. During regular classes students also felt reluctant to explain their point of view in English. Sometimes it was difficult for them to respond orally in front of their teacher and classmates using the right vocabulary and grammar.

A participant said:

*“Online group discussion is better than class groups. Mostly two participate and the rest take a break. During the e-book session, I have to write my answer, so I have to say my idea too. I have to try. Everything is documented and saved. In regular classroom, group discussion is too noisy I can’t focus and sometimes it is difficult to understand the text. Online it is more focused and interactive environment.”*

Within the e-book learning environment, the text was divided into paragraphs with guided reading questions posted in the discussion board for each paragraph. Every student had the opportunity to read each paragraph and participate in answering the discussion questions about each paragraph. Participants detailed that within the e-book environment each student can explain their point of view, read their classmates' responses, and ask questions in the discussion board. They found that collaboration within the discussion board in the e-book increased their comprehension of the text and kept the whole class engaged during the reading class. It also provided them with opportunities to have sufficient time to think about the content and write at their own pace without worrying about errors. Peer collaborative responses encouraged participants to use simple English without being reluctant to write in a foreign language. They described the e-book environment as a fun online learning environment for reading skills that meets their current technological lifestyle. In their daily lives, most students communicate with their friends via text, online applications (e.g. WhatsApp), or social media (e.g. Instagram, Snapchat) as opposed to having face-to-face interactions. They are used to the internet and technology applications such as online videos, online dictionaries and online reading being a part of their everyday lives. They found the e-book online reading with its multimedia features of discussion board, videos, glossing and illustrations more engaging, motivating, and helpful in improving their reading comprehension than traditional classroom environments.

A participant said:

*“Discussing Online is amazing because I am using the online chatting daily with smart phones especially what app. So, the idea of discussing academic materials in a type of chatting is up to date way that met us ‘technology generation’. I like the idea that I read my classmate’s discussion as if I am checking Instagram’s and WhatsApp’s comments, so I read and comment on whatever they are saying which helped me understand the text better.”*

Concerning participants' perceptions toward teaching future reading sessions through e-book environment or traditional face-to-face classrooms, students responded differently in the questionnaire. Of the 13 participants, 12 preferred being taught the reading skills with metacognitive strategies through the e-book learning environment. Participants recognized they have more opportunities to understand the text through the e-book environment because it allows them to practice the reading strategies. Students can readily participate via the discussion board by presenting their thoughts on each paragraph and utilizing the available multimedia features (videos, glossing and illustrations) for better reading comprehension. Other students commented that if the internet is fast and the lab is always available, teaching reading comprehension skills online would be more effective for students' learning and engagement. One student commented that she preferred being exposed to both the traditional face-to-face classroom and the multimedia e-book environment. She would like the e-book to be used three times a week and the traditional lecturing method twice a week. Her justification was that she likes variations in teaching methods. She would become bored if only the traditional lecture or the online e-book environment was to be used.

A participant said:

*"I prefer the reading sessions to be daily through the interactive e-book because in regular classroom we stayed for three hours in the class and the teacher keeps lecturing about the reading text. It is boring, and we feel tired from being receptive. Here it is kind of a change and keep us interactive and engaged and each student has a chance to say something. It's a break for us from teachers' lecturing method."*

Another participant commented:

*"I am a type of person who likes changing, so I prefer to get the reading session through regular classroom and sometime in lab using the e-book environment. I get bored if the teaching method followed one rhythm."*



**Table 23.** Summary of Findings: The Differences Between E-book Learning Environment and Traditional Face-to-Face Learning Environment.

Traditional Face-to-Face Environment	E-book Learning Environment
<ul style="list-style-type: none"> <li>• Teacher lectures of the reading strategies</li> <li>• No sufficient opportunities for students to apply and learn these strategies</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher might provide short lecture for the reading strategies</li> <li>• Each student has ample opportunities to apply reading strategies</li> <li>• Interactive features (video, illustrations, glossing) combined with collaboration and discussion board develop reading comprehension</li> <li>• Higher chances for applying the strategies in the future</li> </ul>
<ul style="list-style-type: none"> <li>• Teacher reads the text or assigns a student to read</li> <li>• Teacher asks general questions that do not improve students' comprehension of the text</li> <li>• Teacher picks 1 or 2 students to answer questions, 1 or 2 students out of 40 participate while the rest of the class remain silent</li> </ul>	<ul style="list-style-type: none"> <li>• All students have to read the text silently and focus</li> <li>• All the guided questions in the e-book focus on the text and follow strategic reading</li> <li>• Each student has to participate and respond in the discussion board and develop their reading comprehension of the text</li> </ul>
<ul style="list-style-type: none"> <li>• Students are reluctant to present their point of view in English</li> <li>• Worried about responding orally and choosing the wrong vocabulary or grammar</li> </ul>	<ul style="list-style-type: none"> <li>• Students encouraged to write down responses using simple English language because all their classmates are participating (not shy)</li> <li>• Not worried about being corrected</li> </ul>

**Table 23.** Continued

<b>Traditional Face-to-Face Environment</b>	<b>E-book Learning Environment</b>
<ul style="list-style-type: none"><li>• Traditional grouping in a regular classroom is not engaging because mostly 2 students participate while others just listen</li></ul>	<ul style="list-style-type: none"><li>• All students get to participate</li><li>• Meets the technology generation's current communication style preferences</li><li>• Students prefer online chatting due to social media use (e.g., WhatsApp, Snap chat)</li><li>• Students are more engaged by watching online videos, using online dictionaries and reading online</li><li>• Combination of the interactive features aid in developing reading comprehension</li></ul>
<ul style="list-style-type: none"><li>• One participant preferred learning reading comprehension skill twice a week through traditional lecturing and three times a week through e-book learning</li></ul>	<ul style="list-style-type: none"><li>• 12 participants preferred the e-book learning environment due to multiple opportunities to practice the reading strategies via different interactive features (glossing, videos, discussion board, illustrations)</li></ul>

### **Discussion: RQ 3**

The quantitative and qualitative results illustrate how Saudi EFL learners perceive the effectiveness of the e-book learning environment on their overall reading comprehension. According to the questionnaire responses and interviews, the most important themes highlighted by EFL participants about the effectiveness of the multimedia e-book dialogic environment are: (1) e-book as a reading environment, (2) MS-based discussion and reading comprehension, (3) effectiveness of the e-book multimedia features for reading comprehension, and (4) comparison of the e-book learning environment and the traditional face-to-face classroom as a reading environment.

The current study's findings confirm Bickel's (2017) claim that an interactive e-book environment increases students' level of engagement and motivation for reading compared to printed books. It also confirms Sung and Tings' (2017) results that the e-book reading system

enhanced EFL learners' motivation for reading comprehension in English. Saudi participants in the current study found the e-book environment motivating, engaging, and fun, similar to their everyday online activities and social media life. Compared to the traditional classroom setting, students found the e-book to be a superior learning environment to practice and improve their reading comprehension. In the current study, students were motivated and excited to increase their reading comprehension not only due to the engaging technology, but also because the e-book satisfied their learning needs by providing ample opportunities to practice what they had learned. The multimedia features within the e-book (videos, glossing, illustrations, discussion board) break the formal lecture routines of teaching the reading skill and help participants understand the text. Most Saudi universities are technologically well-equipped, however, Saudi EFL instructors mostly use computer labs for oral and listening skills as opposed to reading and comprehension skills. Chapelle's (2001) human learning approach is highlighted here as learning the MS is a matter of practice. Participants clarified their need for more practice during the formal lecture time and noted how the e-book environment provided them opportunities to learn and practice the MS through discussion to improve their comprehension levels.

