

CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 Introduction

Today all around the world students are going online to search for information. They are using the Internet to locate facts, access multimedia and communicate with one another. As a result, in Malaysia and across the world, there has been a tangible shift from reading print to reading digital text in schools and Institutions of higher learning. This has caused researchers and educators to question the validity of traditional print literacy in equipping students with the skills needed for reading online information or hypertext. It has also prompted the researcher to consider whether her students use different strategies when reading printed text and when reading hypertext. Furthermore, it raises some pertinent questions about reading strategies: Should teachers pay more attention to specific reading strategies to equip learners to become better online readers?

According to Snow (2002), using computers and accessing the Internet make large demands on an individual's literacy skills and little is known about how to analyze or teach these skills. Similarly, Wendy Sutherland-Smith (2002) argues that Internet technology has had a significant impact on reading strategies, resulting in a need to reshape our thinking about classroom reading practice. Furthermore, Kamil and Lane (1998), state: "What is clearly missing from the literature is a systematic analysis of the relation between reading hypertext and reading conventional text.... Clearly, nothing in any of the current literacy curricula prepares students for this sort of

reading, which requires navigational strategies not needed in reading conventional printed text” (p.333).

Furthermore, researchers have not clearly addressed the question of which cognitive processes are involved in using present technologies related to literacy.

Reading researchers have realized that when reading instruction occurs using traditional forms of literacy, namely print, the students are conditioned to expect certain characteristics and also to employ certain strategies to ensure comprehension. The characteristics of print texts are: they are linear, have a fixed format, are static or unchanging and contain a limited amount of information. Also, students are taught to recognize the various styles and genres available in printed texts and to recognize forms and devices used to direct attention, increase retention or provide illustration. Although online texts have some conventions that are similar to printed text, there are differences.

Text was traditionally conceived as books or pieces of linear print. Charney (1994) states that the text presents a collection of ideas that a writer has carefully selected, framed and organized into a coherent sequence or pattern in hopes of influencing a reader’s knowledge, attitudes, or actions. It is important in that the ability to anticipate a text’s structure enables readers to identify it as they assimilate it into their existing schema and consequently, make decisions about how they might approach it. According to Bolter, 2001 the structure of the text serves as a literacy cue. Some researchers believe that textual structure and reading comprehension are inextricably

linked (Travis, 1998; Charney, 1994) and has an impact on the selection of reading strategies.

1.1.1 Key characteristics of linear text and hypertext

The major characteristics of linear text reside in its structure. Linear text:

- has clearly anticipated organizational structure which allows readers to invoke schemas and situate new information within the context of already existing information. For example, readers do not approach reading a novel, a play or a reference book in the same way. They employ different strategies in each context based on the expectations they have of the text due to its organizational structure (Charney, 1994).
- allows readers the opportunity and choice to linger on a particular detail and also to mark pages
- creates a passive interaction between the reader and the text, as the text asks nothing more of the reader than approaching the words on the page.

On the other hand, texts online are often in hypertext format. Hypertext is a form of text composed of pieces of text and images joined by links that permit multilinear reading (Landow, 1997). In other words, hypertext is an interlinked structure of nodes or links. These links or nodes may connect to other nodes or links in the same text, and they may also link to nodes contained within an external text (McEneaney, 1997). This linking feature of hypertext allows readers to follow a path of their choosing based on a series of interrelated links embedded within the information they have accessed.

Therefore, unlike linear texts, hypertext is nonlinear and has no clear anticipated organizational structure. Bolter, 2001 discusses the possibility that the textual structure expectations that the readers bring to hypertexts might infringe upon their reading. Charney, 1994 also agrees that such expectations may be transferred to hypertext. As a result, many researchers today have begun to move towards addressing issues of how students engage in literacy tasks especially in the context of hypertext environments (Reinking, Labbo,& Mckenna,2000; Kumbruck,1998; Reinking,1997).

Salmeron, Kintsch and Canas (2005) say that although comprehending a hypertext requires the same cognitive processes involved in reading a traditional linear text, hypertext demands additional cognitive processes. One of these additional cognitive processes is the selection of the reading order of the text sections. Furthermore, the hypertext that students encounter when searching for information on the Internet varies greatly in structure and organization. There are no set rules to govern the structures or organization of hypertext. Charney, 1994 states that much knowledge in the brain seems to be arranged hierarchically and sequentially with regard to how information is processed. At the same time there is no evidence to show that readers can understand information better when it is presented in a network rather than in hierarchical and linear form. Therefore, hypertexts do pose cognitive challenges to the readers, and these challenges differ from those posed by printed texts (Charney, 1994). This could raise some problems for readers when they read hypertext.

Unlike linear text, hypertext does not have an organizational structure that readers can

anticipate. It goes against standard assumption about what texts look like. Another challenge Charney mentions is that sometimes readers stop midway when reading and fail to pursue further information. The reader therefore does not take full advantage of the information available. This reinforces what McEneaney (1997) and Bolter (2001) say about how the reader creates his/her own individual pathways.

Currently, students are not taught to recognize the nature of hypertext; they don't receive explicit instruction in the conventions and devices used to direct attention, increase retention, or provide illustration. Mayer (1997) concludes that researchers need to know how students process the visual and verbal material in multimedia and online environments. Students are often taught to navigate the WEB and read online sources without being taught to comprehend the processes of information selection or evaluate the quality of the content presented and think metacognitively about their seeking strategies. This is similar to teaching students to decode print text without teaching the students cognitive strategies for comprehension or metacognitive strategies to internally control learning and processing.

Researchers today claim that both children and adults misunderstand the ability to move around on the Internet as the ability to read and comprehend the information therein. Schmar-Dobler (2003), points out educators should guide students toward success by allowing them to apply existing knowledge of texts to online environments. The important question is: What strategies do we need to teach our students for them to engage effectively in the context of hypertext environment?

The users of hypertext are faced with the challenge of creating meaning both within and between texts. Within the text here refers to the main text that is read and between texts refers to the various texts provided by the hyperlinks. Therefore, cohesion is an important factor contributing to whether a reader is able to capture meaning and comprehend text. When readers are required to use their schema to fill in gaps in a text, comprehension can fail if they do not have sufficient knowledge or exposure. However, to date there is no agreement among researchers and in the literature regarding the strategies that hypertext readers follow when their main purpose is to comprehend a text (Unz and Hesse, 1999).

1.1.2 Malaysian Scenario - Steps taken by the Malaysian Government

According to the Third Outline Perspective Plan 2001 – 2010, Malaysia has planned to upgrade its communications and multi-media infrastructure to world-class standards. This is to support the rapid flow and accessibility of information within the country and across other countries at competitive rates. As part of this initiative, the government has made e-learning one of the seven flagship applications of the Multimedia Super Corridor (MSC). This is done via the Smart School Project which is aimed at assisting the country in managing development and change to become a fully knowledge-based industrialized nation.

In support of this, schools and universities have decided to take up the challenges of globalization by changing not only the content of their curriculum and programmes, but more importantly, their delivery system as well. This has resulted in the need to

design a curriculum that would teach the learners the necessary skills for them to excel in an e-learning environment. Information Technology (IT) enhanced teaching and learning are already involving computers in school, distance learning, video-conferencing and Internet research a commonplace occurrence.

The Malaysian government has also taken the necessary steps to ensure that children are adequately prepared for their future by:

- integrating information technology or ICT into the curriculum, often for the first time as a central curriculum strand
- developing extensive Internet resources for students and teachers
- providing teachers training in the effective use of IT and ICT.

The Ministry has introduced several projects. The first was the Smart School Project, which was launched in July 1997. As part of the first project, two components with developed browser-based teaching and learning materials (and related print materials) in Bahasa Malaysia, English, Science and Mathematics, and the other a computerized smart school management system were introduced. The second project was the setting up of a website, MySchoolNet, to help increase the use of ICT in education.

Then, in 2001, the ministry initiated a pilot project involving the use of the electronic book or e-book. The ministry was interested to see how this device that stores electronic textbooks that links the users to the Internet could be used to improve teaching and learning in the classroom. They were also interested in investigating the use of the e-book to replace conventional textbooks and hereby resolve the perennial

problem of heavy school bags. The next project involved ICT training in which selected master trainers would undergo training and then pass this knowledge to selected trainers, who in turn would have trained their colleagues at school, district and state levels. Therefore it can be safely concluded that a lot has been done by the Education Ministry to enhance e-learning which includes retraining and retooling staff with current technologies, updating the management systems towards e-governance and e-government, providing infrastructure and manpower support to create e-university environments, providing web-based learning contents, and encouraging IT culture at all levels.

However, nothing has been mentioned about equipping or reinforcing the learners with the appropriate reading strategies for this new delivery style. It would be dangerous to assume that it is a mere transfer of skills from reading in print to reading hypertext. One of the most important skills needed by learners of this new medium would be reading strategies that would enhance their reading performance of vast amounts of information on screen. This in turn would help learners become more efficient readers in an e-learning environment. Very little research has been done in this country regarding reading from print versus reading hypertext. Therefore identifying the appropriate reading strategies and training the learners would definitely enhance the learners learning ability in this era of e-learning. There is a need to design and incorporate an e-reading programme or course that would equip learners with the appropriate reading strategies to help them effectively read and comprehend electronic or digital text.

However, simply having Internet technologies in our classrooms will not prepare children adequately for the new literacies they require. As more texts become available in digital form, users access information in different ways that have potentially profound ramifications for reading. It must be noted that the fundamental principles of reading have not changed but the process has shifted from the serial cognitive processing of linear print text to the parallel processing of hypertext. Text and meaning are no longer embedded exclusively in a linear sequence of alphabetic characters combined in a logical sequence of phrase, sentence, paragraph and narrative units or formatting demands of a page or book. Hypertext embeds text-image and meaning in a web like pattern of links that readers can pursue or ignore. The hypertext author designs an editorial structure of potential meanings through links, but readers too structure their own transitions from one part of the text to another, moving from one set of emerging meanings to another (Kaplan, 1995).

This process of choosing and ignoring links demands a particular kind of reading, a cognitive mapping and pathway navigation that is quite different from the relatively choiceless linearity of printed text.

1.1.3 Conclusion

Therefore, given the prediction that in the future our reading could be mainly digital and the fact that the Internet has propelled the rapid growth of e-learning, we need to identify the strategies that will help learners to read effectively in this new medium. It is also clear that the nature of literacy is rapidly changing as new technologies emerge

(diSessa, 2000; Dresang & McClelland, 1999; Leu & Kinzer, 2000). Electronic texts introduce new supports as well as new challenges that can have a great impact on an individual's ability to comprehend what he or she reads. The internet, in particular, provides new text formats, new purposes for reading, and new ways to interact with information that can confuse and overwhelm people taught to extract meaning from conventional print. Proficiency in the new literacies of the Internet will become essential to our students' literacy future (International Reading Association, 2002).

Leu (2002) reinforces the fact that "the Internet has entered our classroom faster than books, television, computers, the telephone, or any other technology for information and communication" (p.311). Similarly, Coiro (2003) stresses that "electronic texts introduce new supports as well as new challenges that can have a great impact on an individual's ability to comprehend what he or she reads".

Therefore we must teach our students to function in the world of the computer screen by reading web sites, conducting research on the Internet, and reading and writing messages and multimedia documents for online partners around the world. It is crucial that learners know how to read and write not only in the print world but also in the digital world and in an e-learning environment.

In order to better prepare for these challenges, there is a need for a "rich theoretical description of the comprehension processes" involved in Web-based and electronic reading environments. Since technology is now viewed as both a necessary component and a means to achieving literacy, it must become an integral part of ESL

courses and the Internet must be used as a tool to promote linguistic skills and knowledge construction. It is this expressed need for clarification of the comprehension processes necessary for reading that this study hopes to address. Therefore the purpose of this study is to investigate the differences in the choice of metacognitive and cognitive reading strategies that second language learners employ to comprehend a text in print and hypertext.

1.2 Statement of the problem

Most of the research on reading process, strategies and text processing of L1 and L2 reading in English are from printed texts. Therefore a great deal of what we know about reading and comprehension is through research conducted using printed texts. However, the Internet and the hypertext have significantly changed how we read (McDonell, 2003). In fact, according to Leu, Kinzer, Coiro & Cammack, (2004) & RAND Reading Study Group, (2002) reading on the Internet differs in important ways from reading in traditional, print-based texts. A few of the important areas where different reading skills are required includes searching for information, effectively using hyperlinks and critical evaluating information in texts.

It cannot be denied that currently, students do most of their reading and research on the Internet. These academic materials that they read on screen have features and capabilities that are different from printed text, as the information is presented in hypertext form. As Winkleman (1995) points out while printed text is static, hypertext is “dynamic and malleable”. Hypertext is linked to a variety of information in different forms. The meaning of what is read is not limited to the words on that

page, but rather linked elsewhere depending on the reader's cognitive map of space. Reading on the Internet now truly represents Goodman's (1967) interactive model and students use a "psycholinguistic guessing game" (Carrell. P, Devine. J, Eskey, D, 1988) when they read hypertexts. In addition, reading hypertext on the Internet can produce an overwhelming amount of information and causing a sense of information overload.

Kamil and Lane 1998, discuss that hypertext can be looked at from three situations; the literary version of hypertext, where the reader tries to create his or her own path; hypertext which allows one to add information by providing readers the opportunity to explore the material in greater depth; and the hypertext which permits students to study. There is only a small body of research on hypertext and very few empirical studies that discuss "the cognitive consequences of reading this type of non traditional text".

One of the problems of reading hypertext is the unpredictability of knowing where one will go when choosing the hyperlink. As Kamil and Lane (1998) state, there is no way to predict whether or not that link will be useful. Therefore if students do not process the information correctly through the hypertextual links, then it will affect the students' comprehension of the text. The students will not be able to put this reading into any form of comprehensible output in their task. It cannot be denied that the Internet technology has had a significant impact upon reading strategies, resulting in the need to reshape our thinking about classroom reading practices. The question raised is whether there is a need to pay more attention to certain specific cognitive and

metacognitive reading strategies that are useful to help students decode meaning while reading hypertext. Therefore, given the prediction that in the future we will be reading mainly hypertext or electronic text, we need to equip our students with skills and strategies that will make them better on-line readers.

1.3 Objectives of the study

The objectives of the study are:

1. to identify the metacognitive and cognitive reading strategies used by ESL learners while reading a text in print
2. to identify the metacognitive and cognitive reading strategies used by ESL learners while reading hypertext
3. to examine the differences in the metacognitive and cognitive reading strategies used by ESL learners while reading in print and hypertext
4. to identify the metacognitive and cognitive reading strategies ESL learners perceive they used while reading hypertext

1.4 Research Questions

The research questions underpinning this study are:

1. What metacognitive and cognitive reading strategies do ESL learners employ in comprehending expository texts in print?
2. What metacognitive and cognitive reading strategies do ESL learners employ in comprehending hypertext?
3. Is there a significant difference in the metacognitive and cognitive reading strategies employed by ESL learners in comprehending expository texts in print and hypertext?

4. What metacognitive and cognitive reading strategies do ESL learners perceive they use while reading hypertext?

The research questions were explored within the context of current research and practice relative to reading strategies. The main focus of the study is on types of metacognitive and cognitive reading strategies ESL learners use and perceive when reading hypertext. Moreover, there has been quite a few research studies (Anderson, NJ, 1991; Block, 1989; Shinghal, 2001; & Olshavsky, 1977) conducted on what reading strategies students perceive when reading print.

1.5 Significance of the study

The purpose of this study is to investigate the differences in the choice of metacognitive and cognitive reading strategies employed by second language learners while reading expository texts in print and hypertext. Kamil and Lane (1998) state that there is little research on how students read hypertext on the Internet, and there is a lack of research that compares and contrasts reading conventional text with reading hypertext. This study is in response to these statements.

The study is significant in several aspects. Firstly, it provides insights into how some ESL learners read hypertext and their use of cognitive and metacognitive reading strategies to help comprehend the text. The findings of the study will help address the question of which cognitive processes are involved when reading hypertext. Educators can then equip the learners with cognitive and metacognitive strategies for processing online information. As Leu, D.J. Jr (2000) predict that the Internet, or

online resources, will increase and not decrease, and therefore it is only logical that educators equip learners with cognitive and metacognitive reading strategies for processing online information.