Participants had positive perceptions about the online collaboration and the discussion board on their reading performance. First, it improved their reading comprehension. The current study confirms Huang's (2013) findings that the discussion and collaborative learning was the most preferred feature within the e-book and helped EFL learners with reading comprehension, engagement and motivation. The current findings also confirm Smith's (2003) study that negotiation and discussion within a computer-based communication could enhance students' comprehension. The written format of discussions keeps students focused on their tasks and increase their noticing ability. In another recent study, Chou's (2015) results showed that the

collaborative discussion activity is what helped EFL students improve their reading comprehension by providing opportunities to ask questions and clarify any confusion. Secondly, participants in the current study explained that they prefer collaboration and online discussion boards within an e-book environment because they can write their answers and share ideas without focusing on grammar or having correct answers. These findings coincide with Kern's (1995) claim that chat discussion supports better interaction than face-to-face classrooms. It also verifies Blake's (2002) results that text-based discussion reduces learners' isolation and encourages them to use the language and share their ideas. Accordingly, the Lower Affective Filter hypothesis (Krashen, 1982) as a theoretical framework of the current study is supported here. The complex emotional factors that EFL learners might face while processing comprehension of reading texts was reduced because students were not worried about being corrected by instructors or peers. The previous discussion concerning collaboration and online discussion aligned with the interactionist theory and Chapelle's (2009) psycholinguistic perspective and language development. Participants were able to comprehend the text in English through interaction with their peers and the technology tools. Participants' interaction with their peers helped them negotiate, clarify meanings and ask questions for better comprehension. They also interacted with the computer and the web-based e-book, by utilizing the available multimedia features (discussion board, videos, illustrations and glossing) to facilitate their understanding of the text content.

In addition to the positive impact of the e-book collaboration and discussion board feature in the current study, participants showed positive perceptions of other multimedia e-book features (videos, glossing and illustrations) in improving their overall reading comprehension. It confirms previous researchers' positive results of how multimedia e-book features enhance reading comprehensions (Park, & Kim, 2011; Proctor, Dalton, & Grisham, 2007) and contradicts other

researches' negative results (Juan & Madrid, 2009; Park & Kim, 2011; Proctor, Dalton, & Grisham, 2007; Tseng, 2010). Some researchers found that hypermedia and electronic aids for text reading, such as videos and illustrations, help struggling readers enhance their reading comprehension (Park & Kim, 2011; Proctor, Dalton, & Grisham, 2007). Other studies reveal negative influences of hypertext and online features on learners' reading comprehension (Tseng, 2010; Juan & Madrid, 2009). Tseng (2010) noticed that hypertext reading distracted students from their reading comprehension. Juan and Madrid (2009) concluded that hypertext reading has no influence on ESL learners' reading comprehension and does not promote their application of reading strategies. In the current study, participants provided positive perceptions of the influence of multimedia features on reading comprehension, as each multimedia feature (glossing, videos, or illustrations) targeted their learning needs.

The current study's results confirm other scholars' (Bikowski & Casal, 2018) statement about the positive influences of addressing language learners' needs and learning objectives through an e-book environment. The current study considered EFL learners' language needs in the design of the e-book, multimedia features, and pedagogical method of teaching the reading comprehension. First, an online web-based design that provides language learners with an effective reading environment was chosen. The design resembles a shelf with different books on it, as shown in Appendix F. Participants found the design appealing and acknowledged that it provided them with a welcoming reading atmosphere. The findings confirm Huang, Liang, Su, and Chen (2012) study's qualitative results that participants found the e-book environment more appealing than the printed book. Second, all the multimedia content features targeted language learners' reading comprehension. For example, the researcher chose videos that matched EFL learners' language level and related them to the text's main ideas and themes. Participants found the videos helpful

in supporting their comprehension of the text content, details, and vocabulary. This confirms other researchers' findings about the influence of multimedia aids, such as videos and illustrations, on improving students reading comprehension (Park & Kim, 2011; Proctor, Dalton, & Grisham, 2007). Third, vocabulary words or glossing were carefully chosen from the text after considering EFL students' language level and needs. The chosen vocabulary words for glossing were approved by EFL language learners and subject-matter experts from the United States and Saudi Arabia. Study participants found glossing to be a helpful feature for reading comprehension. Other studies have confirmed that glossing helps language learners with their reading comprehension (Al Seghayer, 2001; Laufer & Hill, 2000; Lomicka, 1997; Yanguas, 2009). These multimedia features (videos and illustrations) supported the Cognitive information processing theory, utilized as a framework of the current study, as they helped participants connect between their prior knowledge and new information, enabling them to better understand the text.

Concerning students' preferences of the e-book dialogic environment over face-to-face classes, Saudi EFL participants explained their positive perceptions about the method of teaching reading comprehension through online strategy-based discussion and collaborative learning. The current study' findings confirm that in most EFL contexts the prevalent pedagogical methods of teaching reading skills and strategies need attention. Reading classrooms in Saudi Arabia are described by Al-Nujaidi (2003) and Al-samadani (2009) as being focused on the traditional comprehension structures, testing model, and vocabulary learning, which do not provide improvement opportunities in reading comprehension. Pei's (2014) study findings also showed that teaching English reading in China is mainly based on a comprehension-testing model and students are unable to take advantage of the reading strategies or recognize the purpose of learning such strategies. The current study contributed to the literature by proposing a pedagogical method

of learning MS through practice and collaborative guided discussions that trigger students to use MS within the e-book environment. The instructor role is to teach and model the strategies for students at the beginning of the treatment. However, one of the main goals of this study is to encourage EFL students to learn the reading strategies through increased practice. The current study provides each EFL learner with opportunities to apply MS by responding to guided discussion questions, asking questions, getting clarification from peers, and replying to peers' responses through online e-book sessions. The achieved expected outcome of this study was to improve EFL learners' utilization of the reading strategies and comprehension.

### **Chapter Summary**

This chapter discussed the findings of the current study's research questions. A mixed-methods design was used to collect and analyze the data. Research questions 1 and 2 were analyzed quantitatively, while research question 3 was analyzed quantitatively and qualitatively to provide more robustness to the current study results. Research question 1 focuses on the impact of metacognitive reading strategy-based discussion and collaborative learning on English language learners' application of the reading strategies within a multimedia e-book dialogic environment. The researcher investigated whether the treatment supports EFL learners to utilize more reading strategies or not. The questionnaire findings show statistically significant results and a positive change in the mean score of student utilizations of strategies.

Research question 2 inquires whether or not metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL impact EFL learners' reading comprehension. The findings show statistically significant results for both main effects (MS and Group structures). A positive mean difference in reading comprehension scores was noted for participants who used the metacognitive strategy-based discussion compared to students who were

not exposed to the use of MS. The collaborative groups showed higher average mean scores on their reading comprehension compared to the individual groups. Participants who were exposed to the combined use of MS-based discussion and collaborative learning achieved the highest average mean score on their reading comprehension. However, there was no interaction effect between the metacognitive strategy-based discussion and collaborative learning. This indicates that the relationship between MS and CL is additive and more research is needed to prove the efficacy of teaching MS with CL.

Research question 3 investigates how EFL learners perceive the effectiveness of the e-book environment to improve their overall reading comprehension performance. This research question was examined using both a quantitative and qualitative approaches. The quantitative part analyzes the Likert scale questionnaire and presents EFL learners' perception about the e-book environment for reading performance. The qualitative part includes results from the open-ended questionnaire and interviews. The results demonstrate that participants found the e-book dialogic environment with its multimedia features, metacognitive strategy-based discussion and collaborative learning effective in improving their reading comprehension. According to the participants, the discussion board and collaborative learning was the most effective feature for reading comprehension, followed by videos, glossing, and illustrations. Differences between the traditional face-to-face classroom and the e-book learning environment were discussed to reveal which environment students prefer. This chapter described the findings and provided discussion of the results. The next chapter presents the conclusion of the study, pedagogical implications, and suggestions for further research along with the limitations of the current study.



## **Chapter 5: Conclusion**

Many EFL students continue to struggle with problems related to reading comprehension. They often get distracted with details in text and end up reading the entire text without retaining the main ideas. The current study tends to provide EFL learners with a pedagogical method of learning the metacognitive strategies (MS) through guided discussion and collaborative learning (CL) within a multimedia e-book environment. Learning the reading strategies through discussion and collaborative learning with assisted educational multimedia features within a dialogic environment could improve learners' utilization of the strategies and their ability to comprehend the text. This chapter presents: (1) limitations of the study, (2) detailed recommendations for EFL instructors and students on teaching and practicing the metacognitive strategy-based discussion (MS) and collaborative learning (CL) within multimedia e-book dialogic environments and technology-based instruction, (3) future research recommendations and concluding remarks of the study.

### **Limitations of the Study**

The current study has a number of limitations that are described below. To begin with, the number of participants was sufficient to conduct the present study, however, having a larger sample size from different Saudi universities would provide more robust results and details about the impact of the combined use of MS and CL on reading comprehension. Regarding the external validity, since the study was conducted using female participants in a Saudi university, the results cannot be generalized to include all female or male Saudi learners until similar studies are

conducted in different contexts and sufficient empirical evidence is collected. Since the students were intermediate speakers of English at the collegiate level, it is important not to generalize the results to include different levels of education and English proficiency. Another study limitation is the quantitative data collection instruments. The Survey of Reading Strategies (SORS) has limitations since it is restricted to participants' self-reporting. Self-reporting may not be an accurate presentation of students' actual use of the reading strategies. Students may report utilizing certain strategies based on their opinion about the strategy use, even if they did not personally apply those strategies. According to Mokhtari and Reichard (2002) awareness of the strategy does not guarantee students' implementation of the strategies. Comprehension tests and the e-book learning experience survey are also sources of measurements, but they do not guarantee the effectiveness of learning the MS through discussion and collaborative learning to improve EFL learners' reading comprehension within a multimedia e-book learning environment.

There were also limitations for the qualitative research design. The qualitative data collections were limited to one individually structured interview and an open-ended questionnaire. It is more advantageous to have multiple data collections for qualitative studies to support evidence. According to the current study, collaboration benefits students' comprehension; however, such collaborative learning is not without limitations. One limitation is that students are randomly divided into groups, without consideration of differing personalities or pre-existing negative relationships. Another limitation of the collaboration activity is that EFL instructors have to constantly monitor EFL students during the e-book session. They must remind students about the importance of online discussion participation to increase utilization of the strategies and improve reading comprehension. Without monitoring, EFL students might act irresponsibly and take the discussion lightly. Hence, the expectations of improving EFL learners' utilization of the

strategies and reading comprehension will be lower. Lastly, there are limitations to using technology in language instruction. If universities do not offer EFL labs with up to date computers, projectors, and high-speed internet for EFL instructors and students, it will be difficult to utilize multimedia e-books or other technology-based instructional environments.

### **Pedagogical Implications**

The present study offers a number of implications for teaching metacognitive reading strategies (MS) through discussion and collaborative learning (CL) to improve EFL learners' utilization of reading strategies and comprehension. It provides future researchers and EFL educators insight on creative methods of teaching metacognitive reading strategies through discussion and collaborative learning by employing interactive teaching techniques, hands-on experience, instructional technology and learner-centered approach to enhance EFL learners' reading comprehension. As shown in Chapter 4, the findings indicate that teaching metacognitive strategy-based discussion and collaborative learning within a dialogic e-book environment improves EFL learners' application of metacognitive strategies and reading comprehension. The qualitative results also confirm EFL learners' satisfaction, motivation and engagement with the e-book learning environment to improve their MS application and reading comprehension. The fieldwork and result analysis of the current study reveal important implications and recommendations for EFL instructors to achieve successful teaching method and for EFL learners to accomplish learning goals.

Prior to exposing EFL students to MS technology-based instruction, including the multimedia e-book environment, EFL instructors should first consider teaching and modeling MS during a formal classroom session. Instructors should consider utilizing part of the lecture-style class to model the strategies while the remaining time can be used to engage students in an e-book

session to improve their comprehension. After teaching and modeling the reading strategies and making sure students understand the process, the instructor should encourage students to practice applying the strategies via technology such as the multimedia e-book environment. For modeling and practicing purposes during the lecture class, instructors can use an animated video that describes the strategy of planning or monitoring. Then, they can ask students to apply what they have learned from the video to answer and discuss comprehension questions with their classmates during the e-book session. The model of gradual release of responsibility, introduced by Pearson and Gallagher (1983), proposes that instructors should provide support to students at the beginning of the teaching phase and steadily decrease their assistance as students gain confidence as independent readers. Learning the strategies through the e-book environment is a way of breaking the classroom routine, having some fun and motivating EFL students while practicing the reading strategies. EFL instructors must assist students in the initial online session before leaving them to work independently.

Additionally, it is recommended EFL instructors realize that students require time to internalize the metacognitive strategies and apply them successfully. The students' slow progress should not frustrate instructors. Instructors must support students and strive to increase their motivation during the learning process as students may find the strategies complicated or the time commitment laborious. Instructors need to clarify to students that practicing the reading strategies is crucial for improved reading comprehension. In the present study, participants learned metacognitive strategies by responded to MS-guided questions and interacting with peers on the online discussion board. The instructor encouraged participants to write their responses without worrying about grammatical errors or using correct vocabulary. EFL learner's concerns related to text comprehension can be managed by instructors advising students to avoid being stressed about

producing error-free academic writing by re-directing their focus back to text comprehension. Such encouragement will keep students motivated and focused on applying the strategies and improving their comprehension level.

Additionally, EFL instructors need to train students on using the multimedia e-book system for successfully learning the reading strategies and improving comprehension. EFL instructors need to provide students with detailed explanations about the goals of learning the MS through CL within a multimedia e-book environment and how they can achieve those goals for better reading comprehension. Students should be sufficiently trained on how to log into the e-book website, how to access the glossary and videos, and how to move from one discussion board to the other. Comprehensive training will allow students to take full advantage of practicing the reading strategies while interacting with their classmates. One of the main goals of reading instruction for all academic students is to develop their metacognitive awareness and become constructively responsive readers to monitor and overcome their reading comprehension problems. Instructors should also promote the idea that although the e-book is an educational reading environment, students need to enjoy the learning process with the available educational multimedia features. Videos, glossing, illustrations, and discussion boards are not only educational tools but can also be interactive features that enhance student motivation and learning experience.

There are various pedagogical implications that can be applied to improve EFL learners' reading comprehension through multimedia interactive e-book learning. EFL instructors can transform a reading session into a more interactive and practical lesson for EFL learners through a multimedia dialogic e-book environment. For the first three weeks, instructors can have students practice certain strategies, such as planning (activating student's background, prediction, etc.), via collaboration in the e-book dialogic system. For the next three weeks, instructors can focus on

teaching monitoring strategies (analyzing the text's main ideas, identifying connections between ideas, etc.) and evaluation strategies (summarizing, stating opinions, etc.) can be emphasized for the following three weeks. Finally, for the last three weeks, EFL instructors can simultaneously expose students to all the strategies they have learned. This will allow instructors better insight on how MS-based discussion and collaborative learning via dialogic e-book environments can help resolve EFL students' reading comprehension problems. Considering the implications for successful collaboration within the e-book environment, EFL instructors need to monitor the collaborative learning process to ensure all students are participating in each discussion board and are moving together from one discussion board to the next. To make sure all students are on the same page, instructors must also track how long students discuss questions and when they have to move on to the next discussion board question. It is recommended that EFL instructors use a projector to present the e-book web-pages to confirm that all students are on the same reading text and discussion board.

Apart from recommendations for instructors, students are also responsible for contributing to their learning experience. Students must make an effort to remain patient while learning the strategies, respond regularly to their peers and write discussion board responses as required to achieve better comprehension results. Students must participate on the discussion board and do their best to practice the reading strategies. If students do not take the discussion board seriously, the goal of learning how to successfully apply the reading strategies and improve their reading comprehension will not be achieved. They have to do their best in comprehending the text material by letting their ideas flow and by expressing their thoughts and opinions about the text in their own words. Integrating metacognitive strategies accordingly with technology implications will

gradually develop students' confidence in using reading strategies to tackle reading difficulties. This will ultimately contribute to their success in their respective academic and professional fields.