Furthermore, B. Kramaski and Y. Feldman's (2000) study show that technology or use of online resources does not itself increase student comprehension. Students need explicit or direct instruction in metacognitive reading strategies that regulate self-awareness, self-control, and self-monitoring. Only then will students be able to read online information effectively and productively.

Secondly, online reading serves as a source of input for millions of L2 readers and the growing interest in online learning has led to the increase in the number of educational centers offering online courses and degrees. With the increased use of the Internet in the field of education, there is a dire need to train ESL learners to be effective on-line readers. Also, there is an increased interest in L2 reading research on how technology influences reading. Teachers are able to guide students' comprehension in hypertext reading only if research can reveal some of the cognitive and metacognitive processes involved in reading hypertext.

In the area of curriculum design, identifying cognitive and metacognitive reading strategies used to read online or hypertext will help educators design explicit instructions to teach students to monitor and adjust their online processing. These new instructional practices incorporated into the reading curriculum will help equip students to engage effectively in an online environment. As Shetzer and Warschauer

(2000) suggest teachers and curriculum designers need to rethink our instructional goals and techniques in order to prepare students to read online information.

In addition, the study will further contribute to the field of L2 reading research on how text structure and reading comprehension are inextricably linked. Texts are taken to convey meaning and new ways of producing texts, as in the hypertext, require new ways of reading. Hypertext requires understanding the interplay between image, sound and texts. As a result we need to reshape our thinking about classroom reading instructions and materials so as to prepare children to be literate in today's world. It is important to remember that literacy empowers the individual to access and generate knowledge in today's society.

Empirical work done on finding out the cognitive and metacognitive reading strategies needed to enhance ESL learners' reading ability using hypertext is scarce. Therefore, my research study might provide some vital findings in this area.

1.6 Definition of Terms

1. ***Metacognition*** is a construct which literally means "thinking about thinking"; it involves how learners think about their learning and how they know what they know, and what they do when faced with challenging learning situations (Anders & Guzzetti, 1996).

2. ***Cognition*** is the process by which you recognize and understand things.

3. A *strategic reader* is an effective reader who adjusts his reading to fit the type of text, employs specific tactics or strategies that will help if confusing text passages are encountered, actively pursues meaning, and carries on a mental dialogue with the writer (Barton,1997)

4. *Expository text* refers to text written to inform; it is nonfiction and is usually characterized by technical vocabulary , and hierarchical patterns of main ideas and details (Anders &Guzzetti,1996; Musthafa, 1996). Expository text has a variety of text structures.

5. *Cognitive Strategies* in reading aid the reader in constructing meaning from the text. Cognitive strategies can be divided into bottom-up and top-down strategies. When a reader uses bottom-up strategies the reader starts by processing information at the sentence level. As they process information that each sentence gives them, they check to see how this information fits, using top-down strategies such as background knowledge, prediction, getting the gist of a text, and skimming. (Barnett,1988; Carrell, 1989).

6. *Metacognitive Strategies* in reading function to monitor or regulate cognitive strategies (Devine, 1984). The strategies include checking the outcome of any attempt to solve a problem, planning one's next move, monitoring the effectiveness of any attempted action, testing, revising and evaluating one's strategies for learning.

7. *Qualitative data* provide rich descriptions and explanations of processes or events in local contexts that are not easily identified by quantitative research methods.

6. **Verbal Protocol** is any collection of verbal reports like think aloud reports during a task, interviews or self-deposited accounts of events or problem solving strategies reported by people during or after the task. (Ericsson and Simon, 1984, 1987).

9. **Concurrent reports or think-aloud.** This is verbalization where cognitive processes, also described as successive states of information under attention, are verbalized directly without any sort of encoding.

10. **Retrospective reports** of a done cognitive process or in other words verbalization of information heeded just after the task is done. This has some encodings by the person before verbalization.

11. **Hyperlinks** can be words, graphics or numbers which, when selected, transfer the user to a new location in the hypertext or to another site (Barrons, 1998)

12. **Hypertext** is a computer-based electronic text with built in hyperlinks.

Unlike reading a book, the user can typically read hypertext by following up on different connections to increase understanding.

CHAPTER TWO

REVIEW OF LITERATURE

This study describes the metacognitive and cognitive strategies used by 10 ESL learners while reading in print and hypertext. It especially explores the processes these students use while reading hypertext. This chapter will describe the theory and research in the area of literacy, hypertext and reading comprehension. The main research tool, think-aloud protocol used in this study will also be discussed.

2.1 Literacy

What is literacy? Is it just about reading and writing or is it about how we respond to and understand our world? (Earle, 2005). Today, television, film, computer, and the Internet are rapidly becoming our dominant cultural tools for selecting, gathering, storing and conveying knowledge in representational form. ICT, with its new forms of text and its multimodal possibilities for narrative, has made educators reassess what literacy means. The primary function of literacy is to empower individuals to engage with the knowledge and culture of society. Due to this literacy has evolved over the last century and with it the definition of literacy has changed. However, today it is changing at a pace never before experienced as new technologies for information and communication appear rapidly (Leu, 2000 ; Leu & Kinzer, 2000). Also, Coiro, 2003; Karchmer, 2001; Reinking, and Mckenna, Labbo, & Kieffer, 1998, concur that the Internet and other technologies are changing the nature of literacy.

The general definition of literacy in the past is the ability to read and write. In other words it is simply a matter of acquiring the technical competence that enables people

to read and write. Literacy research conducted from this point of view only focuses on how people learn to code and decode printed text. Therefore, to be literate meant to have competence with printed texts and to possess the mechanical skills of encoding and decoding.

Today the definition of literacy has expanded from traditional notions of reading and writing to include the ability to learn, comprehend, and interact with technology in a meaningful way (Selfe cited in Pianfetti, 2001). Younie. (2001) says that literacy is taken to mean an understanding of how to read, create, and analyse texts in order to participate in society. Texts are taken to convey meaning and new ways of producing texts require new ways of reading and processing information. Some text requires understanding the interplay between image, sound and text.

As a result there has been a shift in educational thinking in that literacy is more than the ability to read and write. Many now consider literacy to be the ability to locate, evaluate, use and communicate using a wide range of resources including text, visual, audio, and video sources. It would seem that literacy now requires understanding and manipulating the processes used to create messages in the modern world.

Now, reading, reading instruction and more broadly conceived notions of literacy and literacy instruction are being defined by change in even more profound ways as new technologies require new literacies to effectively exploit these potentials (Coiro, 2003; Kinzer & Leander, 2003; Leu, 2000). In recent years, the many dimensions of “new literacies” like computer literacy, cultural literacy, technological literacy, visual literacy, media literacy, information literacy, networking literacy, document literacy,

scientific literacy, television literacy, environmental literacy, film literacy and many others have emerged (Paterson, 1996). Information literacy, visual literacy and media literacy are often used interchangeably.

However, the most essential new literacies for schools to consider revolve around the Internet and allow the students to exploit the extensive ICT'S (Interactive Computer Technology) that have become available in an online, networked environment. Traditional definitions of literacy and literacy instruction will be insufficient if we seek to provide students with the future they have to cope with.

A more precise definition of these new literacies may never be possible to achieve because their most important characteristic is that they change regularly; as new technologies for information and communication continually appear. (Bruce, 1997; Leu, 2000; Reinking, 1992). These “new literacies” are needed to successfully negotiate today’s complex information and technology world.

Leu, Kinzer, Coiro and Cammack, 2004 have begun to frame a new concept of new literacies around the following definition, “The new literacies of the Internet and other ICT’s include the skills, strategies and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies and context that continuously emerge in our world and influence all areas of our personal and professional lives. These new literacies allow us to use the Internet and other

ICT’s to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others.”

It is important to remember that most definitions of literacy of the past and present have generally shared three commonalities:

1. the ability to engage in some of the unique aspects of reading and writing
2. contextualization to some extent with the broad demands of society
3. some minimal levels of practical proficiency.

McCarthy and Raphael (1992) noted that definitions of literacy evolve as a result of the consensus of members of society. In 1800's literacy was seen as being able to recognize and pronounce words; in the 1920's literate students were expected to silently read passages and be able to answer comprehension questions. In addition, they were required to make inferences about texts as a sign of basic literacy. Today, being literate includes the ability to read, comprehend, and interact with technology in a meaningful way.

The figure on the next page shows the changes in our conception of literacy and the role of literacy in society.

Figure 1 : Literacy Transformation

Primitive symbol systems

Complex oral languages
Early writing
Manuscript writing
Print literacy
Video literacy
Digital/ multimedia / hypertext literacy
Virtual reality

Bruce 1998, p.47

From this we can see that in the past, literacy has been defined in many ways, changing as new advances were introduced. Mosenthal (2000) commented that reading is defined in terms of the interplay of agendas that are set and implemented by different levels of society. At one time literacy was entirely shaped by the technologies of the printing and publishing industries and their associated cultures. Now, however with the rapid rise of new media of communication and information, there are more new and different technologies available. Furthermore, the International Reading Association (2002) suggested that the Internet and other forms of information and communication technology (ICT) such as word processors, web editors, presentation software, and e-mail are regularly redefining the nature of literacy.

Within just 20 years, we have seen the widespread appearance of, among other word

processing technologies, electronic database technologies, multimedia / hypermedia technologies, e-mail technologies, and Internet technologies. Each has helped to redefine the nature of literacy. In addition, Mayer (1997) discuss that in the past, our

concept of literacy has been based on the assumption that print is the primary carrier of information in our culture and that the most important skills are those that enable students to understand and express themselves in text. The new definition of literacy is based on a different assumption, that digital technology is rapidly becoming a primary carrier of information and that the broader means of expression this technology makes possible are now critical for education. Text literacy is necessary and valuable, but no longer sufficient. We know that the use of the digital technologies affect how we read and write, how we teach reading and writing and how we describe literacy practices.

Leu, et. al (2004) discuss that there are three forces causing the convergence of literacy instruction and networked technologies for information and communication and the changes taking place in literacy and literacy instruction. These forces are:

- Global economic competition within economies based increasingly on the effective use of information and communication.

The world of work is undergoing fundamental transformation (Bruce, 1997; Drucker, 1994; Glister, 1997; The New London Group,2000). These researchers say it is important to note that it is this social context of global economic competition that has resulted in numerous changes to ICTs and to literacy. Therefore, effective use of the Internet should be a necessary component of the

literacy curriculum. Today's work is characterized by the effective use of information to solve important problems within a globally competitive economy. In addition, new technologies provide increasingly greater access to larger amounts of information.

This makes the efficient use of information skills in the competitive workplace contexts even more important (Glister, 1997;. It is the access to information and the ability to use information effectively that enables individuals to meet the new challenges of literacies.

Traditionally, industrial-age organizations were organized in a vertical, top-down mode. Most decisions were made at the highest levels and then communicated to lower levels, thus wasting much of the intellectual capital within an organization. However, the Information-age organizations seeking to achieve greater productivity are organized horizontally, with teams within lower levels of the organization empowered to make important decisions related to their functions. As a result of this type of organization, individuals or teams would have to quickly identify problems, locate useful information related to the problems , critically evaluate the information they find, synthesize this information to solve problems, and then quickly communicate the solutions to others within the organization. These high performance tasks in the workplace have had a fundamental effect on the nature of literacy within these organizations. Therefore all these changes that are shaping the workplace today has important implications for the nature of literacy instruction (Leu, Kinzer, Coiro and Cammack, 2004). There is a need for education researchers to check if the literacy programs in the school are preparing the students for this. The students need to know how and where to locate useful information as well as critically read and evaluate information that is represented in hypertext.

- The rapid emergence of the Internet as a powerful new technology for information and communication

The Internet is rapidly becoming an important tool for one to be able to function effectively in the workplace, home and school. Therefore this has resulted in new literacy skills and strategies demanded by the Internet and other ICTs emerging. (Leu, Kinzer, Coiro, & Cammack, 2004).

- Public policy initiatives by governments around the world to ensure higher levels of literacy achievements including the use of the Internet and other ICTs

Governments around the world are aware of the consequences of global economic competition. They have responded by implementing policies to raise literacy so as to better prepare the children for the challenges that lie ahead. The governments have made great effort to provide new ICTs resources to schools to prepare children for the new literacies of the future.

The Malaysian government too has introduced programs which include developing new teaching methods which include the use of ICTs, connecting all schools to the Internet in the near future and providing all schools with new computers. The governments of the world have realized that knowledge and familiarity with new technologies will be an important dimension of employability in the information society. Therefore, our aim should be to create a learning environment that enables students to develop the attitudes, knowledge, understanding, and skills to enable them to succeed in the modern competitive economy.

It can be very clearly seen that the forces discussed above have placed the internet and other information and communication technologies in a central position in the classroom. There is a need to explore these new contexts for literacy and learning if we are to prepare children to be literate in today's world. It is important to remember

that literacy empowers the individual and therefore enables an individual to access and generate knowledge in today's society (Freire, 2001). Therefore, individuals need to meet minimum standards of literacy in order to function in society, and the responsibility of ensuring that individuals meet these standards falls upon the schools.

We are now moving beyond the constraints of literacy practices that are purely print-based. Therefore, just how do we go about shifting our strategies for teaching more or less print-bound literacy to help our students meet the fresh demands and challenges of literacies?.

As education becomes increasingly technologised and globally referenced, it not only constitutes a new text type but it also opens up new possibilities for learning and new skills to be developed (Coiro, 2003; Anderson, 2003; Leu, 2005).

2.1.1 Central Principles of New Literacies

Leu, et al (2004) have identified 10 central principles of New Literacies emerging from the Internet and other ICTs:

1. The Internet and other ICTs are central technologies for literacy within a global community in an information age.

In the past, literacy has definitely emerged from a variety of social contexts but has been shaped largely by the technologies of the book and the printing press. However, today the Internet and other ICTs are playing a significant role in defining the new literacies. Therefore, it becomes pertinent that educators identify the cognitive reading strategies that would help learners become efficient online readers.

2. The Internet and other ICTs require new elements of literacies to fully access their potential.

Although traditional elements of literacy such as word recognition, vocabulary knowledge, comprehension, inferential reasoning, spelling and other literacy skills, are important, they will be insufficient today, for one to fully utilize the Internet and other ICTs (Coiro, 2003; Leu, 2000; Sutherland-Smith, 2002). The new literacies include the skills, strategies, and disposition that allow us to use the Internet and other ICTs effectively to identify important issues, locate information quickly, critically read and evaluate the usefulness of that information on hypertext, synthesize the information, and then communicate the answers to others. According to Leu, Kinzer, Coiro & Cammack, 2004 we encounter new literacies nearly every time we try to read, write, and communicate with the Internet and other ICTs. It is important to equip the students today with the skills and strategies required to cope with these new literacies.

3. New literacies are deictic

According to Leu (1997, 2000) and Leu and Kinzer (2000) literacy is in a period of technological deixis. What this means is that the forms and functions of literacy

change as rapidly as new technologies for information and communication emerge and individuals construct new envisionments for their use. Therefore, deixis becomes the defining quality of the new literacies of the Internet and other ICTs. Our duty as educators is to keep up with these changes and to prepare students for a vastly different conception of what it means to become literate.

4. The relationship between literacy and technology is transactional.

Technology transforms the forms and functions of literacy (Reinking, et, al. 1998), but literacy also transforms the form and functions of technology. It is important to remember that as we use technology in new ways, we also transform the technology itself, creating additional new literacies in the process.

5. New literacies are multiple in nature

Unlike traditional text forms that typically include a combination of two types of media, print and two dimensional graphics, the Internet texts integrate a range of symbols. The New London Group (2000) defines multiliteracies like computer literacy, cultural literacy, technological literacy, visual literacy, media literacy, information literacy, networking literacy, document literacy, scientific literacy, television literacy, environmental literacy, film literacy, as a set of open-ended and flexible multiple literacies required to function in diverse contexts and communities.

Leu, Kinzer, Coiro, and Cammack 2004 state three different levels which are apparent to the multiplicity of new literacies.