### **Future Research Recommendations**

This study revealed significant results regarding the use of metacognitive strategies (MS) and collaborative learning (CL) on students' application of MS and reading comprehension within a dialogic e-book environment. The qualitative portion confirmed that students were satisfied with the effectiveness of the multimedia e-book learning environment on their overall reading comprehension. Recommendations for future research and scholarship have been compiled based on the results and limitations of this study. These recommendations will aid future researchers and EFL instructors in the improvement of teaching and learning methods of English language reading strategies and comprehension through technology-based instruction and multimedia e-book dialogic environments. The recommendations are listed based on categories of gender, EFL learners, EFL instructors, and metacognitive strategy (MS) teaching methods.

The first category provides future research recommendations regarding the influence of gender differences and the varying pedagogical methods of teaching reading skills to male and/or female EFL learners. Since the current study only focused on female Saudi EFL learners, including both female and male students will broaden future research. The present study can be replicated on Saudi EFL learners, from different Saudi universities to confirm the significance of the study results or provide different evidence for future experiments. Future studies may explore the relationship between metacognitive strategies and collaborative learning on reading comprehension within an e-book dialogic environment on Saudi female and male EFL participants. The goal is to identify the influence of gender differences in learning reading strategies through chat-based discussion on student comprehension and application of the reading strategies.

Examining reading comprehension score results of female and male EFL learners, will provide EFL instructors with better insight regarding appropriate MS teaching method(s) for Saudi EFL learners, regardless of gender, to improve comprehension and utilization of metacognitive strategies. It may also be beneficial to conduct a qualitative study based on interviews and focus groups data collection to investigate the difference in perception between female and male Saudi EFL learners regarding learning MS and CL through online based discussion to improve comprehension and use of strategies within multimedia e-book learning environments. The qualitative data will provide EFL instructors with more details about what Saudi female and male EFL learners believe to be an effective and motivational teaching method for improved reading comprehension.

The second category includes future research recommendations on improving reading comprehension for EFL learners. A discourse analysis can be conducted on collaborative discussions for participants in advanced English language levels to further examine the influence of metacognitive strategy-based discussion and collaborative learning on EFL learners' use of reading strategies and comprehension within an e-book dialogic environment. Advanced language learners may provide more detailed discussion, compared to intermediate level learners, which would allow researchers to better examine the comprehension and utilization of strategies improvement. Furthermore, a qualitative inquiry with multiple data sources about EFL learners' perceptions of learning various metacognitive strategies through practice and collaborative learning will show more detailed results about EFL learners' improvement of reading comprehension and use of strategies. Multiple data sources such as observations, note taking, and weekly reflective journal entries can be used to collect more robust data. Additionally, there is a demand for further research to be conducted on EFL learners' motivation for and engagement with



metacognitive strategy-based discussion and collaborative learning as a learning method to improve their comprehension and utilization of reading strategies through a multimedia e-book dialogic environment.

Future research fieldwork may explore how metacognitive strategy-based discussion with more structured collaborative groups positively influence students' reading comprehension. In the current study, participants were randomly divided into groups of five using a generator program. Future researchers may group students according to personality type after conducting a standardized personality test survey. Students may also be grouped based on their reading level, where each group has students with differing reading abilities. This will increase opportunities for students to learn from each other. The current study's teaching method may also be applied to Saudi EFL learners using other technology tools, such as Ning, WebQuest, Edmodo, and Google Classroom, that incorporate discussion and collaborative learning features to examine the influence of technology-based instructional environments on learners' comprehension. Analysis of EFL learners' reading comprehension results with use of other technology tools may also be compared to learners' reading comprehension results within multimedia e-book learning environments to verify the effectiveness of e-book reading systems on EFL learners' overall reading performance.

The third category suggests future pedagogical recommendations for EFL instructors. To examine the effectiveness of learning MS and CL within a multimedia e-book environment compared to face-to face classroom, a qualitative research may be conducted on novice EFL instructors. Novice instructors usually require special consideration and training on utilizing new pedagogical methods for teaching reading skills. A study may be designed to train novice EFL instructors how to teach metacognitive strategy-based discussion through technology tools to

examine novice instructor's perception of how this pedagogical method supports them in the reading classroom and benefits EFL learners' reading comprehension. Furthermore, a qualitative study may be conducted with experienced EFL instructors to examine the advantages and disadvantages of learning MS and CL in different learning settings (e-book vs. face-to-face classroom) by collect multiple qualitative data sources such as open-ended questionnaires, semi-structured interviews, focus groups, note taking, reflective journals entries and observations.

The last category of future recommended research is about teaching metacognitive strategies to increase EFL learners' comprehension level and use of metacognitive strategies. Departing from the current study, future studies may use a different set of metacognitive strategy (MS) questions with collaborative learning (CL). The influence of these differing MS structured questions with collaborative learning discussion can be measured and analyzed to investigate the effectiveness of learning and applying other types of metacognitive strategies on EFL learners' reading comprehension. Conducting such studies on Saudi EFL learners will provide more robust results about the influence of metacognitive strategies on reading comprehension. Moreover, future researchers may wish to expose EFL learners to each metacognitive strategy stage (Planning, Monitoring, Evaluation) separately for three weeks within the e-book environment for further practice. Consequently, students will have sufficient time and opportunity to learn and practice each MS stage (Planning, Monitoring, Evaluation) which may improve student reading comprehension and utilization of MS. Conclusively, the MS and CL teaching method in the current study may be replicated over a longer time frame. Future studies may could examine teaching MS-based discussion with CL for one full semester (12 weeks) within a dialogic e-book environment. Extending the instructional time may reveal different results about the relationship between MS and CL on EFL students' reading comprehension.

## **Conclusion**

The current study investigates the influence of integrating metacognitive strategy-based discussion and collaborative learning within a multimedia e-book learning environment to improve EFL learners' reading comprehension and utilization of reading strategies. To achieve this goal, different factors were examined throughout the course of the study. Firstly, it was examined how Saudi EFL students' utilization of reading strategies improved after exposure to the treatment. Secondly, metacognitive strategy-based discussion (MS), collaborative learning (CL), and the combined use of MS and CL as a teaching method was examined to assess improvement of Saudi EFL learners' reading comprehension. Lastly, EFL learners' perception regarding the effectiveness of e-book environments and its multimedia features on their overall reading comprehension was evaluated.

The present study will contribute to the existing literature in the field of second language acquisition and instructional technology. A review of literature shows there are no studies with structured MS questions for discussion and collaborative learning that combine the planning, monitoring, and evaluation strategies for EFL learners. There is also a gap in existing literature regarding how MS are utilized and taught for EFL instructors' implication and researchers' replication. A contribution of this study includes proposing a pedagogical method of teaching MS through structured discussion questions and collaborative learning to improve EFL learners' utilization of the metacognitive strategies and their reading comprehension. Additionally, the present study explicitly showed the MS questions used for each stage (planning, mentoring, evaluation) and how EFL instructors can utilize them within the text. Teaching the MS-based discussion and collaborative learning within a multimedia e-book environment is yet another contribution of this study. Literature review has shown that existing e-book designs focus on the

influence of multimedia features (e.g. videos, glossing, annotations etc.) on reading comprehension but lack the appropriate design and method for teaching ESL/EFL learners. The e-book design in the current study addressed English language learners' needs by integrating the learning of metacognitive strategies and collaborative learning as features within the e-book to improve EFL learners' comprehension and utilization of reading strategies. Even the multimedia e-book features utilized in the present study (videos, glossing, illustrations and discussion boards) were carefully considered and chosen to better support reading comprehension and English language learners' needs.

Participants in the current study achieved positive results for the study's various goals. Saudi EFL students obtained better results in their usage of the reading strategies after being exposed to the study treatment. There was a significant impact of the individual use of metacognitive strategy-based discussion and collaborative learning on EFL learner's reading comprehension. There were also positive results of practicing the MS-based discussion in combination with collaborative learning for improving students' English language reading comprehension level. The qualitative results verified student engagement and motivation in using the e-book environment during their reading classroom time. Students' responses expressed satisfaction with the effectiveness of multimedia e-book dialogic environments on their overall reading performance. The e-book provided students with opportunities to learn and practice the strategies, decipher text details, and improve their reading comprehension. Furthermore, these results revealed that students prefer being exposed to MS-based discussion and collaborative learning through the multimedia e-book rather than face-to-face traditional classroom.