- The first level is represented with multiple media forms. Internet texts integrate a range of symbols and multi-media formats including icons, animated symbols, audio, video, interactive tables, virtual reality environments, and many more (Bruner & Tally, 1999; Lemke, 1989). Therefore, today as read we are confronted with new and different forms and

combinations of texts and images. This poses as a challenge to our traditional understanding of how information is represented and shared with others. Internet technologies require literacy educators to prepare their students with these new, complex and multiple forms of Internet literacies.

- The second level is that the Internet and other ICTs offer multiple tools for constructing multiple forms of communication. Therefore, those who can effectively assess their individual purposes for using the Internet and effectively read and evaluate information from the Internet to meet their need would go far.
- The third level consists of the new skills demanded by the students as they more frequently encounter information from individuals in different social context. The global sharing of information permitted by the Internet introduces new challenges for students who are now expected to interpret and respond to information from multiple social and cultural contexts that share profoundly different assumptions about our world. These multiple contexts for new literacies have important implications for educators preparing students to critically understand and interpret the meaning and images they find on the Internet.

6. Critical literacies are central to the new literacies.

The Internet permits anyone to publish anything on the Internet. This allows people who have strong political, economic, religious, or ideological stances to influence the nature of the information they present. Therefore, as educators we need to teach our

students to become more critical consumers of information they encounter on the Internet.

7. New forms of strategic knowledge are central to the new literacies.

Mayer (1997) has reminded us that the new technologies for networked information and communication are complex and require many new strategies for their effective use. Hypertext technologies, for example, embedded with multiple forms of media and unlimited freedoms of multiple navigation pathways, present opportunities that may distract some readers away from the important content unless they have developed strategies to deal with these distractions (Lawless & Kulikowich, 1996; Lawless, Mills, & Brown, 2002). Also other cognitive and aesthetic changes to text on the Internet may present new challenges to comprehension and information seeking as well. (Sutherland-Smith, 2002, Coiro, 2003)

8. Speed counts in important ways within the new literacies.

In a world of vast information resources, the new literacies of the Internet will be defined in important ways around the rate at which one can read, write, and communicate. Rapidly finding, evaluating, using, and communicating information will become central instructional issues. Highly literate individuals will be able to skim webpages, link to other webpages, and generally sift through large amounts of information in a short time. Individuals who read slowly and haltingly will still be evaluating the first screen of information by the time a more rapid reader has already completed the informational task. Leu, et al (2004) have suggested that literacy educators need to address this issue.

9. Learning is socially constructed within new literacies.

Social learning strategies will be central to literacy instruction in the future. Leu, et al (2004) highlight two dimensions that are important;

- Social learning strategies will play an important role in the exchange of new skills and strategies needed to interact within a world of multiple new literacies framed by the Internet and other ICTs. Therefore, effective learning experience will be increasingly dependent on social learning strategies and the ability of a teacher to orchestrate literacy learning opportunities between and among students who know different new literacies. This will distribute knowledge about literacy throughout the classroom, especially as students move above the stages of foundational or traditional literacy.
- The second is that it is not only how important information is learned or comprehended but also how information is constructed within the technologies themselves (Leu, et al 2004). It would seem that both the workplace and the home, the new technologies of literacy allow us to take advantage of the intellectual capital that resides in others, enabling us to collaboratively construct solutions to important problems by drawing from the expertise that lies outside ourselves. The construction of knowledge will increasingly be a

collaborative venture within the learning spaces defined by the Internet and other technologies and thus, introduce new instructional challenges for educators.

10. Teachers become important, though their role changes, within new literacy classrooms.

Teachers will play a vital role in planning and orchestrating learning experiences within information environments that are richer and more complex than print media for students. The new literacies will require teachers to be;

- aware of emerging technologies for information and communication
- capable of identifying the most important new literacies that each requires, and
- proficient in knowing how to support their development in the classroom.

Leu & Kinzer (2000) tell us that it is essential to begin to integrate these new literacies into classrooms if we hope to prepare all students for the literacy futures they deserve. Most governments around the world have realized this need and have or are in the process of trying to introduce new literacies in the classrooms. However, Leu, 2000 ; Leu & Attaya, 2002 suggested that the literacy curriculum has not begun to recognize the important new literacies these technologies require. The learners need to be equipped with the necessary strategies to engage effectively in an online environment.

In conclusion, the New Literacies Perspective (Leu, Kinzer, Coiro, & Cammack, 2004) highlights three important issues:

- Using technologies in the classroom does not assure that students are acquiring the new literacies they require. The software packages designed to

support the acquisition of foundational literacies will not prepare students for the new literacies of the Internet and other ICTs. It does nothing to develop the essential skills, strategies, and dispositions that define the new literacies (Leu, et al 2004). It is important to note here that using software programs to teach foundational literacies is the only vision many have for integrating literacy and technology in classrooms.

- A central challenge for educators and researchers is that because new literacies continuously change as new technologies appear, we require new instructional practices that keep up with the rapid changes we anticipate.
- It is essential to implement the New Literacies Perspective in classrooms if we hope to maintain economic advantage to all.

Along with the introduction of the new Literacies Perspective, we need to identify the essential strategies that learners need to be equipped to engage effectively in an online environment.

2.1.2 What does it take to be literate today?

The World Wide Web has become an indefinitely large, semi-chaotic collection of information in a profusion of texts, graphics, images, and multimedia material. Anyone can put anything on the Web, making it essential that users have the ability to discriminate between high quality, reliable information and misleading, inaccurate information, and everything in between. The Internet and other information and

communication technologies are changing the nature of literacy and literacy learning as they become an increasingly important part of our lives (Karchmer, 2001; Kinzer & Leander, 2003; and Reinking, Mckenna, Labbo, & Kieffer 1998). These researchers have argued that global economic changes have generated new information technologies that generate new literacies. Therefore, what becomes crucial to our students' literacy future is the ability to identify important problems, gather rapidly and critically evaluate relevant information from information networks, use this information to resolve central issues, and then clearly communicate the solutions to others (Leu, 2002). Most educators agree that literacy now involves being able to make sense of and navigate through several forms of information, including images, sounds, and animation for comprehension.

As a result, Shetzer and Warschauer (2000) suggest that as teachers we need to rethink our instructional goals, techniques, and objectives in order to prepare students for literacy in both paper and electronic mediums. As educators, we are not being fair to our students if we expect them to read, comprehend, and extract information from the Web without first providing explicit instruction in the unique skills needed for these tasks. Moreover, these are the skills that modern academia and the global workplace will demand of our students in the future.

Firstly, in order to help our students it would be good to know how these students read hypertext. This is because reading hypertext is a unique, nonlinear experience that cannot be easily equated with reading traditional, linear printed text. Most educators agree that the students need specialized strategies and skills, which are different from those used with print, to access and read online information. In addition, students need critical thinking skills and strategies to examine and evaluate

that information, much of which is unregulated. In conclusion, in the Industrial era, knowledge was mostly paper based and readily organized into books. Retrieval was dependent on the research skills of knowing how to locate texts, use a library, understand referencing, cataloguing, indexing and so on. To be literate then was to know how to use paper based information.

However, now the Internet requires new literacies to achieve high levels of reading comprehension but we know very little about what these literacies are or how best to teach them. The report of the Rand Study Group (2002), points out that accessing the Internet makes large demands on individuals' literacy skill and very little is known how to analyse those skills. Leu, Kinzer, Coiro, & Cammack, 2004 suggest that research needs to be directed to better understand the new skills, strategies and dispositions required to effectively use the Internet and other ICTs. Scholars who study reading comprehension, for example, need to examine the various components of meaning construction to help us understand the extent to which comprehension processes are similar or different within the multimedia, hyperlinked contexts of the Internet and other ICTs (Coiro, 2003). Reading comprehension is likely to be a major area of investigation because the Internet and other ICTs focus so much on information and learning text.

According to Leu, et. al 2004 there are many questions that await investigation:

- What new aspects of comprehension are required when reading information on the Internet?
- Are inferential processes and strategies similar or different on the Internet?
- How do other aspects of comprehension process change?

Reading comprehension strategies within this context are likely to be important, and we need to know what these are. It is only when we know this that we are able to teach students these strategies. This research study hopes to provide some insight in this area.

2.2 Reading Comprehension

2.2.1 Reading

Reading is a complex process in which readers use a number of strategies to comprehend what they read. Koda (2005) states that an individual's awareness of text structures contributes to reading comprehension. Similarly, Kintsch and Gernsbacher (2006) report that L1 reading research reveal that expository text structure awareness improves comprehension and learning. Furthermore, the act of reading also involves acquiring information from both printed text and non-print sources already stored in the reader's memory. This store of informative sources upon which a reader relies for more information is nonvisual information, or schema.

In addition to the information the reader already has on the content of a given text, this nonvisual information includes a working knowledge of language and of how to

read. It also includes experiences, attitudes, beliefs, and perceptions, all of which contribute to the reader's "theory of the world" (Smith, 1986). According to Smith, the more working knowledge of language and reading skills the reader has, the less visual information the reader needs. This creates a transaction between the reader and the text. When a discrepancy occurs, it creates a sort of functional blindness where the

reader physically looks at the text but fails to see it by means of processing it. In their pursuit of information, the reader is presented with a number of alternatives. These alternatives that Smith refers to are the vast amount of information the readers encounter. Therefore, the readers must discern and eliminate these alternatives in order to reduce the amount of uncertainty. According to Smith comprehension is a “state, the opposite of confusion”. Smith asserts that we comprehend when we have no unanswered questions because we have no doubts about alternative interpretations or decisions in our mind. Information enables us to make sense of a situation, and comprehension aids that making sense, the resultant absence of uncertainty. Therefore for comprehension to take place, uncertainty must be eliminated. However, comprehension does not result necessarily from reading all of the information in a text but also from using the skill of knowledge to acquire information necessary to reduce uncertainty.

Another important variable that Smith claims that help readers interact and comprehend text is the organization and presentation of the text itself. The different ways in which various texts present their information is called “genre schemes” by Smith. These genre schemes differentiate one type of text from another. Genre schemes have become conventional (Smith, 1986). They are conventional in that they signal readers regarding the characteristics they might expect to encounter while

reading a particular text. These expectations help readers by allowing them to predict what a text will look like. Since readers have become accustomed to the genre schemes they regularly encounter, a text that does not comply with the characteristics of its genre scheme may cause problems for readers. Smith (1986) goes on to say that, if we do not know the relevant structures then we will not understand the text, or

our reading of it will be distorted. Therefore structure and organization play an important role in the skills readers employ in order to comprehend text. This supports what this study wants to find out, that is if there is a difference in the strategies used by ESL readers when reading hypertext as to reading printed text.

Rumelhart, 1997 said that the three important components involved in reading are, the reader, the text and the interaction between reader and text. On a similar note The Rand Reading Study Group (2002) defines reading comprehension as the process of simultaneously extracting and constructing meaning through interaction and involvement with written language. They provide a useful heuristic for conceptualizing reading comprehension which includes four interactive components:

Characteristics of

- the reader
- the text
- the comprehension activities and
- the sociocultural context.

These components rarely operate in isolation and need to be considered to understand the reading comprehension processes. This idea is illustrated in the diagram below.

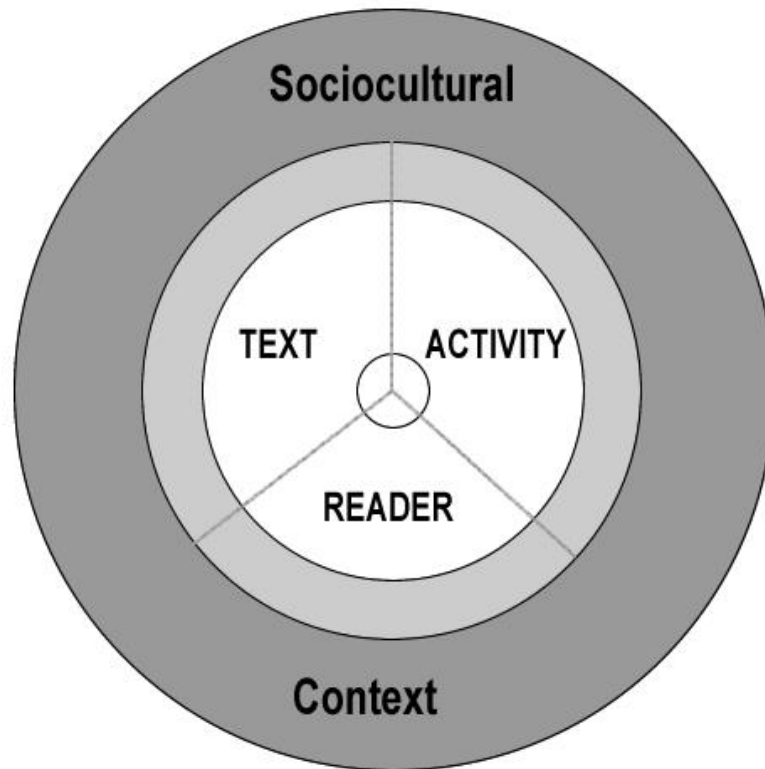


Figure 2 – A Heuristic for Thinking about Reading Comprehension

- The Reader

The reader needs to have a wide range of capacities and abilities for him or her to comprehend the text. These include cognitive capacities (attention, memory, critical analytic ability, inferencing, visualization ability), motivation (the purpose of reading, an interest in the content being read, self-efficacy as a reader) and other types of knowledge (vocabulary, domain and topic knowledge, linguistic and discourse knowledge, knowledge of specific comprehension strategies), and experiences. However there are inter-individual differences among these attributes as well as within an individual reader with regards to differences in text and activity. According

to the Rand Reading Study Group (2002), “the specific cognitive, motivational, and linguistic capacities and the knowledge base called in any act of reading comprehension depend on the texts in use and the specific activity in which one is engaged”.

- The text

We now live in a world that is experiencing an explosion of alternative texts that vary in content, readability levels, and genre. They incorporate multimedia and electronic options and pertain to a variety of cultures and groups (Rand Reading Study Group 2002). The features of any given text have a large effect on comprehension. In addition, Mcnamara, Best, & Castellano (2003) point out that text structure plays a crucial role in the ease with which text can be processed, recalled and interpreted. The proliferation of computers and electronic text has led reading experts to broaden the definition of text to include electronic text and multimedia documents as well as conventional print. The Rand Reading Study Group (2002) states that the electronic text can present particular challenges to comprehension such as, dealing with the non-linear nature of hypertext.

Some features that are inherent in the text like content presentation, vocabulary load, linguistic structure, discourse style, and genre are not matched to a reader’s knowledge and experience, the text may be too difficult for optimal comprehension to occur. According to the Rand Reading Group, “electronic texts that are the product of Internet searches typically need to be scanned for relevance and for reliability, unlike assigned texts that are meant to be studied more deeply. Electronic texts that

incorporate hyperlinks and hypermedia introduce some complications in defining comprehension because they require skills and abilities beyond those required for the comprehension of conventional, linear text”. Therefore it is crucial that researchers and educators investigate how learners process hypertexts. This study hopes to provide some answers as to how learners read and comprehend hypertext.

- The Activity

Reading is done for a purpose, that is to achieve some end and according to the Rand Reading Study Group (2000), activity refers to this dimension of reading. The purpose is influenced by a cluster of motivational variables, including interest and prior knowledge. The reader will normally engage in reading operations designed to address the purpose. Readers interact with the text for several reasons. They decide what it is they want out of the text and how they will get it, and during the task they check their progress and revise their course (Dillon, 1996).

There are many different reading purposes, and different reading conditions or circumstances that necessitate different reading strategies. A study examining college students’ knowledge about reading conditions showed that students distinguish at least nine distinct reading purposes: exam preparation; reading for research; class preparation; reading to learn; reading to apply; reading to self-inform; intellectually challenging reading; reading for stimulation; and light reading (Lorch, Lorch, & Klusewitz, 1993).

Rosenblatt's theories of reader response and transaction with texts points out two concepts of efferent and aesthetic responses to text. Efferent reading involves reading for the purpose of acquiring information. Aesthetic reading involves an active engagement with the text whereby the reader is genuinely engaged in and deriving pleasure from the transaction.

- The Context

It is important to remember that these three elements (Reader, Text and Activity) occur within a larger sociocultural context that shapes and is shaped by the reader and that interacts with each of the above mentioned three components (Rand Group, 2003). One of the effects of contextual factors can be seen in the types of literacy activities in which the reader engages. In fact, the difference among readers can be traced to the varying sociocultural environments in which children live and learn to read. Tharp and Gallimore (1998) explain that children's acquisition of knowledge and literacy is influenced by five characteristics of the sociocultural context: the identity of the participants, how the activity is defined or executed, the timing of the activity, where it occurs, and why children should participate in the activity, or the motivation for the activity.

Yet another way in which reading can also be studied is by looking at the structure of discourse and characteristics of texts, the text attack strategies needed to comprehend texts, the purposes of reading, the role of the reader, and the media utilized for reading. In the readers attempt to make sense of what they read, readers resort to a number of strategies which are deliberate plans readers execute when processing

textual information. It is therefore important today for researchers and educators to find out what sort of strategies learners resort to when reading hypertext.

Harold Herber (1978) on the other hand, defines reading comprehension by delineating a three-level process. During the reading process, the readers initially look at the text in order to determine what the writer is saying and what information is being presented. This is the literal level of comprehension. If students encounter problems at this level it is due to a lack of understanding of words' definitions. Students may skip the words and move straight to interpretation before reviewing the information provided. The second level is when the readers try to find relationships among statements within the text and then derive various meanings from these intrinsic relationships. The readers use their prior knowledge, experience and theories of the world to get an overall picture of the message. This is the interpretive level of comprehension. It is here at the interpretive level that readers "develop intrinsic concepts from the relationships they perceive in the authors' information" (Herber, 1978). The final level is the applied level of comprehension. The readers select "intrinsic relationships produced at the interpretive level of comprehension and synthesize them with concepts that are the product of previous knowledge and experience" (Herber, 1978). In other words the information the reader has just acquired will then combine with the information he or she already knows in order to embrace larger concepts that reside beyond the physical realm of the text. Herber like Smith (1986), also points out that genre schemes in texts play a key role in the process of comprehension. These genre schemes are a means of describing how authors present information, and "awareness of this information helps students develop an

understanding of the author's information and ideas expressed in the text" (Herber, 1978).

Frank Smith (1971) was one of the first researchers to characterize reading as a process by charting the reader's path through a text rather than making judgements of comprehension based on reading outcomes. In addition, Catherine Wallace (1993) stated that as we progress through a text, our choices of what to select are constrained by features within the text itself and our schematic knowledge, like knowledge of how texts are constructed, and familiarity with the discourses within the text to draw upon a relevant schema. However when reading hypertexts, the reader has numerous choices because of the presence of hyperlinks. The reader can choose his own path which can be totally different from the author.

According to Ken Goodman (1967), attempting to make sense of text drives the process of reading. The reader works through various levels of the text to come to an understanding of it. Adding on, he said that elements of a text, such as inflection, punctuation, and structure, direct the reader to read the text in a certain way, thereby affecting the text's meaning on some level. The gaps that exist between reader and text must be filled in based on existing schema. In addition, the readers search for meaning in texts, the need and opportunities to develop necessary strategies for making sense of the text arises. As they make sense of the text readers develop efficiency and effectiveness in comprehension. Based on Goodman's interactive model, 1967, reading is a constructive process requiring active engagement. In trying to make sense of the text there are four fundamental beliefs that he mentions, firstly reading is an active process in which readers use powerful strategies to comprehend

the text. Secondly, everything the readers do is part of their attempt to make sense of the text. Readers become highly efficient in using just enough of the available information to accomplish their purpose of making sense. Finally, the reader's knowledge that they bring to the text is as important for successful reading as anything they use from the text itself.

Therefore the process of text comprehension involves the reader in a complex, dynamic and ongoing interaction with the text (Goodman, 1967; Rumelhart, 1977, reprinted in 1994). The total meaning of the text that is the sense of the written text depends on the interaction between the reader and the text (Rosenblatt, 1994). Also Leu (2002) and Reinking (1992), view reading as an interaction between reader and text is an idealized interpretation of the reading process. However, they point out that in electronic learning environments (i.e. hypertext, hypermedia or multimedia), the electronic medium is interactive, and therefore, the interaction between readers and texts becomes real. It is therefore essential that we identify the cognitive strategies readers engage in this interaction between reader and hypertext for comprehension.

2.2.2 Reading Strategies

Reading strategies are “the mental operations involved when readers approach a text effectively and make sense of what they read” (Barnett, 1988). He divides reading strategies into two categories: text-level strategies and word-level strategies.

Text-level strategies are strategies used by the reader to understand the whole text. These include surveying the text and making predictions about it, background

knowledge, skimming, and looking for the organization of a paragraph or a passage. On the other hand word-level strategies are strategies that involve individual words or phrases like guessing the meaning of a word from context and understanding the meaning of a word through recognizing word families. Paris et al. (1991) grouped reading strategies into three areas: before reading, while reading, and after reading strategies. Strategies for:

- before reading - previewing
- while reading - identifying main ideas, making inferences and looking forward and backward in the text.
- after reading - summarizing

Shinghal (2001) says that comprehension or reading strategies indicate how readers conceive of a task, how they make sense of what they read, and what they do when they don't understand. Therefore these strategies are processes used by the learner to enhance reading comprehension and overcome comprehension failures. These strategies include skimming and scanning, contextual guessing, reading for meaning, utilizing background knowledge, recognizing text structure and so forth. Coiro (2003), reaffirms that reading strategies are tools that assist a reader in unlocking meaning behind printed words. These strategies can be helpful before, during and after the actual reading event. Similarly, Oxford (1990) offers a useful and comprehensive classification scheme of the various strategies used by learners when performing learning tasks. The following are the strategies:

- Cognitive strategies are used by learners to transform or manipulate the language. This includes note-taking, summarizing, paraphrasing, predicting, analyzing, and using contextual clues.

- Memory strategies refer to techniques used that help the learner to remember and retrieve information. Some of these techniques include creating mental images through grouping and associating, semantic mapping, using keywords, employing word associations and placing new words in context.
- Comprehension strategies include skills such as inference, guessing while reading, or using reference materials.
- Metacognitive strategies are behaviors used by the learners to plan, arrange, and evaluate their own learning. These include directed attention and self-evaluation, organization, setting goals and objectives. In the context of reading, self-monitoring and correction of errors are examples of metacognitive strategies.
- Learners also use affective strategies such as self-encouraging behaviour, to lower anxiety, and encourage learning.
- Lastly social strategies are those that involve other individuals in the learning process, and refer to cooperation from peers, questioning, asking for correction, and feedback.

It is important to recognize that the above strategies can be used to facilitate learning, or can be used to facilitate comprehension.

Besides the well established classification of language learning and reading strategies, there are new classifications that have been developed recently in the field of research of L2 reading strategy. Sheorey and Mokhtari (2001) and Mokhtari and Sheorey (2002) have developed a new instrument named Survey of Reading Strategies (SORS) designed to measure metacognitive reading strategies of L2 reading engaged in reading academic materials. A brief description of each SORS category and the number of items within each category are given below:

1. Metacognitive Strategies are those intentional, carefully planned techniques by which learners monitor or manage their reading. The strategies include having a purpose in mind, previewing the text as to its length and organization, or using typographical aids and tables and figures. (10 items)
2. Cognitive Strategies are the actions and procedures readers use while working directly with the text. These are localized, focused techniques used when problems develop in understanding textual information. These cognitive strategies include adjusting one's speed of reading when the text becomes difficult or easy, guessing the meaning of unknown words, and re-reading the text for improved comprehension. (12 items)
3. Support Strategies are basically support mechanisms to aid the reader in comprehending the texts such as using a dictionary, taking notes, or underlining or highlighting the text to better comprehend it. (6 items).

Many researchers like Alderson 2000; Cohen 1998, and Purpura 1998 have mentioned

that sometimes in research practice, the distinction between skills and strategies are vague and used interchangeably. In this study, strategies are viewed as distinct from skills, especially in reading comprehension in that skills refer to the largely subconscious nature of linguistic processes involved in reading while strategies refer to conscious cognitive processing. In other words, skills refer to information techniques that are automatic, whether at the level of recognizing grapheme-phoneme correspondence or summarizing a story. Skills are applied to a text unconsciously for many reasons including expertise, repeated practice, compliance with directions, luck, and naïve use. In contrast strategies are actions selected deliberately to achieve particular goals. An emerging skill can become a strategy when it is used intentionally. Likewise a strategy can become a skill. Indeed strategies are more efficient and developmentally advanced when they become generated and applied automatically as skills. Paris, Wasik and Turner (1991), stated that strategies are “skills under consideration”

Even the term strategy seems to be defined in a number of different ways (Purpura, 1998). According to Phakiti (2003) there are two issues that need to be addressed and made clear, in order to arrive at proper descriptions of the term strategies. First is that language learning strategies can be stipulated either within the focal attention of learners or within their peripheral attention. Peripheral attention refers to when learners can identify a strategy when asked immediately (Schmidt, 1994). If the learners cannot identify any strategy within their peripheral attention, it is unconscious and the behaviour referred to as a process, not a strategy (Cohen,1988). Faerch and Kasper (1987) argue that once learners have developed some strategies to

the point that they become automatic, those strategies maybe subconscious. Ellis (1994), on the other hand states that if strategies become automatic the learners are no longer conscious of employing them and they cannot be accessible for description, they lose their significance as strategies. In this study, strategies are viewed as conscious and deliberate. That is the actions that readers actively select and control to engage and comprehend the texts.

The second issue is whether a strategy is observable. Oxford, (1990) views strategy as observable whereas Pupura, (1999) is of the opinion that strategies are both observable and unobservable. In this study, strategies are seen as both observable and unobservable. This study also allows for the possibility that the learners might use a strategy but fail to report it. Therefore it may be wrong to imply that they did not use such a strategy

Reading strategies are of interest because of what they reveal about the way readers manage their interaction with written text and also how these strategies are related to effective reading comprehension. Research has shown the ESL readers use a wide variety of strategies to help them comprehend a text.

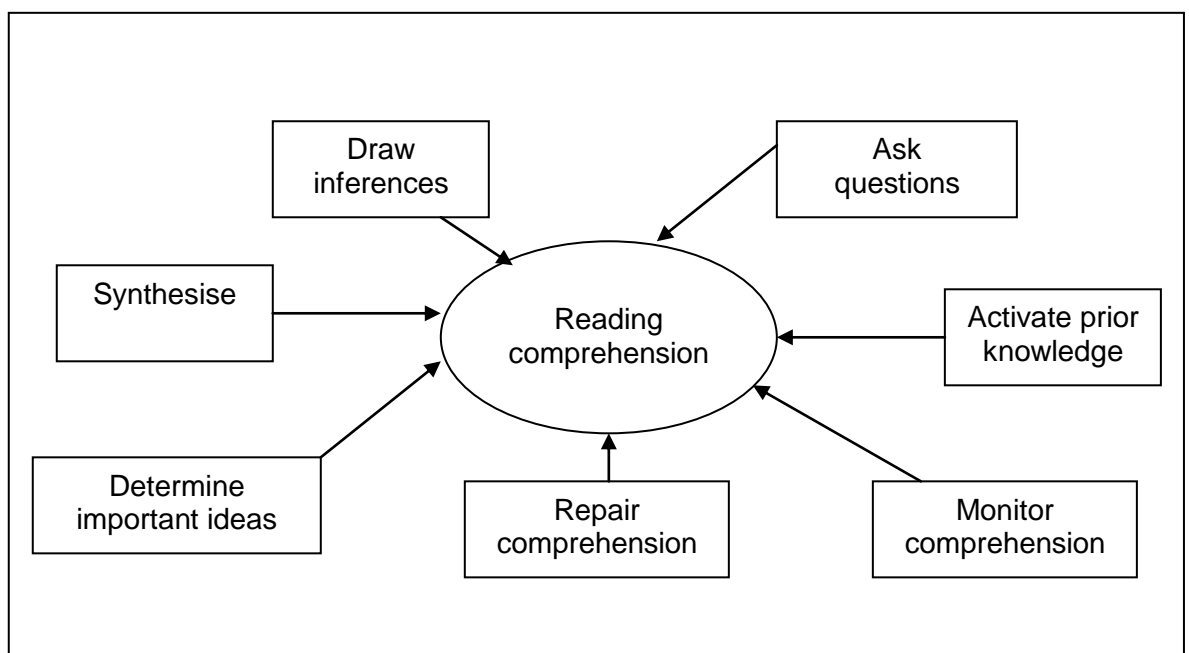
There have been numerous studies, both in L1 and L2, conducted to identify reading strategies used by learners of English in text comprehension of printed text. A major contribution of research on reading strategies also has been to identify the strategies used by good language learners and to determine how these strategies can be taught to others.

However, “one area in which strategy research has not been integrated into other areas

of investigation is the work related to online reading. Researchers have done very little to explore the reading strategies that learners use while engaged in online reading tasks” (Neil J. Anderson, 2003). One study that explored reading strategies that learners use while reading on the Internet was by Elizabeth Schmar-Dobler (2003). She used observation and interviews with adolescent Internet readers who provided examples of the comprehension strategies these readers apply to the reading of text on the Internet. Her findings revealed that these Internet readers have the seven strategies that Pearson et.al.(1992) mentioned for reading print text and applied them to reading of Internet text. Furthermore, she also indicated that for the present and the future, students need to rely on speed, efficiency and understanding of how to make reading on the Internet an effective tool in their world of work and learning.

Given below is the diagram for the seven strategies.

Figure 3 – Seven Comprehension Strategies for Reading Comprehension



Seven comprehension strategies for reading comprehension

- Activate prior knowledge - Strategic readers use what is known about the topic of a text and the way a text is organized to check their comprehension and make mental connections between new information and existing knowledge.
- Monitor Comprehension – Reading rate and strategies are adjusted when a reader needs to understand different kinds of text.
- Repair Comprehension – When meaning has been lost, fix-up strategies such as rereading and skipping are used by strategic readers to move back on track.
- Determine important ideas – Making predictions and identifying the most important ideas of the text come before, during and after reading.
- Synthesize - Throughout reading, strategic readers mentally summarize information as a way to check their comprehension.
- Draw Inferences - Strategic readers combine prior knowledge with textual information to make inferences about the text. Gaps in understanding are filled in through predictions, inferences and new ideas.
- Ask Questions - Questions are developed and answered by strategic readers throughout the reading of the text to activate prior knowledge, check comprehension, clarify ideas and focus attention

The process of text comprehension involves the reader in a dynamic interaction with the text. It is important to note that readers employ strategies to comprehend the text and thus lend it meaning, but different reading conditions, text structures, purposes or circumstances necessitate different reading strategies.

If this is so, this study hopes to find out if the students need to be specifically trained in certain reading strategies to enhance their reading performance when reading hypertext and also, if any one reading strategy plays a more significant role in one medium than the other.

2.3 Hypertext

The ability to read texts is considered one of the most important skills that University students of English as a Second Language need to acquire. In the current Internet age, with its proliferation of information needed for academic purposes, students are exposed not only to conventional text presentation but also to electronic texts. While students used to read in English primarily through text on paper; now they often do most of their reading online. The Internet has significantly changed how we read. The explosion of information and negotiating these online learning tools add an additional challenge to Second Language readers. They must be able to navigate through various hypertext forms to construct meaning.

A hypertext reading environment differs from the traditional printed text environment in that the hypertext reader has the ability to self-select the type and sequence of information to be acquired rather than following a path provided by the author of the

text. Brown (1986) described hypertext as non-sequential written text that allows branches and multiple paths to be selected by the reader. Sequential flow imposed by authors in the printed medium is replaced by flow initiated by the reader. Therefore hypertext requires the readers to take on an active role in determining the quality and coherence of the texts they read (Burbules and Callister, 2000). According to McDonnell (2003), reading on the Internet now truly represents Goodman's (1967) interactive mode and students really do use a "psycholinguistic guessing game" (P.L.Carrell, Devine, Joanne, Eskey, David,E, 1988) as they read these texts. This dynamic aspect is the main difference between text and hypertext. Hypertexts support activities that are impossible or difficult to perform with paper (Joanassen, 2004).