It is feasible to have EFL learners utilize different reading strategies, including the ones that require more analysis and critical thinking, to enhance reading comprehension. If EFL

instructors recognize learners' reading weaknesses, set learning objectives based on learners' performance needs, develop appropriate instructional materials, and provide frequent practice opportunities, the likelihood of enhancing MS application and reading comprehension will increase greatly. Additionally, students of the technology generation like being interactive rather than receptive while learning. Thus, Instructors must focus on student engagement in the physical and/or virtual classroom when delivering teaching materials either through a technology-based or face-to-face lesson or classroom.

There are also other important determinations in language learning classrooms than just integrating technology into the learning environment. This study utilized the e-book as technology-based instruction and showed positive influences on EFL learners' overall reading performance and comprehension. However, the positive comprehension results and metacognitive strategy learning in this study were achieved due to the combination of educational material (MS-guided questions) and engagement features (discussion boards, videos, glossing, etc.) within the e-book. The e-book succeeded as a technology environment in this study and produced positive results for MS learning and reading comprehension. Learning MS in a technology-based environment through discussion and collaborative learning provides engagement opportunities to EFL learners for the entirety of the reading session and learning process. Engagement through reading strategies practice, peer interaction, and utilization of multimedia features within a technology environment are vital for improved reading comprehension achievement of EFL learners.

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## **Appendices**





## Appendix B: Survey of Reading Strategies (SORS)

### SURVEY OF READING STRATEGIES (SORS)

The purpose of this survey is to collect information about the various techniques you use when you read **academic materials in English** (e.g. reading textbooks for homework or examinations, Reading journal articles, etc.). All the items below refer to your reading of college-related academic materials (such as textbooks, not newspapers or magazines). Each statement is followed by five numbers, 1,2,3,4, and 5 and each number means the following:

- **1** means that “**I never or almost never** do this”
- **2** means that “I do this **only occasionally.**”
- **3** means that “**I sometimes** do this.” (about 50% of the time)
- **4** means that “I **usually** do this”
- **5** means that “I **always or almost always** do this”

After reading each statement, **circle the number** (1, 2,3,4, or 5) which applies to you. Note that there are **no right or wrong responses** to any of the items on this survey.

Category	Statement	Never	1	2	3	4	Always	5
GLOB	1. I have a purpose in mind when I read.	1	2	3	4	5		
SUP	2. I take notes while reading to help me understand what I read.	1	2	3	4	5		
GLOB	3. I think about what I know to help me understand what I read.	1	2	3	4	5		
GLOB	4. I take an overall view of the text to see what it is about before reading it.	1	2	3	4	5		
SUP	5. When text becomes difficult, I read aloud to help me understand what I read.	1	2	3	4	5		
GLOB	6. I think about whether the content of the text fits my reading purpose.	1	2	3	4	5		
PROB	7. I read slowly and carefully to make sure I understand what I am reading.	1	2	3	4	5		
GLOB	8. I review the text first by noting its characteristics like length and organization.	1	2	3	4	5		
PROB	9. I try to get back on track when I lose concentration.	1	2	3	4	5		
SUP	10. I underline or circle information in the text to help me remember it.	1	2	3	4	5		
PROB	11. I adjust my reading speed according to what I am reading.	1	2	3	4	5		
GLOB	12. When reading, I decide what to read closely and what to ignore.	1	2	3	4	5		
SUP	13. I use reference materials (e.g., a dictionary) to help me understand what I read.	1	2	3	4	5		

*Continuation of Survey*

PROB	14. When text becomes difficult, I pay closer attention to what I am reading.	1	2	3	4	5
GLOB	15. I use tables, figures, and pictures in text to increase my understanding.	1	2	3	4	5
PROB	16. I stop from time to time and think about what I am reading.	1	2	3	4	5
GLOB	17. I use context clues to help me better understand What I am reading.	1	2	3	4	5
SUP	18. I paraphrase (restate ideas in my own words) to better understand what I read	1	2	3	4	5
PROB	19. I try to picture or visualize information to help remember what I read.	1	2	3	4	5
GLOB	20. I use typographical features like boldface and italics to identify key information.	1	2	3	4	5
GLOB	21. I critically analyze and evaluate the information presented in the text.	1	2	3	4	5
SUP	22. I go back and forth in the text to find relationships among ideas in it.	1	2	3	4	5
GLOB	23. I check my understanding when I come across new information.	1	2	3	4	5
GLOB	24. I try to guess what the content of the text is about when I read.	1	2	3	4	5
PROB	25. When text becomes difficult, I re-read it to increase my understanding.	1	2	3	4	5
SUP	26. I ask myself questions I like to have answered in the text.	1	2	3	4	5
GLOB	27. I check to see if my guesses about the text are right or wrong.	1	2	3	4	5
PROB	28. When I read, I guess the meaning of unknown words or phrases.	1	2	3	4	5
SUP	29. When reading, I translate from English into my native language.	1	2	3	4	5
SUP	30. When reading, I think about information in both English and my mother tongue.	1	2	3	4	5

## **Appendix C: Authors' Permission to Use SORS Survey**

Dear Abrar,

Thanks for your interest in using the SORS instrument in your dissertation research. As authors, we are pleased to grant you permission to do so as long as you do not modify it in any way. If you do decide to modify the instrument, you may also need to seek permission from the copyright holder, which is the Journal of Developmental Education.

Best of luck in your research.

Kouider

**Kouider Mokhtari, Ph.D.**  
**Anderson-Vukelja-Wright Endowed Chair, Literacy**  
**Director, K-16 Literacy Center**  
**College of Education & Psychology**

## Appendix D: Multimedia E-book Student Learning Experience Questionnaire

Please indicated how satisfied you are with the e-book learning environment on your reading performance.

How satisfied are you	1 disagree	2 strongly disagree	3 neither agree nor disagree	4 agree	5 Strongly agree
1. The e-book helped me understand the text.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The e-book's features helped me find the main ideas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The e-book's feature helped me understand the text's details.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The video was a helpful feature in the e-book to understand the text.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. The videos were the most helpful feature in the e-book to understand the text.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Glossing (dictionary) was a helpful feature in the e-book to understand the text.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Glossing (dictionary) was the most helpful feature in the e-book to understand the text.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. The discussion boards were helpful feature in the e-book to understand the text.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. The discussion boards helped me clarify meanings and ideas about the tex.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. The discussion boards were the most helpful feature in the e-book to understand the text.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. The discussion questions in the e-book helped me understand the text's details.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. The discussion questions in the e-book helped me to use more reading strategies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. The discussion questions were the most helpful feature in the e-book to understand the text.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. It was easy to use the e-book.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I like the idea of using a multimedia e-book in reading classes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Continuation of Survey*

16. Overall, I am satisfied with how the multimedia e-book learning environment helped improv my reading performance.

17. Overall, I am satisfied with using the multimedia e-book learning environment.

**Reflection Questions**

1. How did you like/dislike the experience of utilizing e-book environments for English language reading comprehension skills? Provide example.