Given below are some of the characteristics of hypertext:

- Hypertext is not simply a nonlinear text. Winklemann (1995) argues that while print is static, e-text or hypertext is dynamic and malleable. Hypertext is defined as "more than text" as hypertexts have links that form connections between nodes, or organized chunks of text (Joanassen, 2004). The reader selects a link and is taken to a related node of text. These linking nodes provide the readers with immediate access to definitions of words and explanations of difficult concepts. The meaning of what is read may not be limited to a single closed set of words on that same page but instead may be linked elsewhere depending on that writer's cognitive map or mental representation of space. Therefore these links give the reader the freedom to choose his or her own path. The hypertext offers the reader the choice of progression (Brown, 1986). Each link in the hypertext is linked to others in a

mesh type arrangement rather than in a sequential flow like the printed material. Brown argues that the reader can diverge, explore, then return and continue with the text. This multiple entry and exit of the links can create reader disorientation and cognitive overload (Conklin, 1986). When students read printed text the page retains the information about the topic that the students are reading so that the students may look back and forth in a text. However McDonell, 2003 states that when a student chooses a hyperlink that may take him or her to a page where all the information is new, the student needs to make inferences about the reading from the start. Therefore hyperlinks change the pages information continuously and this may change the context of that information.

- Each hyperlink in the hypertext exposes the reader to different navigational and structural contexts, leading to disorientation. The author of the hyperlink allows the reader to gather additional material and synthesis into their own framework of understanding. Also, the reader is able to see the various texts that influenced the author. This could pose as a problem according to Kamil and Lane (1998), because there is no way to predict whether or not the link will be useful. Therefore if the students do not process the information correctly through the hypertextual links, then the students will not be able to include the information into any form of comprehensible output in their research. This could be also due to the constant shift in the reader's focus.
- Intertextuality is an important characteristic of hypertext. Intertextuality is

based on the assumption that texts derive their meaning from their relationship to other texts. The hyperlinks give the reader an insight into all the materials used by the author in the construction of his or her text.

- The pace of hyperlink is quick. It involves the reader scanning rather than reading the information most of the time. This is because there is so much of information presented to the reader through the hyperlinks.
- Hypertext supports synchronous communication. The reader is able to have direct contact with the author. This is not possible for printed text.

Therefore the key difference according to McDonnell (2003) between hypertext and traditional print relate to textual boundaries, mobility and navigation. The reader is given the freedom to make the directional choice.

In a study by Anderson-Inman, Horney, Der-Thang, and Larry (1994), they reported three types of hypertext readers based on the Electro Text Project.

- The Book Lover is a person who typically reads everything in linear form, and uses available resources sparingly.
- The Studier is an individual who navigates through the text in a linear form, uses backward navigation for reviewing and checking and more frequent use of comprehension monitoring question.
- The Resource Junkie is an individual who spends most of his or her time looking for and using resources. His or Her navigation patterns and strategies are the most varied and complex.

Some reading educators (Coiro,2003; Anderson, 2003; Leu, 2005; Destefano & LeFevre, 2005) concur that there is limited research on the impact of hypertext on the reading process. McDonell (2003) argues that most of what we know about college reading comes from what we know about traditional texts and textbooks. We know little about how text is read on the Internet. A lack of a thorough theoretical foundation is a major breakdown of current hypertext research. We do not have a general theory of hypertext or a model of the cognitive processes describing reading in a hypertext environment (Rouet and Levonon, 1996). Due to this, researchers' characterization of hypertext has pointed out two issues involved in hypertext research: the similarities and differences between linear and non-linear texts, and the problems embedded in navigation while reading hypertext.

Recent research has suggested that the navigational opportunity of a hypertext changes the nature of how individuals interact with the information. The reader when reading hypertext is provided with more flexibility in choosing where to go in the text, more methods of finding relevant information and also more options for moving about in the text (Foltz, 1996). Hypertext and the World Wide Web may foster the cognitive flexibility needed to understand information and to construct knowledge through a broad range of sources. Therefore one area of concern would be how L2 language learners are able to comprehend frames of pages as it has the possibility of drowning the reader in information overload. Furthermore, unlike printed text there is no sequential flow or standard structure that the reader can adhere to. There are many pathways that the reader can follow. Hypertext increases individual freedom because users are entirely free to follow links wherever they please (Landow, 1997). Lanham, R (2000) says that the perceptual field of the reader becomes considerably richer and more complex in electronic display.

It is evident that navigating a text network is a complex cognitive activity in which various strategies are involved (Spiro and Jehng 1990; Rouet, 1989). A few researchers have reported that there is a need to investigate the cognitive aspects in hypertext reading in order to understand the nature of hypertext reading process (Esperet, 1996).

In addition, Charney (1994) points out a few basic problems of reading hypertext, for example, it imposes a greater demand on short-term memory or working memory. Also readers may find that navigation becomes arbitrary through a lack of cues to the meaning of links between nodes. She also states that hypertext may disable the reader's existing knowledge about how texts are structured and about different text genres. In addition, Kamil and Lane (1998) argue that one of the problems with Internet reading is the unpredictability of knowing where one will go when choosing the hyperlink because there is no way to predict whether the link is useful or not. Therefore if the students have difficulty processing the information correctly through the hyperlinks, then the students cannot put this reading into any form of comprehensible output for any of their research papers. This would be especially true for low proficiency ESL learners.

While many computer and cognitive scientists are devoted to the idea of designing better hypertext environments and exploring the mental processes and consequences of learning with hypertext (Spiro & Jehng, 1990; Mc Allese, 1990), far less research has been done by first and second language reading researchers or reading educators to assess the potential impact of hypertext on and implications for reading and literacy (Altun, 2003).

We cannot deny that the Internet has significantly changed how we read and most of what we know about students and text processing is through the printed words of textbooks, books, magazines and newspaper. Furthermore, Kamil (1998) argues that there is limited research on technology and reading. He points out that there is only a small body of research on hypertext and hypermedia and very few of the empirical studies discuss the cognitive consequences of reading this type of text. In order to contribute to the understanding of this area, this study will compare comprehension of printed texts versus hypertext.

2.4 Verbal Protocols

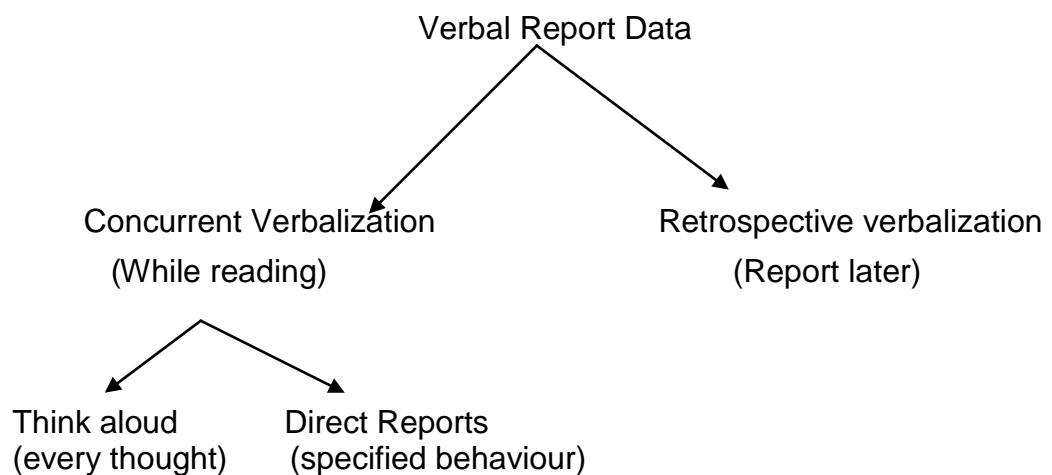
2.4.1 Introduction

Verbal Protocol is any collection of verbal reports during a task, interviews or self-deposited accounts of events or problem solving strategies reported by people during or after a task. In other words, verbal protocol serves to identify mental processes occurring during or after the solution of a given task. The individual is required to say what he or she is thinking during the task or provide a retrospective report after the task has been completed.

Green (1998) points out that the term verbal protocol specifically refers to verbalization which has been generated by a subject instructed to either talk aloud or think aloud. The subject is required to tell the researcher all that he or she is thinking as the task is being carried out, or after the task has been completed. Green (1998) goes on to say that Verbal protocol analysis is a qualitative methodology in which verbal data is analyzed in order to identify inferences about cognitive processes that produced the verbalization.

Ericsson and Simon (1980) concur that verbal protocol refers to subjects verbalizing their thoughts while or immediately after completing the task. According to Ericsson and Simon 1984;1993, Smagorinsky 1995 concurrent and retrospective verbalization are the two broad categories of verbal report data.

Figure 3 Verbal Report Data and Think Aloud



Concurrent verbalization refers to the subjects verbalizing information while simultaneously attending to the task, thus providing a verbal report concurrently with the performance of the task. Think aloud protocols and Direct reports come under concurrent verbalization. Think aloud protocols is where the subjects verbalize every thought that comes to mind. Think alouds are a special type of verbal self-report developed by Newell and Simon (1972) to probe cognitive processes. On the other hand, in Direct reports only specified behaviours are reported (Smagorinsky, 1995).

In retrospective verbalization, the subject is required to report on cognitive processes that have occurred at an earlier point in time. Once the task is completed, the subject is then asked to report on his or her thoughts when attending to the task. The time interval between task completion and start of the verbal report is important.

In the context of this reading research, Anderson (1991) and Block (1989,1991) recommend think alouds because by employing think aloud protocols, information of the unobservable behavior of reading comprehension can be obtained. In order to ensure completeness of the think aloud report, the researchers followed Haasrrup's (1987) suggestion that the think aloud procedure be supplemented by a retrospective interview.

According to Gill R, (2004), combining the think aloud protocols with the retrospective stimulated recall interview report assured the completeness of the subjects' verbalization. It allowed for triangulation of data.

2.4.2 Think aloud Protocol

The mental activity involved when learners read is crucial to the understanding of the reading process as a comparative analysis of the final product. The final product often provides an incomplete and often misleading way into the reading process, hiding both successful strategies and problems. Insofar as it is not possible to directly observe the human mind at work, a number of attempts have been made at indirectly accessing the learners mind. One such attempt, which has been steadily gaining

ground in reading research, has been to ask the learners themselves to reveal their mental processes in real time while carrying out the task. Such a method of data collection, known as think-aloud is not new to scholars working in psychology and cognitive science.

The think aloud protocol is a technique in which students verbalize their thoughts as they read and thus bring into open the strategies they are using to understand the text (Coiro, 2003). Thinking aloud differs from other forms of introspective report because during think-aloud protocol readers report their thoughts and behaviors without theorizing about these behaviors. Thus, think-aloud protocols provide a direct view of a reader's mental activity, a kind of window into these processes which are usually hidden.

This has resulted in the use of think-aloud protocols and other verbal report formats have increased in L1 and L2 reading research. As both a research tool and as a class activity, such protocols provide useful information about the hidden processes that language learners use on all four language skills, as well as be able to identify test taking strategies and teacher decision making processes. In each case, the individual is asked to reflect upon what he or she is thinking about or doing while being engaged in a task.

Within the last 15 years, this research tool has been used as a source of data on the strategies of learning in a second or foreign language, thereby contributing to our understanding of learners' learning strategies. However, a major impetus of this research technique has been its successful use in first language studies, especially in

research on cognitive processes in reading and writing.

The research on think-aloud protocols spans over 40 years. It was initially used by Newell and Simon (1972) as a research tool to examine strategies and processes involved in thinking and problem solving. Since reading according to Thorndike (1917) could be considered as a kind of problem solving activity, think-aloud is also used in reading research. In the 1980's think aloud was viewed as a technique to model to students the reading strategy teachers use to comprehend text so as to help students improve thinking and reading comprehension. Then in the 1990's think aloud was viewed less as a tool or strategy and more as an "aspect of social interaction, specifically as an aspect of the discourse in social contexts designed to teach reading comprehension (Kucan and Beck, 1997). Often methods such as classroom observation produce indications or clues as to the strategies learners use, rather than instances of actual strategy use. Hence, researchers have had to rely to some extent on their own intuitions in order to produce descriptions of strategy use. The verbal report measures provide a more viable – perhaps the most viable – means of obtaining empirical evidence as to strategy use.

Think aloud protocols belong to a larger category of verbal protocol analysis. Verbal protocol analysis is a qualitative methodology in which verbal data is analyzed in order to develop inferences about the cognitive processes that produced the verbalization (Green, 1998). The data may also be coded and quantified in order to identify trends for purposes of comparison.

2.4.3 Theoretical framework of think-aloud protocol

The use of verbal report data as a research tool emerged from the cognitive sciences. According to Smagorinsky, 1995, Newell and Simon, 1972 described a detailed procedure called protocol analysis which they used to study the thought processes related to problem solving activities. This has resulted in the use of verbal report data to study the thought processes of individuals involved in a wide variety of activities. The theoretical framework for think-aloud protocol experiments is provided mainly by the work of Ericsson and Simon (1984; 1993). These researchers' analysis of the cognitive processes underlying verbal report of thinking is based on the information processing theory of human cognition provided by Newell and Simon, 1987. This theory postulates that a cognitive process can be seen as a sequence of internal states successively transformed by a series of information processes. Cognitive processing is thus viewed as a sequence of states in which each state corresponds to information that is attended to or heeded whilst it is in the short term memory.

Haastrup (1987) states that the posit validity of verbal report protocols rests on Ericsson and Simon's information processing model. According to Ericsson and Simon's information processing model (1984), information is kept in different memory stores, with varying access and storage capabilities: short-term memory (STM) is characterized by easy access and severely limited storage space, while long-term memory (LTM) is characterized by more difficult access and larger storage space. Only information present in STM that is information which is being heeded by the subject can be directly accessed for further processing, such as producing think-aloud reports. An important assumption is that for verbally encoded information,

which can be reported in the same form as the one in which it was heeded, the verbalization does not interfere with the cognitive process. The only effect of think-aloud is to slow down the performance.

From the short term memory store, a subset of the heeded information passes into the very large capacity and relatively permanent storage of long term memory (LTM). Retrospective verbal reports draw on this information stored in LTM as well as its traces in STM. In order to provide the retrospective report, the information must first be retrieved from the long-term memory store, which is transferred to STM before it can be reported.

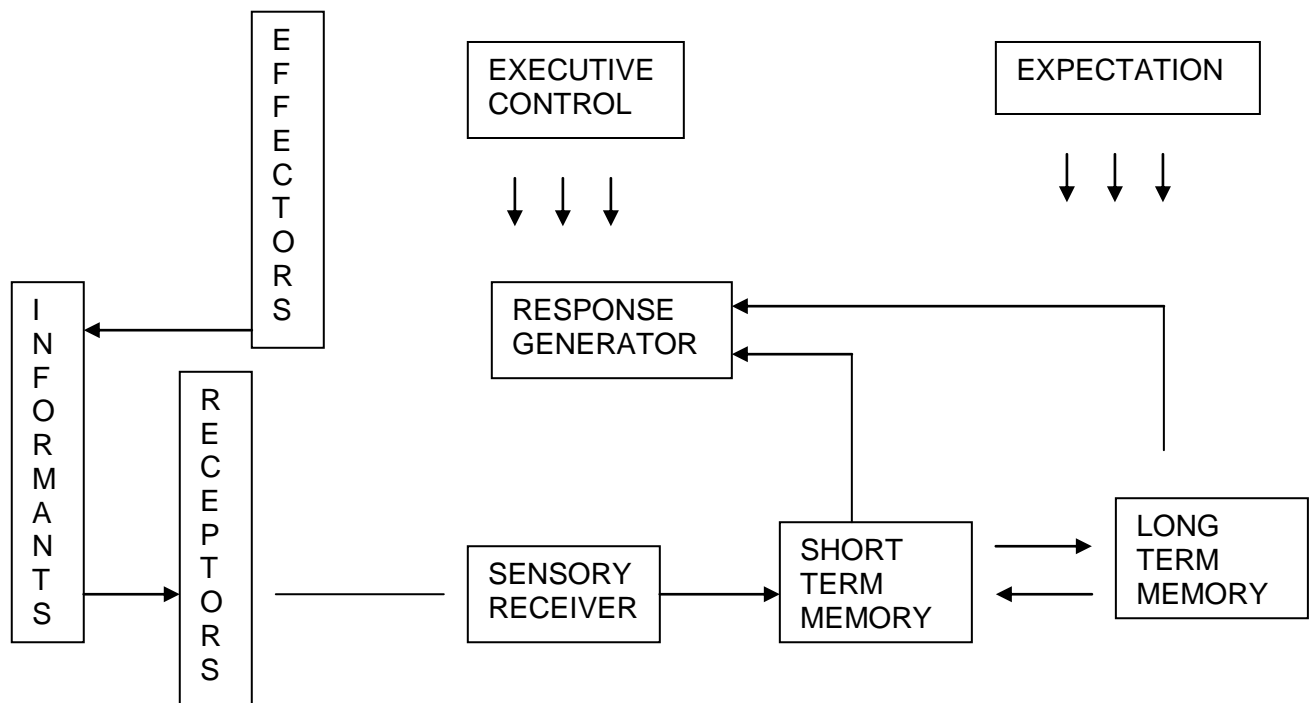


Figure 4: The Information Processing Mode (Ericsson and Simon, 1984)

The implications of this model are manifold, but only those relevant to this study will be discussed. Firstly, only concurrent verbalization of thoughts can be claimed to exhaustively reflect the mental states of a subject carrying out a relatively long task, which takes longer than ten seconds to complete (Ericsson and Simon, 1987). Ericsson and Simon assert that by instructing subjects to verbalize their thoughts, during the performance of the task, one can get a sequence of verbalizations corresponding to the sequence of generated thoughts. The think-aloud protocols that are elicited thus provide a stream-of consciousness disclosure of thought processes while the information is being attended to by the informant and comprise of data that are basically unedited and unanalyzed (Cohen,1998). The use of think-aloud is predicated on this premise.

On completion of such a long task, part of the information moves to LTM, leaving only retrieval cues in STM. According to Ericsson and Simon, in such cases post verbalization has been found difficult and often incomplete. Theoretically, therefore, think-aloud reports more accurately reflect the thought processes that are being reported than do retrospective verbalizations. Ericsson and Simon (1987) have advocated that asking questions about what was stored in short term memory, was seen as a means of making think aloud reports more reliable in that there is no strain on the memory to reconstruct past thoughts.

Secondly, in order to make sure that the reports actually reflect mental states without distorting them, it is important that the subject does not feel he or she is taking part in a social interaction. The interaction between subject and researcher should therefore be avoided or at least reduced to a minimum.

Thirdly, practice and experience may affect the amount of processing carried out in STM, so that fewer mental states will be available for verbalization to subjects' experienced in the task. This process, known as automation, is explained by Ericsson and Simon (1987), "..... before over learning has occurred, process has to be interpreted, with substantial feedback from intermediate processing stages in STM. Automatic processes are therefore faster and more efficient than processes which are under conscious control". Therefore, under the right circumstances (verbally-encoded information, no social interaction, no interferences, no instruction to analyse thoughts), verbalizing is assumed not to interfere with the mental processes and to provide a genuine account of the mental states. Ericsson and Simon's justification on the validity of concurrent type of reporting has resulted in the popularity of the use of think-aloud as a research tool. According to Gill (2004), think aloud protocol analysis is capable of providing insights into the cognitive mechanism and the processes that drive the working of this mechanism in reading and writing events. Therefore, think-aloud is used in this study to provide insights into the types of reading strategies used by ESL learners while reading a printed text and hypertext.

2.4.4 Challenges faced when using Think- Alouds

Cohen (1998) considers a series of challenging areas regarding the methodology; however these challenges can be dealt with. Gill (2004) in his study identified some of the problems encountered when he used think aloud protocols to collect his data. Given below are some of the challenges encountered and solutions.

- Setting

The researcher should be familiar with the working environment and have a trusting relationship with the subjects and also the lecturers involved in the development and validation of the materials and procedures used in the study (Marshall and Rossman, 1992). There is a need to develop a rapport with the selected subjects. This is to make sure that the subjects are not shy or reserved when verbalizing their thoughts and therefore not hinder the data collection. Gill (2004) asserts that having once determined the research focus, many potential problems can be reduced, if not avoided entirely through judicious selection of the research setting.

- Task

It is very important that the researcher and the subjects conceptualize the task in the same way and that the task implicates those behaviours that the researcher is interested in investigating (White, 1980). Also, Ericsson and Simon (1987) assert that a task analysis is necessary to ensure that the processes that are the focus of the investigation are in fact, implicated in the completion of the task.

- Verbal Facility

Garner, as cited in Matsumoto (1993), cautions that the subjects' verbal facility in the target language should always be considered in data collection process so that verbalization difficulties will not mask out the emergence of some important mentalistic data. The ability for the subjects to provide think aloud protocols is critical to the success of this technique.

Therefore, purposive selection is a useful strategy to preempt potential problems related to the subjects (Berg 1989). A rigorous purposive selection procedure will

allow for the identification of subjects with requisite English Language Proficiency.

- Subject Training

Ericsson and Simon (1987), see a need for subject training especially for think aloud protocols as it will increase the completeness of the verbalization. The researchers suggest that to ensure consistency, the subjects be given trials until they are able to make verbal reports.

However, Faerch and Kasper (1987) and Smagorinsky (1995), caution that demonstration of, and practice on tasks similar to the data collection task may affect the verbal report data by cueing particular responses since the processes or information that the subjects should attend to are identified. Gill (2004) in his intertextuality study demonstrated think aloud using a maths word problem. The use of a mathematics word problem had the effect of not cueing the particular strategies. Gill (2004), followed Hartman's (1995) advise and he trained the subjects using sets similar to the ones in the actual collection of data. The sessions were audiotaped and by playing back the audiotape he was able to indicate to the subjects the cognitive processes that they should focus on, without cueing extraneous processes or information.

- Completeness of the Think aloud protocols.

Ericsson and Simon (1984) assert that think aloud protocols are often incomplete because the subjects do not utter all of their thought processes. To address this problem, Gill (2004) used a retrospective interview to supplement the think aloud procedure. This was done so as to probe into some of the statements made during the

think aloud, thereby improving the reliability of the protocol analysis. The technique of cued retrospective recall uses the audio – recordings of the verbal performances of the subjects, as represented in their think aloud protocols, to serve as cues in eliciting their retrospective reports (Dipardo 1994). The technique rests on the premise that confronting the subjects once again with the task situation by means of the audio recording reactivates traces in short term memory, thus allowing the subjects to report their cognitive processing with an acceptable degree of accuracy (Faerch and Kasper 1987).

According to Gill (2004), combining the think aloud protocols with the retrospective stimulated recall interview data assured the completeness of the subjects' verbalizations. It also allowed for between methods of triangulation of data. Many researchers have encouraged triangulation as a means of enhancing the validity and reliability of verbal data (Ericsson and Simon 1984; Greene and Higgins 1994). In addition, Smagorinsky, 1995 stated that methodological triangulation allows for the construction of a composite picture from both retrospective and concurrent protocols that is likely to yield the corroboration necessary to draw strong conclusion. Furthermore, collecting and cross-referencing data from the think aloud protocol and cued retrospective recall interview allows checking for consistency as well as completeness of these accounts (Greene and Higgins, 1994). Nyhus (1994) in his study, the respondents and the researcher listened to the recording of the verbal report and the respondents provided a retrospective verbal report by pausing the tape when they wanted to make additional comments about thoughts that had occurred to them while reading the text. According to Nyhus (1994) this provided still more insight on the verbal reports.

In conclusion, think aloud protocols do have their shortcomings, as in all other research methodology but what is important as Smagorinsky (1995) asserts is that when researchers are attentive to the potential problems caused by the procedure and take steps to control and account for them, think aloud collection and analysis is a remarkably illuminating methodology.

Ericsson and Simon (1993) have advocated the collection of concurrent verbalization over other approaches of verbal reports because asking questions only about what was heeded in short-term memory was seen as a means of making such reports more reliable in that there is no strain on the memory to reconstruct past thoughts. Furthermore, Ericsson and Simon (1984) found substantial evidence that the contents of thinking aloud and of immediate retrospective reports are valid, and no empirical evidence that these reports do not correspond to what subjects pay attention to in normal course of problem solving and thinking. Therefore these reporting procedures should yield useful information on the cognitive processes involved in reading and text comprehension.

2.4.5 L2 Reading Research Using Think-aloud Protocol

There have been a plethora of studies that examine the comprehension strategies that second language readers utilize to process a text. However, only a few of these studies have used think aloud protocol as a research tool.

A comprehensive review of think aloud studies in reading by Presseley and Afflerbach (1995) showed the enormous range of strategic activities used by readers

in elementary schools (e.g., Meyers, Lytle, Palladino, Devenpeck, & Green, 1990), high school (Olshavsky, 1976-1977), and college students and adults (Afflerbach, 1990). Readers in think-aloud studies show evidence of planning their reading activities, enacting numerous cognitive and metacognitive strategies, monitoring the efficacy of those strategies, adjusting strategies flexibly, reflecting on and reacting to what was read, and many other processes. Furthermore, Cromley and Azevedo (2004) have stated that think-aloud studies have revealed reading processes of proficient readers (e.g., planning) that had not been identified by other research tools. In addition, to the experimental studies cited above, several think-aloud studies have shown evidence that background knowledge, inference, strategies, vocabulary, and word reading play a role in students' reading comprehension.

With regards to background knowledge, Kletzien (1991, 1992) studied activation of prior knowledge by high and low 10 and 11 grade readers as they read social studies texts of varying difficulty using think-aloud protocols. His study revealed that there was no difference in vocabulary strategy use between high and low readers on independent or instructional level texts.

While Afflerbach (1990) used think-aloud protocol on 15 skilled reader graduates and high school students from a gifted and talented program – to make predictions while reading three essays and two short stories. With regards to inference, nine think aloud protocol studies with middle and high school students have shown differences in inferencing across either readers groups or text type. Furthermore, Neuman (1986) compared 21 low achieving and 21 high achieving 5th grade students on a think aloud

task with two stories from a children's mystery series. Students' inferences were coded and analyzed; low and high achieving readers did not differ significantly on the types or frequency of strategies, but they did differ on inference errors. Whereas Rogers (1991) used think aloud on 8 ninth grade students at a range of teacher-rated reading levels, reading short stories by William Faulkner. He was able to identify a number of specific strategies used by high school readers. These included summarizing, elaboration, monitoring, hypothesizing, and evaluating.

In another such second language study, Hosenfeld (1978) used think aloud procedure to examine what types of cognitive operations, successful and unsuccessful readers used to process written texts. The subjects were ninth grade students who were learning French. In an oral interview the subjects were asked to read a text and verbalise their thoughts. They were required to say in their first language whatever comes to their mind while processing each sentence in the text.

Block (1992) investigated the comprehension –monitoring process used by first and second language readers of English. The subjects were twenty-five college freshmen and consisted of proficient and non-proficient readers of English. While reading an expository text the subject were asked to think aloud, or specifically to say everything they understood and everything they were thinking as they read each sentence.

On the other hand, Anderson (1991) used think aloud to examine individual differences in strategy use on two types of reading task: standardized reading comprehension tests and academic texts. The subjects were twenty-eight Spanish-speaking adult students enrolled in University-level English as a second language

course. A think aloud protocol was used where the subjects verbalized their reading strategies while the subjects read two passages from the Textbook Reading Profile, which consisted of academic reading passages.

Yet in another study, Young and Oxford (1997) investigated the differences among forty-nine native English speaking men and women while reading two Spanish texts and one English text. The subjects read the passages, rated their familiarity of topic, and then completed a think aloud protocol.

In the studies mentioned above the researchers used think aloud protocols to examine reading strategies of second language learners. Each study revealed important information about the reading process and each investigation contributed to the database on L2 reading strategy use in its own unique way.

In the last few years think-aloud protocol has played a role in a significant number of research studies on language learning strategies. Many insights about learning in particular reading strategies have been obtained from learners as they provided verbal report data before, during, and after performing learning or language tasks. It is important to note that verbal report is not one measure but encompasses a variety of measures intended to provide mentalistic data regarding cognitive processing. In studies where the respondents answered interview questions or completed written questionnaires about their language strategies the self report has been shown to be somewhat removed from the cognitive events being described, this approach may

produce data of questionable validity. On the other hand, questionnaire items are more likely to elicit learners beliefs about what they do, rather than what they actually do (Cohen, 1998). Therefore, think aloud protocols have gained popularity in the last few decades because it provides data on cognitive processes and learner responses that otherwise would have to be investigated only indirectly.

Furthermore, this type of protocol has at times provided access to the reasoning processes underlying cognition, response, and decision making. Presseley and Afflerbach (1995) asserted how the use of verbal report has yielded a thorough description of reading. They also provide a detailed description of what they refer to as before reading, while reading, after reading, monitoring and evaluating strategies, based on a review of 38 primary data studies. Presseley and Afflerbach then went on to say that the think alouds were extremely revealing about the dynamics of comprehension difficulties and how understanding of text shifts in reaction to comprehension difficulties and surprises in text. It is for these reasons that think-aloud protocols were used in this study so as to “provide a more direct access to the learners’ processing and knowledge” (Faerch and Kasper, 1987). It for this reason that this study uses the think-aloud protocol as the primary data collection tool.

CHAPTER THREE

METHODOLOGY

The purpose of this study is to gain a deeper understanding of the reading process when ESL readers read printed text and hypertext. In other words this study seeks to identify the type of metacognitive and cognitive reading strategies ESL readers employ to comprehend while reading a text in print and hypertext. This chapter describes the research design of the study, research sample, instruments used, and the procedures followed in carrying out this research. This study adopts both a qualitative and quantitative approach to gather data and to analyze it.

These areas are covered in the following sub-sections:

- Research Design
- Research Sample
- Research Instruments
- Data Collection Procedures
- Data Analysis

3.1 Research Design

Given that reading strategies are internal mental processes and therefore, not directly observable behaviors, their identification has always been problematic and has relied heavily on learners' self-reports (Cohen, 1998). Many L2 researchers agree that observation yields extremely limited and unreliable information on students' mental processes (Cohen, 1998; O'Malley & Chamot, 1990; Wenden, 1991).

The most common methods of data collection in reading strategies research are questionnaires and interviews, which provide retrospective information on students' recollections of the strategies they have used for particular tasks and, often, of the frequency (sometimes, often, usually, etc) with which they use the strategy. Two obvious limitations of such retrospective data collection are students' ability to remember accurately the strategies they have used and their willingness to respond truthfully. Nonetheless, questionnaires and inventories have been favored by many reading strategy researchers because information can be collected from a large number of participants and analysis is straightforward (Cohen, 1998; O'Malley & Chamot, 1990; Oxford, 1990; 1996).

Relatively few research studies have used think-aloud procedures in which individual students are asked to recount their thoughts while working on a language task, perhaps because this method of data collection is extremely labour-intensive (individual interviews with verbatim transcription) and complex to analyse. Concurrent verbal procedures also have potential limitations, such as participants reporting only some of their actual thoughts and strategies and not being able to verbalize their mental processes. In addition, the presence of the interviewer may affect their thinking processes and strategies. In spite of these potential limitations, think-aloud procedures in this and other studies (Cohen, 1998; Feng & Mokhtari, 1998; Cromley & Azevedo, 2004; Gill, 2002; Neil. Anderson, 1991) have provided rich descriptions of students' mental processing and reading strategies that are not accessible in any other way.

The research design of this study involved two different types of text, one linear and the other hypertext. The research subjects read a printed text and then a hypertext. Think-aloud verbal protocol methodology (Pressley and Afflerbach, 1995; Ericsson and Simon, 1993) was used to identify reading strategies used by 10 Law students from MARA University of Technology, while reading text in print and hypertext. This method was selected because think-alouds “provide a more direct access to the learners’ processes and knowledge” (Faerch and Kasper, 1987:9). In contrast to other methods like questionnaires, interviews or observations, that attempt to infer the learners’ thoughts, Faerch and Kasper explain that introspective methods of data collection generate verbal report data that comprise the subjects’ own statements about the ways in which they process and organize information. Furthermore, Smagorinsky (1995) points out that think-alouds have the potential for yielding significant information about the internal structures of cognitive processes. In addition, the data elicited through think-alouds is untainted by subsequent rationalization and interpretation by the subjects as retrospective verbalizations are often prone to be (Cohen, 1987).