---

2. How did you find the e-book environments' features (videos, dictionary, collaboration, discussion board) effective/non-effective to support your application of reading strategies and reading comprehension? Which features you liked the most to enhance your reading comprehension? Why? Provide examples

---

3. How did you find the structured discussion questions? Did they help you over time to improve your application of the reading strategies and understanding the text? Provide examples

---

4. How did you find the e-book environments in general support/didn't support your reading comprehension? Provide examples

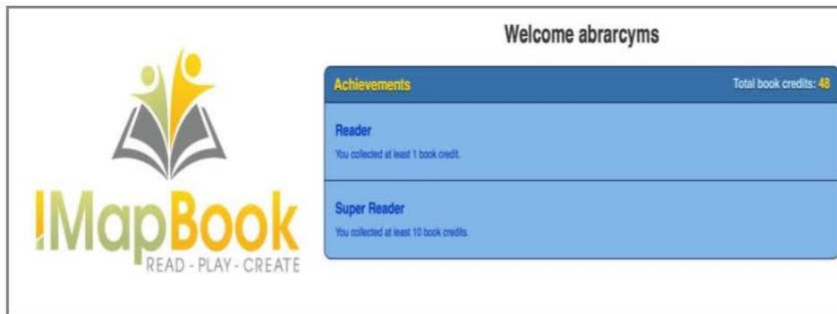
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## Appendix E: Structured Interviews

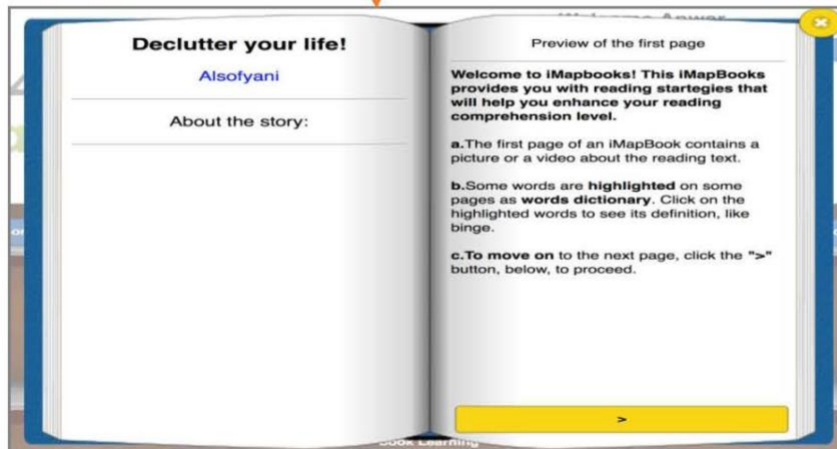
1. How did the e-book environment help you understand the text?
2. How did the e-book's features help you find the main ideas in the reading material(s)?
3. How did the e-book's features help you understand the details in the text?
4. How did each feature (videos, illustrations, glossing, collaboration and the discussion board) help you with reading comprehension?
5. Which feature did you like the most: videos, illustrations, glossing, collaboration, or the discussion board? Why?
6. How did the discussion questions help to improve your reading strategies applications and comprehension while reading the text?
7. How did the collaboration and discussion board within the e-book environment help you understand the text details and improve your comprehension?
8. What do you prefer as a collaboration environment: face to face learning or multimedia e-book learning? Why?
9. Was it easy to use the navigation tool for the interactive e-book materials?
10. What were the advantages of the e-book learning environment compared to the formal classroom session?
11. How did you like the teaching method of integrating e-book environments into the formal reading class session as extra practice to improve your reading comprehension? Why did you like it?

## Appendix F: Samples of the Designed E-book Reading Lesson Experiment

### A) Samples from the MS Collaborative Learning Group



Start on the homepage which displays all the reading sessions. Click on the "Declutter Your Life!" book to start.







A welcome page will appear explaining important instructions about the e-book

Click here to proceed

1



Start the planning stage by watching a video to activate your prior knowledge.

Click here to proceed

Click here to access the Discussion Board

Before reading: Know/want to know  
 1. What do you already know about declutter?  
 2. What questions do you have about this topic?

Before After

1. What do you already know about declutter? 2. What questions do you have about this topic?

- clean and arrange
- cleaning
- chaos
- it's mean cleaning up, organizing the place
- cleaning is important

Type your response here

Read the planning strategy's questions, then click on the Discussion Board icon to respond.

Before reading: Try to make prediction  
 1. What do you expect to read in this text?

THINKING CAP

Whoa.

1. What do you expect to read in this text?

- about the clutter and the chaos
- COMPARE BEFORE AND AFTER
- organization
- about cleaning
- How to organize rooms.

Read the planning strategy's questions, then click on the Discussion Board icon to respond.

Read the text

2

**Declutter your life!**

**Read the Text: Declutter Your Life!**

1 **Clutter**, Rubbish, Stuff, Call it what you like, we've all got so much of it we're drowning in it. It gradually **takes over** our houses and our lives. All this stuff has become a huge **source** of stress today, affecting everything from our lifestyle choices to our personal development. Decluttering – clearing out that clutter and living a cleaner, simpler life – is becoming increasingly popular.

2 **Don Aslett** is a cleaning specialist. He believes that we're **addicted to stuff**. "By the time we become adults, we believe that things make us happy," he says. "If one little thing gives us pleasure, then surely more things will **cannot live without** it."

3 And we think things can change us, make us better. For instance, 'the kids won't do their homework – I'm sure it'll help if we buy a computer' or 'I'm unpopular – a new shampoo should help.' "He believes that we buy things to solve all the problems in our lives, and so we keep getting more stuff. And of course, we're wrong."

4 **Michelle Passoff makes her living** from other people's clutter – she's a 'clutter consultant' and author of *Lighten Up! Free Yourself From Clutter*. "A long time ago, I noticed that when something big happened in my life, I would go on a cleaning **binge**: I'd tidy up the front room; I'd put the kids' toys away in their cupboards; I'd clean up the kitchen. "She found that cleaning helped her feel less stressed about the big problems in her life."

5 "But then one day I had a thought: suppose I did it the other way around. If I had a big clear-out, would big things happen in my life?" She found that they did. She found that, without so many **possessions**, she could concentrate on the important things in her life, like relationships with friends and colleagues. Do you **hoard** things and never throw them away? Go on, declutter your life.

How do you feel about clutter?

Comments:

1. In my neighborhood, there's one day a month when you can put old furniture and stuff you don't want out on the street. I think it's good to give away stuff you don't need any more. **Ana**, Spain.

2. I don't agree with these people. My wife and I enjoy buying new things and we're perfectly normal. We have two happy and healthy kids. When you're happy, the things around you have happy **memories**, so you want to keep them. **Manual**, Brazil.

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3

**Declutter your life!**

**During reading: If you got confused look forward and keep reading**

1 **Clutter**, Rubbish, Stuff, Call it what you like, we've all got so much of it we're drowning in it. It gradually **takes over** our houses and our lives. All this stuff has become a huge **source** of stress today, affecting everything from our lifestyle choices to our personal development. Decluttering – clearing out all that clutter and living a cleaner, simpler life – is becoming increasingly popular.

1. What is the most confusing word in paragraph 1? 2. What information in this paragraph is important to remember?

**Declutter in 5 minutes a day**

**Students start the monitoring stage.**

**Read the first paragraph and respond to the monitoring strategy's questions in the Discussion Board.**

**Book Club Two**

1. What is the most confusing word in paragraph 1? 2. What information in this paragraph is important to remember?

Oct 3 at 1:46:48 AM  
maybe no one can stay without clutter

Oct 3 at 1:46:56 AM  
the room for what is organized is a comfortable feeling

Oct 3 at 1:47:31 AM  
I feel uncomfortable

Oct 3 at 1:47:53 AM  
I thing hygienic is linked to happiness

Oct 3 at 1:48:23 AM  
I feel uncomfortable

Send Message  
Submit Ans...

Declutter your life!



**During reading: Try to restate ideas in your own words or make connection**  
**2 Don Aslett** is a cleaning specialist. He believes that we're **addicted to stuff**. "By the time we become adults, we believe that things make us happy," he says. "If one little things gives us pleasure, then surely more things will increase our pleasure."  
**1. What information in this paragraph is important to remember? and what is the connection between happiness and possessions?**

Students continue on the monitoring stage screen.

Read the second paragraph and respond to the monitoring strategy's questions in the Discussion Board.

Book Club Two

**1. What information in this paragraph is important to remember? and what is the connection between happiness and possessions?**

- addicted to
- people become happy when they buy new stuff
- buying things he loves makes him happy
- happiness is some thin make me happy but possessions its olredy mine and make me happy
- addicted to stuff

Send Message  
Submit Ans...

Declutter your life!