During concurrent protocols, also called the think-aloud method, participants read and simultaneously verbalize their thoughts. Studies using concurrent protocols reveal details of sequences of information processes reflecting the reader’s short-term memory (STM). It is claimed that readers can be involved with concurrent protocols without altering their cognitive processes (Ericsson and Simon, 1993). Retrospective Interviews were used to help clarify statements made as well as provide details that have been omitted. During retrospective interviews participants

may be able to retrieve the trace of preceding cognitive processes and reveal information preserved partially in STM and partially in long-term memory (LTM). Therefore, in this study a combination of both concurrent protocol and retrospective interviews was used to identify the different metacognitive and cognitive reading strategies used by ESL learners while reading printed texts and hypertext. This was to ensure that the think aloud protocol analysis was thus capable of providing powerful insights into the cognitive and metacognitive processes that drive the working of this mechanism in reading events.

3.2 Research Sample

The sample of this research comprised 10 students, both male and female of Malay origin. The students were from the Faculty of Law, Universiti Teknologi MARA. The subjects were selected on the basis of a questionnaire (See Appendix A), willingness to participate in the research and, most of all, the ability to effectively verbalise their thoughts. The questions in the Students Profile Questionnaire ranged from age, level and type of education to proficiency in the English Language, which was an important criteria. Also included in the questionnaire was a section that obtained the students' attitudes towards English.

The students ranged in age from 20 to 23 years. Older students were chosen based on the premise that older individuals would understand the purpose of the study and also be better at verbalizing their thoughts than younger children. This would add validity and credibility to the verbal reports collected. In addition, these

subjects would have had 11 years of formative school education in which they would have had all studied English as a subject in school up till the eleventh year of their formal education.

As the students were at the ESP level of study for English, it meant that they had already completed two proficiency courses in English in MARA University of Technology. The courses were Mainstream English I and II in their first and second semester respectively. The Mainstream English I or BEL 200, is the first part of the proficiency English courses that the students have to take. The four main components of this course are - reading, writing, speaking and listening. Only if they pass this course can they move on to Mainstream English II or BEL 250. The Mainstream English II is designed to prepare the students for the Malaysian University English Test (MUET). The Mainstream English II course also comprises four components - reading, writing, speaking and listening.

At the outset of this study, the equivalence in the reading ability of the research sample was also established. This was done by comparing the scores obtained by these students in the reading section of the final examination of the Mainstream English II course in the previous semester.

The final examination of the Mainstream English II course has four components:

- Reading - 45%
- Speaking - 15%
- Listening - 15%
- Writing - 25%

The total raw score for the reading component is 50, out of which 45% is taken to add to the final score of the Mainstream English II exam. The scores of the research subjects in the reading section of the Final Examination for Mainstream English II ranged from 30 to 36 out of 45%. This information was verified by consulting available academic records.

The subjects were in their third semester at the University. This particular (third) semester was thought especially suitable for the purpose of this study because by this time, the students are required to read a considerable amount of their research materials in print and on the Internet. In addition, some of their coursework involved working on the computer. Furthermore, there was evidence that these students had adequate proficiency in English. Proficiency was demonstrated by the students obtaining an A or B+ grade in the Mainstream English Final Exam paper which is similar to the Malaysian University English Test (MUET). There was a need to make sure that the students were fairly proficient in the language so that their language proficiency was not an obstacle to the collection of data. The selected research sample had all obtained a Band 4 or 5 for the Malaysian University English Test (MUET). The test components and the maximum score for each test component are as follows:

Test Components	Maximum Score
Reading	135 marks
Speaking	45 marks
Listening	45 marks
Writing	75 marks
<hr/>	
Aggregated Score	300 marks
<hr/>	

Once a student obtains his/her aggregated score, he/she will be placed in the appropriate band. Given below is the description of the various bands.

Figure 5 - The description of the Aggregated Score sheet for MUET is given below.

AGGREGATED SCORE	BAND	USER	COMMAND OF LANGUAGE	COMMUNICATIVE ABILITY	UNDERSTANDING	TASK PERFORMANCE
260 - 300	6	Excellent user	Very good command of the language	Highly expressive, accurate and appropriate language with hardly any inaccuracies	High level of understanding of the language: understands complex texts easily	Functions extremely well in the language
220 - 259	5	Good User	Good command of the language	Expressive, accurate and appropriate but with minor inaccuracies	Good level of understanding of the language: understands complex texts well	Functions well in the language
180 - 219	4	Competent User	Satisfactory command of the language	Generally expressive and appropriate but occasional inaccuracies	Satisfactory level of understanding of the language: has satisfactory understanding of complex texts	Functions reasonably well in the language
140 - 179	3	Modest User	Fair command of the language	Fairly expressive, usually appropriate but with noticeable inaccuracies	Modest understanding of complex texts and with some misinterpretations	Able to function in the language but with some effort
100 - 139	2	Limited User	Limited command of the language	Lacks expressiveness and appropriacy: inaccurate use of the language resulting in breakdown in communication	Limited understanding of the language: has limited understanding of complex texts	Limited ability to function in the language

Below 100	1	Extremely limited user	Poor command of the language	Inexpressive and inaccurate use of the language resulting in very frequent breakdown in communication	Poor understanding of the language: little or no understanding of complex texts	Hardly able to function in the language
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8 out of the 10 students scored a Band 4. They are described as competent users of the language. Therefore, they have a satisfactory command of the language. For their communicative ability they are described as generally expressive and appropriate with occasional inaccuracies. They have a satisfactory level of understanding of the language and complex text. Finally, they would be able to function reasonably well in any task performance.

Two of the students obtained Band 5. They are described as good users of the language. Therefore, they have a good command of the language. For their communicative ability they are described as expressive, accurate and appropriate with minor inaccuracies. Also, they are believed to have a good level of understanding of the language and complex texts, and function well in the language.

Table 3.2: Comprehensive Overall Information about the Subjects

Subject	Age	Sex	SPM(Eng)	Mainstream Eng. II (BEL 250)	MUET BAND
1	20	F	B	B+	4
2	21	M	A1	A+	5
3	21	F	B	B+	4
4	23	F	B	B+	4
5	20	F	B	B+	4
6	20	F	B	B+	4
7	21	M	A1	A+	5
8	23	F	B	B+	4
9	22	F	A1	A	4
10	21	F	B	B+	4

Thus based on their SPM (Sijil Peperiksaan Malaysia) English grades, reading scores for the the UiTM Final Mainstream English Examination (BEL 250) and the MUET scores, it can be said that the sample was fairly homogeneous in their reading ability and language proficiency.

Given below is Table 3.3 which shows the students' attitudes towards English.

Table 3.3: Students' Attitudes Towards English

Subjects	1	2	3	4	5	6	7	8	9	10
Questions										
Effectively learn English through which skill.	R	R/W	R	R	R/W	R/W	R/W	R/L	R/L	R/W
Which skill is important?	S	R	S	S	S	S	R	S/R	S	R
Amount of reading on computer.	Av	Lots	Lit	Av	Lots	Lit	Lots	Lit	Lit	Av
Importance of reading academic materials on computer.	VI	VI	VI	I	VI	I	I	I	I	I
Hours per week on computer reading academic materials.	6-10	11-15	<5	11-5	6-10	<5	11-15	<5	<5	6-10
Rate Reading ability in English.	Ad	Ad	Ad	Ad	Ad	Ad	Ad	Ad	Ad	Ad

KEY: R =Reading, W= Writing, S= Speaking, L=Listening

Lit = Little, Av=Average Amount, Lots=A lot

VI= Very Important, I= Important

Ad= Adequate

In general all the subjects expressed that they learn English effectively through reading, while some through writing and listening skills. 6 of the subjects felt that speaking was the most important skill and the other 4 subjects thought it was reading. Only 3 of them read a lot on the computer.

All of the students expressed that reading academic and reference materials using the computer were important. Out of which, only 3 subjects spent 11-16 hours per week on the computer reading academic materials and another 3 subjects spent about 6-10 hours per week reading on the computer. The remaining 4 of the subjects did very little reading on the computer about less than 5 hours per week

Another important criteria for the selection included willingness to participate in the study and commitment to spend their time participating in all phases of the study. The 10 research subjects had willingly signed the consent form (See Appendix B) to show their willingness to participate in the research.

3.3 The Research Instruments

The following is a list of instruments used in this study.

- Texts
- Questionnaire
- Think –Aloud Sessions
- Retrospective Interview Questions
- Observations
- Summary

3.3.1 Texts

The reading texts used in this study consisted of two expository texts of a similar level of difficulty. Expository texts were chosen because most of the academic references and research materials are expository. Furthermore, according to Elizabeth Schmar-Dobler (2003), most of the texts on the Internet are expository.

Kamil and Lane (1998) report that in an analysis of 50 websites, 48 contained expository text while 2 sites contained narrative text. Most of the expository texts found on the Internet are written as hypertext, where highlighted elements within it, such as a word or phrase, are linked to other texts. Each link can lead to a definition, additional information, or a video example related to the original linked word or phrase.

By selecting links in various orders, a reader creates his or her own path when reading on the Internet. This path can be ever changing because information on the Internet is ever changing, with websites continually being updated, removed, or remodeled. Text on the Internet is not static, whereas the text of a book remains the same each time the book is opened. The Internet is “an interactive model of continuously updating information” (Glister, 1997 p.137), which requires a rethinking of what it means to be a reader or even a literate person in today’s world. As a result of technology, our definition of reading has changed to include websites, e-books, e-mail, discussion boards, chat rooms, instant messaging and listservs.

Expository text makes up the bulk of what we read and these texts are written to convey, describe, or explain non-fictional information. In Education, most textbooks and academic reference materials in print at tertiary level are expository. An expository text is text that is informative. Expository texts include essays, encyclopedias, reference books, speeches, journals, experimental books, scientific reports, newspaper articles and so on (Reutzel and Cooter, 2007). Most learning requires students to read and understand expository text in print. Based on this premise, expository texts were chosen to be used in this study.

Both the texts ranged in length from 523 to 537 words and had a predetermined 12th grade readability level. The Fry's readability Formula was used to determine this.

Printed Text (*Shifting Paradigms*)

	Number of Sentences (to the nearest)	Number of Syllables
1 st 100 words	6.1	176
2 nd 100 words	7.9	160
3 rd 100 words	5.5	161
Totals	19.5	497
Divide Totals by 3	6.5	166

Hypertext (*It's Eco-logical*)

	Number of Sentences (to the nearest)	Number of Syllables
1 st 100 words	6	167
2 nd 100 words	5.3	171
3 rd 100 words	5.5	158
Totals	16.8	496
Divide Totals by 3	5.6	165

To control the effect of prior knowledge, an attempt was made to select topics that were familiar to the subjects. Given that there are no established ways of accomplishing such a goal, and after much reflection, a list of familiar topics was drawn up by the researcher and reading Lecturer. Examples of such topics include those frequently found in newspapers and magazines. After much discussion and deliberation the researcher and the subject's reading lecturer, a consensus was reached to select the two passages. (See Appendix C and D)

Following established methodological recommendations for increasing the likelihood of obtaining complete and accurate self-reports (Ericsson and Simon, 1987 and Pressely and Afferbach, 1995) the printed text and the hypertext was marked with intermittent red dots placed after each sentence. The red dots were embedded in both the printed and hypertext after each sentence, as a reminder to verbalize their thoughts while reading. The linear text was printed in three separate

pages, which were placed in front of the students. The hypertext was designed to have six hyperlinks which the students could access.

3.3.2 Questionnaire

The Online Survey of Reading Strategies (OSORS), a 38-item Likert scale questionnaire adapted from Sheorey and Mokhtari, (2001) by Neil. J. Anderson (2003) was used in this study (See Appendix E). It is a self-report measure assessing students' awareness and perceived use of reading strategies, while reading hypertext on the following three subscales:

- Global reading strategies
- Problem-solving strategies
- Support reading strategies

The 10 subjects were required to answer the questionnaire after they had completed reading the hypertext. The questionnaire was used to indicate the extent to which the subjects perceived themselves as using the described strategy while reading on-line.

The questionnaire used a 5 point Likert scale to assess the frequency of strategies used:

- 1 Never
- 2 Only occasionally
- 3 Sometimes
- 4 Usually
- 5 Always or almost always

The strategy use scale defines a continuum of increasing levels of intensity, that is, low scores indicate a low frequency of strategy use and high scores indicate a high frequency of strategy use while reading on-line.

The Survey of Reading Strategies (SORS) developed by K. Mokhtari and R. Sheorey (2001) measures three broad categories of reading strategies, namely metacognitive strategies, cognitive strategies and support strategies. The Survey of Reading Strategies (SORS) was developed for post secondary students who are native and non native speakers of English. The SORS was based on a separate metacognitive reading strategy survey developed for native speakers of English called The Metacognitive Awareness-of-Reading Strategies Inventory (MARSI). Therefore the SORS three categories were based on both MARSI factor analyses and theoretical considerations.

A brief description of each SORS category and the number of items within each category are given below;

1. Metacognitive Strategies are those intentional, carefully planned techniques by which learners monitor or manage their reading. The strategies include having a purpose in mind, previewing the text as to its length and organization, or using typographical aids and tables and figures. (10 items)
2. Cognitive Strategies are the actions and procedures readers use while working directly with the text. These are localized, focused techniques used when problems develop in understanding textual information. These cognitive strategies include adjusting one's speed of reading when the text becomes

difficult or easy, guessing the meaning of unknown words, and re-reading the text for improved comprehension. (12 items)

3. Support Strategies are basically support mechanisms to aid the reader in comprehending the texts such as using a dictionary, taking notes, or underlining or highlighting the text to better comprehend it. (6 items).

When Neil. J Anderson adapted the SORS for the Online Survey of Reading Strategies (OSORS), the same three categories were maintained, Metacognitive (Global), Cognitive (Problem-solving) and Support strategies. However, Anderson added another 5 items to Global strategies, 3 items to Problem-solving strategies and the original 9 items remained for support strategies. Each item was modified by Neil J. Anderson (2003) to include the phrase “on-line” each time a reading task was referred to.

Neil J. Anderson used the Cronbach’s alpha for the overall reliability of the Online Survey of Reading Strategies (OSORS), which was 0.92. The reliability for each sub-section are:

- Global reading strategies - 0.77
- Problem-solving strategies - 0.64
- Support strategies - 0.69

According to Sekaran (2000) if the Cronbach's alpha value is greater than 0.7, the survey instrument can be considered to exhibit internal consistency reliability, thus resulting in a degree of confidence in the survey instrument. Therefore, this established the OSORS as a reliable instrument for assessing the metacognitive on-line reading strategies of L2 reading strategies.

Although Anderson (2003) established that the OSORS is reliable, the on-line survey of reading strategies (OSORS) was piloted by the researcher with 4 students to ensure its reliability and comprehensibility before the actual use in this study.

The OSORS for this study was administered after the subjects had read the hypertext. The 10 subjects were informed of the purpose of the survey and of the fact that there were no right or wrong answers and were asked to express their honest opinion by circling the appropriate number printed on the right side of each OSORS statement. The subjects were able to complete the survey in 10 to 15 minutes, with some taking a slightly longer time. Each completed survey was manually examined, and then coded for statistical analysis.

3.3.3 Think –aloud Protocol

Think alouds are a research tool originally developed by cognitive psychologists for the purpose of studying how people solve problems. The basic idea behind a think aloud is that if a subject can be trained to think aloud while completing a defined task, then the introspections can be recorded and analysed by researchers to

determine what cognitive processes were employed to deal with the problem. In the field of reading comprehension think alouds have been used to identify reading strategies used by L1 and L2 learners, good and poor readers. As Coiro (2003) states that think aloud bring to the open the strategies the learners use to understand the text. Therefore, think alouds provide a direct view of a reader's mental activity, a kind of window into these processes which are usually hidden.