2 **Don Aslett** is a **cleaning specialist**. He believes that we're **addicted to stuff**. "By the time we become adults, we believe that things make us happy," he says. "If one little things gives us pleasure, then surely more things will increase our pleasure.

3 And we think things can change us, make us better. For instance, 'the kids won't do their homework – I'm sure it'll help if we buy a computer' or 'I'm unpopular – a new shampoo should help.' "He believes that we buy things to solve all the problems in our lives, and so we keep getting more stuff. And of course, we're wrong.

1. How is paragraph 3 connected with the paragraph 2: supports, contradicts, or introduces new idea? Provide examples

Students continue on the monitoring stage. Read the paragraph and respond to questions in the discussion board.


Book Club Two

1. How is paragraph 3 connected with the par. 2: supports, contradicts, or introduces new idea? 2. What is important to remember about Don Aslett's opinion about clutter in our life?

- it's supports paragraph Oct 3 at 1:58:42 AM
- supports paragraph 2 Oct 3 at 2:00:38 AM
- he talked about how people collected things with thinking of that will solve the problms Oct 3 at 2:01:30 AM
- Don beleives that people addict to stuff and buying a new things Oct 3 at 2:01:54 AM
- SUPPORT Oct 3 at 2:02:03 AM

Send Message  
Submit Ans...

**Declutter your life!**



**During reading: Restate in your own words**  
 4 Michelle Passoff makes her living from other people's clutter – she's a 'cleaning specialist' and author of *Lighten Up! Free Yourself From Clutter*. "A long time ago, I noticed that when something big happened in my life, I would go on a cleaning binge : I'd tidy up the front room; I'd put the kids' toys away in their cupboards; I'd clean up the kitchen. "She found that cleaning helped her feel less stressed about the big problems in her life.


1. What is important to remember about the connection between decluttering and stress in Michelle Pasoff's life?

Students continue on the monitoring stage screen.

Read the fourth paragraph and respond to the monitoring strategy's questions in the Discussion Board.

**Book Club Two**

1. What is important to remember about the connection between decluttering and stress in Michelle Pasoff's life?

	makes her living	Oct 3 at 1:53:06 AM
	Declutter and cleaning help her get stressless	Oct 3 at 2:07:15 AM
	She found that cleaning helped her feel less stressed	Oct 3 at 2:07:49 AM
	feel less stressed	Oct 3 at 2:08:04 AM
	she found that cleaning helped her feel less stressed about the big problems in her life.	Oct 3 at 2:08:17 AM

Send Message  
Submit Ans...

Declutter your life!

to keep

to throw away

5 "But then one day I had a thought: suppose I did it the other way around. If I had a big clear-out, would big things happen in my life?" She found that they did. She found that, without so many **possessions**, she could concentrate on the important things in her life, like relationships with friends and colleagues. Do you **hoard** things and never throw them away? Go on, declutter your life.

1. Does paragraph 5 support the idea in paragraph 4, contradict, or introduces new idea?
2. According to par. 5, has Michelle's opinion about the effect of clutter in her life changed?

Students continue on the monitoring stage screen.

Read the fifth paragraph and respond to the monitoring strategy's questions in the Discussion Board.

Book Club: Two

1- Does paragraph 5 support the idea in par. 4, contradict, or introduces new idea? 2. According to par. 5, has Michelle's opinion about the effect of clutter in her life changed?

	makes her living	
	cleaning make her happy	Oct 3 at 2:06:18 AM
	I think the par 5 contradict par 4	Oct 3 at 2:07:15 AM
	she said the cleaning this thing make her less stressed	Oct 3 at 2:07:26 AM
	she said the cleaning her stuff helps in make happiness	Oct 3 at 2:09:03 AM

Send Message  
Submit Ans...

4

**Declutter your life!**

**After reading: Summary**  
1. What was the article about?

**Declutter Your Life!**

1 Clutter, Rubbish, Stuff, Call it what you like, we've all got so much of it we're drowning in it. It gradually **takes over** our houses and our lives. All this stuff has become a huge **source** of stress today, affecting everything from our lifestyle choices to our personal development. Decluttering – clearing out all that clutter and living a cleaner, simpler life – is becoming increasingly popular.

2 Don Aslett is a cleaning specialist. He believes that we're

Students start the evaluation stage.

Summarize or evaluate the text and respond in the Discussion Board.

### B) Samples from the MS Individual Learning Group

1

**Could social networking sites mean the end of lasting friendships?**

**Before reading:** Look at the below title of the text, the picture and think.  
**Could social networking sites mean the end of lasting friendships?**

Students start the planning stage by looking at an illustration to activate your prior knowledge.

**Before reading: Know/want to know**  
1. What do you already know about Social networks and friends?  
2. What questions do you have about this topic?

Type your response here

Type your response here

I am a fan of social networks. For example, I have a Facebook, Instagram, and a Twitter account. I have many more friends on my Social Networks than in my real life. I am not sure if I can call all people on my social networks friends.

Continue on the planning stage and respond to questions in a textbox that displays on the same screen.



2

Could social networking sites mean the end of lasting friendships?

**Read the text: Could social networking sites mean the end of lasting friendships?**

1 A **generation** that is growing up using social networking websites, such as Facebook and Twitter, is less likely to form **lasting** relationships and is more likely to act without thinking, an expert has warned.

2 Many people who were born in 1990 or later have only known a world with the Internet, so they could grow up with an unrealistic view of the world and themselves, the annual meeting of the Royal College of Psychiatrists heard.

3 Dr Himanshu Tyagi, a psychiatrist, said social networking sites have **encouraged** the idea that friendships and relationships can be formed and ended quickly and easily. He said, "It's a world where everything moves fast and changes all the time, where relationships are ended at the click of a mouse. Online, you can delete your profile and change who you are in a few seconds." He said that because everything happens so quickly on social networking sites, people may start to find the real world boring.

4 He said teenagers who **socialize** online are more likely to make quick decisions without thinking about the consequences of their actions. They might not pay enough attention to their 'real world' selves, and might find it difficult to form relationships in the real world because they won't learn about body language or hear the change in their voice, this will influence your understanding of what's going on. He added that friendship means something very different to the 'internet generation'.

5 But there are also **benefits**. When you're online, you often don't know the **wealth, race** or **gender** of the person you're **communicating** with, Dr Tyagi said. "No one is an outsider on the net. It may not be the best way to make lasting friendships, but everyone is welcome

Read the text.

3

Could social networking sites mean the end of lasting friendships?

**During Reading: Restate in your own words**

2 Many people who were born in 1990 or later have only known a world with the Internet, so they could grow up with an unrealistic view of the world and themselves, the annual meeting of the Royal College of Psychiatrists heard.

**1. What information in paragraph 2 is important to remember?**

young people can have an unrealistic view of real life because they only know the world with the Internet.

Type your response here

Students start the monitoring stage.

Read the paragraph and respond to the monitoring strategy's questions in the textbox.

Could social networking sites mean the end of lasting friendships?

**During reading: Look forward/ keep reading**

3 Dr Himanshu Tyagi, a psychiatrist, said social networking sites have **encouraged** the idea that friendships and relationships can be formed and ended quickly and easily. He said, "It's a world where everything moves fast and changes all the time, where relationships are ended at the click of a mouse. Online, you can delete your profile and change who you are in a few seconds." He said that because everything happens so quickly on social networking sites, people may start to find the real world boring.

**1. What is the most confusing ( word, phrase or idea) in paragraph 3?**

clicking the mouse

Type your response here

Students continue on the monitoring stage screen.

Read the paragraph and respond to the monitoring strategy's questions in the textbox.

Could social networking sites mean the end of lasting friendships?



4 He said teenagers who **socialize** online are more likely to make quick decisions without thinking about the consequences of their actions. They might not pay enough attention to their 'real world' selves, and might find it difficult to form relationships in the real world because they won't learn about body language or hear the change in their voice, this will influence your understanding of what's going on. He added that friendship means something very different to the 'internet generation'...

1. What information in paragraph 4 is important to remember? and How is this paragraph connected with the previous paragraph: supports, contradicts, or introduces new idea about networking friendship?

When you talk online, you might make a quick decisions because you don't actually see the real people. You don't see their body language to understand something more important the words on line.

Type your response here

Page 9 / 14


Students continue on the monitoring stage screen.

Read the paragraph and respond to the monitoring strategy's questions in the textbox.

4

Could social networking sites mean the end of lasting friendships?

# Summary



**After reading: Summary**  
1. What was the article about?

**Could social networking sites mean the end of lasting friendships?**

1 A **generation** that is growing up using social networking websites, such as Facebook and Twitter, is less likely to form **lasting** relationships and is more likely to act without thinking, an expert has warned.

2 Many people who were born in 1990 or later have only known a world with the Internet, so they could grow up with an unrealistic view of the world and themselves, the annual

The article explains the point of view of Dr. Tyagi, who thinks that social networking sites, like Facebook, discourage young generation from creating lasting relationships. Because such websites make it so easy to change an identity and start and end friendships, teenagers do not learn how to communicate in the real world and tend to make decisions without thinking about consequences. On the other hand, according to Dr. Tyagi, social networks allow people of different backgrounds find friends.

Type your response here

Page 11 / 14

Students start the evaluation stage.

Summarize the text and respond in the textbox.

Could social networking sites mean the end of lasting friendships?



**After Reading: Reflections**  
1. What was the most interesting in the article?  
2. What did you learn today that was familiar or opposite to your previous beliefs?

social networks make people think that the real world is too slow and boring. Something that was familiar is that online relationships are not always real, it is so easy to just delete someone from your "friends" online. Something that was in contrast with my beliefs is Dr. Tyagi's idea that online friendship can have positive sides. He says that you can make friends with anyone, no matter their age or where they live and work.

Type your response here

Page 12 / 14

Evaluate the text and respond in the textbox.

## Appendix G: Permission to Reproduce Images

Abrar,

You have my permission to use the images.  
You could use IMapBook LLC and the year you got the images.

*Glenn Smith*

Associate Professor, [glenns@usf.edu](mailto:glenns@usf.edu)

Instructional Technology Program, Dept. of Educational & Psychological Studies, University of S. Florida

## **Appendix H: Recruitment Letter**

Pro# **00036220**

Dear Participant,

This is Abrar Alsofyani. I am conducting a research study to examine the impact of scaffolding metacognitive strategies discussion and collaborative learning on EFL learners' reading comprehension within multimedia e-book learning environments. I want to examine the influence of this web-based e-book treatment on your level of reading comprehension. I am writing this recruitment letter to invite 120 students to participants in my study treatment and 10 students to participate in a taped interview. If you agree to participate in the treatment, you will be exposed to a web-based multimedia e-book treatment for approximately six sessions and each session will last for an hour. If you agree to be interviewed about your experience with the e-book treatment, I will explain the interview procedure and go over the required consent form with you. The interview will be conducted in a one-time, 30-minute, face-to-face meeting at a convenient location.

Thank you,  
Abrar Alsofyani  
PhD candidate, TESLA program  
University of South Florida  
Tampa, Florida  
[aalsofyani@mail.usf.edu](mailto:aalsofyani@mail.usf.edu)  
720-243-9301

## **Appendix I: Consent Form**

### **Informed Consent to Participate in Research Involving Minimal Risk**

**Pro # 00036220**

You are being asked to take part in a research study. Research studies only include people who choose to take part. This document is called an Informed Consent form. Please read this information carefully and take your time to make a decision. You may ask the researcher or the study staff to discuss any portion of the consent form with you or to explain words and information you may have difficulty understanding. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below. This research study is entitled: Examining EFL learners' Reading Comprehension: The Impact of Metacognitive Reading Strategies Discussion and Collaborative learning within Multimedia E-book Dialogic Environments. *Abrar Alsofyani* is the person who is in charge of this research study. This person is called the Principal Investigator. However, other research staff may be involved, and may act on behalf of the person in charge.

#### **Purpose of the study**

The purpose of this study is to examine the impact of metacognitive strategy-based discussion with collaborative learning to enhance EFL learners' utilization of reading strategies and reading comprehension within multimedia e-book learning environments. Additionally, the study will investigate how EFL learners perceive the impact of multimedia e-book learning environment on their overall reading comprehension.

### **Why are you being asked to participate?**

You are being asked to take part in this research study because you are a female, undergraduate and intermediate language proficiency level at the English Language Institution in a Saudi university.

### **Study Procedures**

If you take part in this study, you will be asked to participate in a web-based e-book activity for six sessions. Each session will take no more than an hour of your time and will take place during your regular class period. You will also be asked to complete a background questionnaire, Strategies of Reading Survey, an e-book learning experience questionnaire and a final reading comprehension test. From the participants who complete the e-book learning activity, 13 students will be asked to volunteer for an individual taped interview that will last approximately 30 minutes.

### **Total Number of Participants**

About 115 individuals will take part in the study treatment in a Saudi university. From the students exposed to the treatment, 13 volunteers will be asked to participate in an individual interview.

### **Alternatives / Voluntary Participation / Withdrawal**

You do not have to participate in this research study. You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty if you stop taking part in this study. Your graduate student status will not be impacted by the decision to participate in this study.

**Benefits**

You will receive no benefit(s) by participating in this research study.

**Risks or Discomfort**

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

**Compensation**

You will receive no payment or other compensation for taking part in this study.

**Costs**

It will not cost you anything to take part in the study.

**Privacy and Confidentiality**

Your information and records will be kept private; however, absolute confidentiality cannot be guaranteed. Your personal information may be disclosed if required by law. Certain people may need to see your study records. These individuals include:

- The research team, including the Principal Investigator, study coordinator, and all other research staff
  - Certain government and university employees who need to know more about the study, and individuals who provide oversight to ensure the study is being conducted correctly
  - Any agency of the federal, state, or local government that regulates this research
  - The USF Institutional Review Board (IRB) and related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance.
- The details or results of this study may be published. If any portion of this study is published it will not include your name or any personally identifiable information

**Questions, Concerns, or Complaints**

If you have any questions, concerns or complaints about this study, or experience an unanticipated problem, email *Abrar Alsofyani* at [aalsofyani@mail.usf.edu](mailto:aalsofyani@mail.usf.edu). If you have questions about your rights as a participant in this study, or have complaints, concerns or issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638 or contact by email at [RSCH-IRB@usf.edu](mailto:RSCH-IRB@usf.edu).

**Consent to Take Part in this Research Study**

I freely give my consent to take part in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

\_\_\_\_\_  
Signature of Person Taking Part in Study

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name of Person Taking Part in Study

**Statement of Person Obtaining Informed Consent**

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research subject has provided legally effective informed consent.

\_\_\_\_\_  
Signature of Person obtaining Informed Consent

\_\_\_\_\_  
Date

\_\_\_\_\_  
of Person Obtaining Informed Consent.

\_\_\_\_\_  
Printed Name



## Appendix J: IRB Approval



RESEARCH INTEGRITY AND COMPLIANCE  
Institutional Review Boards, FWA No. 00001669  
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799  
(813) 974-5638 • FAX (813) 974-7091

July 17, 2018

Abrar Alsofyani  
Teaching and Learning  
Tampa, FL 33612

RE: **Expedited Approval for Initial Review**

IRB#: Pro00036220

Title: Examining EFL's Reading Comprehension: The Impact of Scaffolding Metacognitive Reading Strategies Discussion and Collaborative learning within Multimedia E-book Environments

**Study Approval Period: 7/16/2018 to 7/16/2019**

Dear Mrs. Alsofyani:

On 7/16/2018, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within, including those outlined below.

**Approved Item(s):**

**Protocol Document(s):**

[Protocol, version #1](#)

**Consent/Assent Document(s)\*:**

[Adult consent, version #1.pdf](#)

\*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110. The research

proposed in this study is categorized under the following expedited review category:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) business days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kristen Salomon', followed by a horizontal line.

Kristen Salomon, Ph.D., Chairperson  
USF Institutional Review Board