The research design of this study involved reading two different types of text, one printed and the other hypertext. The think aloud protocol was used to identify metacognitive and cognitive reading strategies used by 10 students, while reading a printed and hypertext of similar levels of cognitive difficulty.

The procedure was as follows. From a total of 28 students, 10 were selected to participate in this study. Before the actual data collection of the think aloud reports, the subjects were given a formal introduction to the think aloud protocol method. The researcher modeled to the subjects what is meant by think aloud protocol. Then the subjects had two practice sessions in which the subjects read a printed text and reported exactly what they were thinking after reading each sentence.

After the practice sessions, the data collection for the actual task was individually scheduled. The subjects were asked individually to think aloud while reading a printed text and hypertext. The subjects' verbalizations of all their thoughts were recorded. When subjects fell silent, the researcher would prompt them to think aloud.

Each think aloud sessions lasted anywhere from 40 minutes to an hour for the printed text and 50 minutes to two hours for the hypertext. All 20 sessions (10 for the printed text and 10 for the hypertext) of the tape recordings were transcribed for analysis. Analysis took the form of coding each discrete verbalization in the transcript according to the type of reading strategy exemplified.

Both the think aloud procedures for the printed and hypertext are discussed in great detail in the data collection procedures.

3.3.4 Retrospective Interviews

One of the concerns about think-aloud protocols by researchers are whether the subjects were verbalizing all of their thought processes. Theoretically, the completeness of a think-aloud protocol is dependent on the extent to which information is heeded while in short-term memory (Ericsson and Simon 1980:1984). However, Ericsson and Simon (as cited in Smagorinsky 1995) point out that think-aloud protocols are often incomplete, not because the information is not attended to, but because the subjects do not utter all their thought processes. To address this problem, Gill, (2004) followed Haastrup's suggestion that the think-aloud procedure be "supplemented by a retrospective interview, the purpose of which is to probe into some of the statements made during the thinking aloud, thereby improving the reliability of the protocol analysis" (Haastrup1987, p.202). Therefore these retrospective interviews allow the researcher to explore beyond what the subject said or did not say without increasing the chance of invalid or reactive reports.

Furthermore, retrospective interviews advocate a kind of probing in which the researcher asks the subjects to amplify or clarify certain types of verbalization in their protocols. For example, if the subjects' protocol for reading a text includes behaviour that may signal uncertainty e.g. uhms, ahs or particularly long silence, it may be fruitful to ask the subjects if something is confusing or difficult. It seems likely that the subject could retrospectively articulate the source of a behaviour that he has just exhibited. The information to which he was reacting should still be present in the working memory. The subject might not spontaneously articulate a problem. This is because it can be too demanding to concentrate on solving the problem and at the same time verbalize one's thoughts. However, probing working memory after the task should yield useful additional information without threatening validity.

The technique of cued retrospective recall uses the audio-recordings of the verbal performances as represented in their think-aloud to serve as cues in eliciting their retrospective reports (DiPardo 1994). The technique rests on the premise that confronting the subjects once again with the task situation provides reactive traces in short-term memory, thus allowing the subjects to report their cognitive processing with an acceptable degree of accuracy (Faerch and Kasper, 1987).

Therefore, in order to ensure the completeness of the data, the researcher combined the think-aloud protocols with data obtained from cued retrospective recall interviews.

A sample of the type of questions asked during the cued retrospective interview is given below:

- You paused here for awhile. What were you thinking about?
- You repeated this word. Why?
- What were you thinking at this point?
- What were your thoughts when you were looking at the picture?
- Did you relate it to any incidents?
- Why did you reread the whole paragraph?
- Why did you say that?
- What does okay mean?
- Why did you sigh?

These questions were aimed at expanding and clarifying the responses expressed by the participants during the reading of the think-aloud protocols. Therefore the retrospective interview sought clarification and elaboration of their think alouds. The aim here was to elicit further details of the subjects' strategies.

3.3.5 Observation

Observation has always been considered a major data collection tool in qualitative research. In second language research observations are most often used to collect data on how learners process language in a variety of settings, to study language learning and teaching process in the classroom, and to study teachers' and students' behaviours. The main use of observation is for examining a phenomenon or behaviour while it is going on. Direct observation is unobtrusive, meaning that the researcher allows the activity to proceed without interruption. Questions, if asked at all, are reserved for after the activity.

Some observations are “structured” meaning that the researcher has determined in advance what to look for in the observed context. In this study the researcher wanted to note if the students were:

- taking notes
- scrolling up and down
- referring to a dictionary
- underlining words or phrases
- showing signs of irritation/agitation
- showing signs of confusion

The observation notes were used to clarify the primary data and allow for triangulation. Many researchers have encouraged triangulation as a means of enhancing the validity and reliability of verbal data (Ericsson and Simon 1984; Greene and Higgins 1994).

3.3.6 Summary

The subjects were required to write a summary, for both the printed text and hypertext. After the subjects had completed the think aloud reports and the retrospective reports the subjects were asked to write a summary of the texts. The summary was used to assess the subjects’ comprehension of the text. It was not a primary method for data collection but rather used to clarify or support the primary findings.

3.4 Data Collecting Procedures

3.4.1 Procedures before collecting Verbal Protocol

3.4.1.1 Selecting Subjects

A student profile questionnaire was administered to 52, 3rd year Law students. At the onset, only 28 were selected for this study. The criterion for selection at this point was adequate proficiency in the English language. Proficiency in English was demonstrated if the subject had obtained a Band 4 or Band 5 in the Malaysian University English Test. (Refer to Fig 5 on page 80). This information was verified by consulting available academic records.

3.4.1.2 Briefing Subjects

At the very onset, the purpose of the study was once again stated, emphasizing the importance of the study to reading. The subjects were also informed that their verbal reports would be recorded and transcribed and that there must be commitment and willingness to participate for a good number of hours in all phases of the study. As reporting in a second language (English) would probably increase the cognitive load of the task, the subjects were told that they could verbalize their thoughts in their native language, or a combination of both L1 and L2 (Robinson, 1991). Garner, as cited in Matsumoto (1993), cautions that the subjects' verbal facility in the target language should always be considered in data collection process so that verbalization difficulties will not mask out the emergence of some important mentalistic data. The ability for the subjects to provide think aloud protocols is critical to the success of this technique.

It was also made clear that the anonymity of the subjects would be preserved. This was to make sure that the subjects were comfortable about sharing their thoughts during their reporting. At the end of the session a date convenient to all the subjects was fixed for the next session.

3.4.1.3 Modeling

Presselley and Afflerbach (1995) say that “researcher silence about how the text might be processed is more defensible than directions that prompt particular processing...” (pp 132-135). However, Ericsson and Simon (1987) feel that there is a need for the subjects to be trained before think-aloud protocols are elicited. They are of the opinion that this training had no effect apart from increasing the completeness of the verbalization.

During the modeling session the subjects were given a formal introduction to the think aloud protocol method. The instructions to the subjects were intentionally kept neutral to reduce the likelihood it might influence the subjects’ processing of the text in one way or another. The subjects were asked to read and say everything out loud regardless of how trivial the thinking might seem. Since the main aim of the study was to learn as much as possible about the strategies used while reading printed text and hypertext, the subjects were not given any specific instructions about how the text might be processed. The researcher just modeled 2 examples to the subjects of what is meant by think-aloud protocol.

Firstly, she demonstrated solving a mathematics problem (See Appendix F)

Example: Model 1

The Researcher says: $20 : 10$ ----- $50 : \underline{\hspace{2cm}}$ (25, 150, 30 100)

Think-aloud – Ok, 20 goes with 10, so what goes with 50? Maybe it's 150. Is that right? Twenty is two times 10. Is 50 two time 150? No, that can't be right. The second number must be smaller. Maybe it is 25. Yes, 50 is two times 25 just like 20 is two times 10.

Next, the researcher modeled thinking aloud while reading an excerpt from a short story entitled *Food's on the Table* (See Appendix G).

Example: Model 2

Teacher reads story title and introductory note.

Title: Food's on the table by Sydney Taylor

Introductory Note: Until a door is open, you don't know what's on the other side. Ella , her sisters and her brother opened a door to a new apartment

Teacher: I guess this story has something to do with eating and several children who go to an apartment. I wonder exactly where they're going and what does this have to do with food? This isn't making a whole lot of sense yet. I guess I'll read on.

Teacher reads from beginning of actual story of text.

Text: Ella glanced at the slip of paper in her hand. "We want 725--- it must be the next block.

Teacher: Maybe this takes place in the city, since Ella said “next block”. I know apartments are in cities and they have numbers. I bet the slip of paper must tell where the apartment is. Maybe they are looking for apartment 725. Is this making sense so far? I think so, it's a little early to really decide. I'll read on get more information and find out.

At the end of the demonstration, the subjects were asked to share their thoughts and were free to ask questions and clarify their doubts. Then the first practice session was scheduled for the following day.

3.4.1.4 Practice Session

During the first practice session, the subjects practiced thinking aloud while reading a short expository text. This exercise was to further familiarize the participants with the think-aloud protocol procedure. For this first practice session, the researcher observed and reminded them constantly to verbalize their thoughts. They were told to report exactly what they were thinking after reading each sentence and were cautioned against trying to analyze or explain their thoughts. Ericsson and Simon (1984) state that the subjects' verbalization could be assisted by reminding each of the subjects to speak when he or she lapses into silence.

During the second practice session the next day, the students again read a different expository text but this time their concurrent verbal protocols were audio-taped. This was done so that the subjects became accustomed to the use of the tape

recording device and procedures. The tape recordings were also helpful in reviewing the subjects' verbal reports and checking for completeness and accuracy of reports. The subjects received feedback in reaction to their verbal reports and a lot of encouragement until they felt comfortable with the procedure. Those subjects who were clearly unable to or struggling to provide adequate think-aloud reports as well as individuals who reported that they were unable to give their full commitment were eliminated from the selection. A rater, an English language lecturer who was familiar with think-aloud verbal protocol method, listened to the think-aloud report and rated the verbal reports on a scale of 1 to 5.

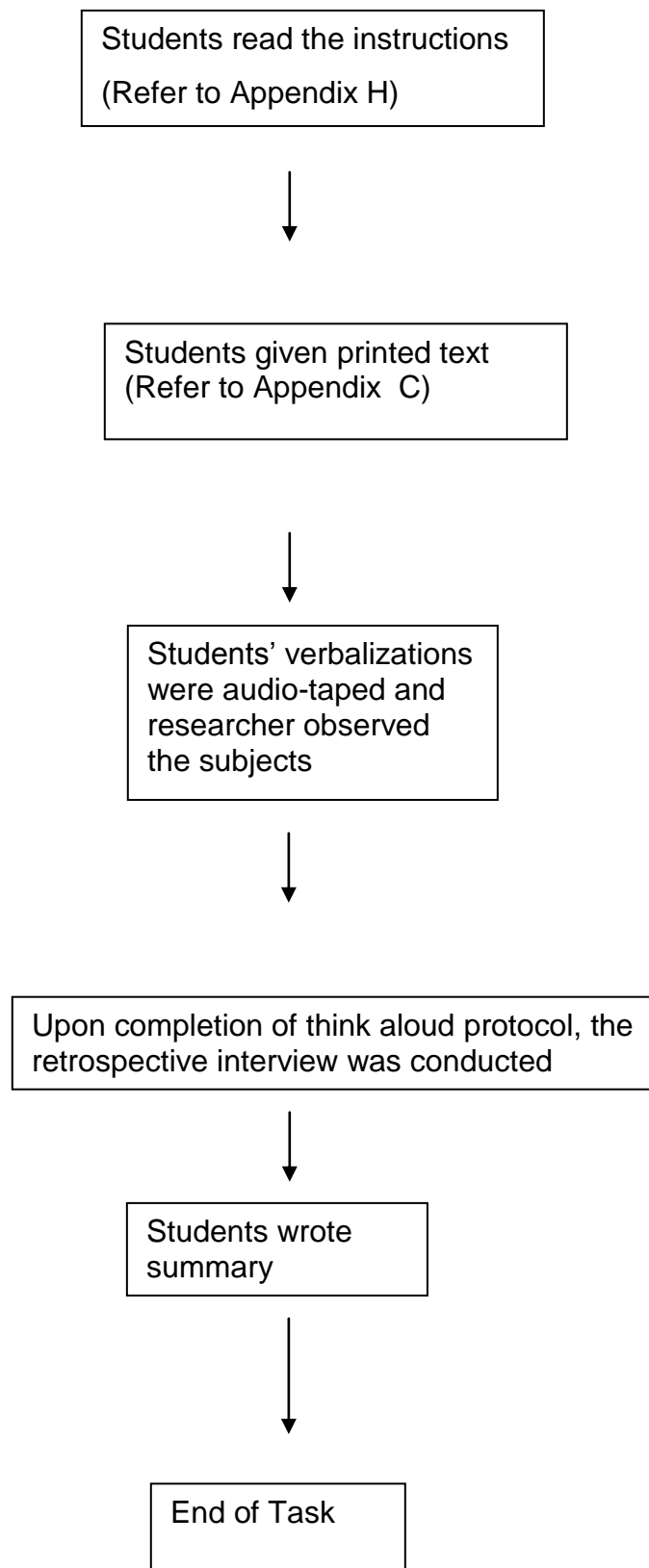
The rater and the researcher, by consensus, then selected the subjects for the study based on their ratings of the richness of data in the think-aloud protocol. Only 10 subjects were finally selected. The data collection for the actual task was individually scheduled and conducted four days after the practice session.

3.4.2 Procedures followed when reading in print during the think aloud Protocol.

Four days after the practice session, the actual data was collected. Individual appointments were set for each subject. At the beginning of the task each participant was given clear instructions on what they had to do and the steps involved.

The flow chart below shows the steps involved.

Flow Chart : Think-Aloud Protocol When Reading In Print



At the beginning of the actual data collection for reading in print, each subject was reminded of the steps involved in completing the task. They were asked to read and say everything aloud regardless of how trivial the thinking might seem. The researcher also assured the subjects that they could verbalize their thoughts in either Bahasa Malaysia (L1) or English (L2) or a mixture of both the languages. They were asked to verbalize in the language that they were comfortable with and in the language that they can best express their thoughts. They were also reminded that the verbal report was not to test their proficiency but to identify the reading strategies employed to comprehend the text. Some of the studies that have recorded the subjects' verbal reports in their native language are, Shohamy, 1991; Buck, 1991; Sasaki, 2000; and Yamashita, 2003. A set of the instructions was prepared for the students to read before the task. (See Appendix H).

When the subjects were clear about the instructions, they were given the text entitled *Shifting Paradigms*, a piece of blank paper and a pencil for the task. The subjects then read and their think-alouds were audio-taped. The researcher's role was that of a guide and an observer. However, if the subjects kept silent for a long time, the researcher prompted the subject to describe his or her thoughts by asking such questions as "What are you thinking? or Why are you quiet, what are your thoughts?". The role of the researcher was not to provide explanations for the text but to act as a guide and to encourage and lead the subjects to continue and complete the think-aloud report. The researcher's interventions were minimal. While the subject thought aloud the researcher observed and took down notes, for example, scrolling up and down, signs of confusion etc.

Immediately after the think-aloud task, the retrospective interview was conducted. The tape was played back and both the researcher and the subject listened to the tape. This session allowed the researcher to ask questions, clarify statements that were considered obscure by the researcher and also obtain confirmation on statements that were incomplete.

Fontaine (1989) cited in Tung-Hsien He (2001:30) confirmed that because of the playback, her subjects further “explained decisions that they had not been able to verbalize on tape.” Some participants clarified certain statements and also explained the long pauses. This helped reduce ambiguity and further strengthened the reliability of the data collected.

Just before writing the summary, the subjects were given a chance to look over the text so that they might reassemble a complete, coherent version from the fragmentation that might have resulted from the continual interruption involved in think-aloud (Block, 1989). The subjects were given 40 minutes to write a summary of the text. The summary was scored for the presence of the number of main ideas, supporting details and general understanding of the text.

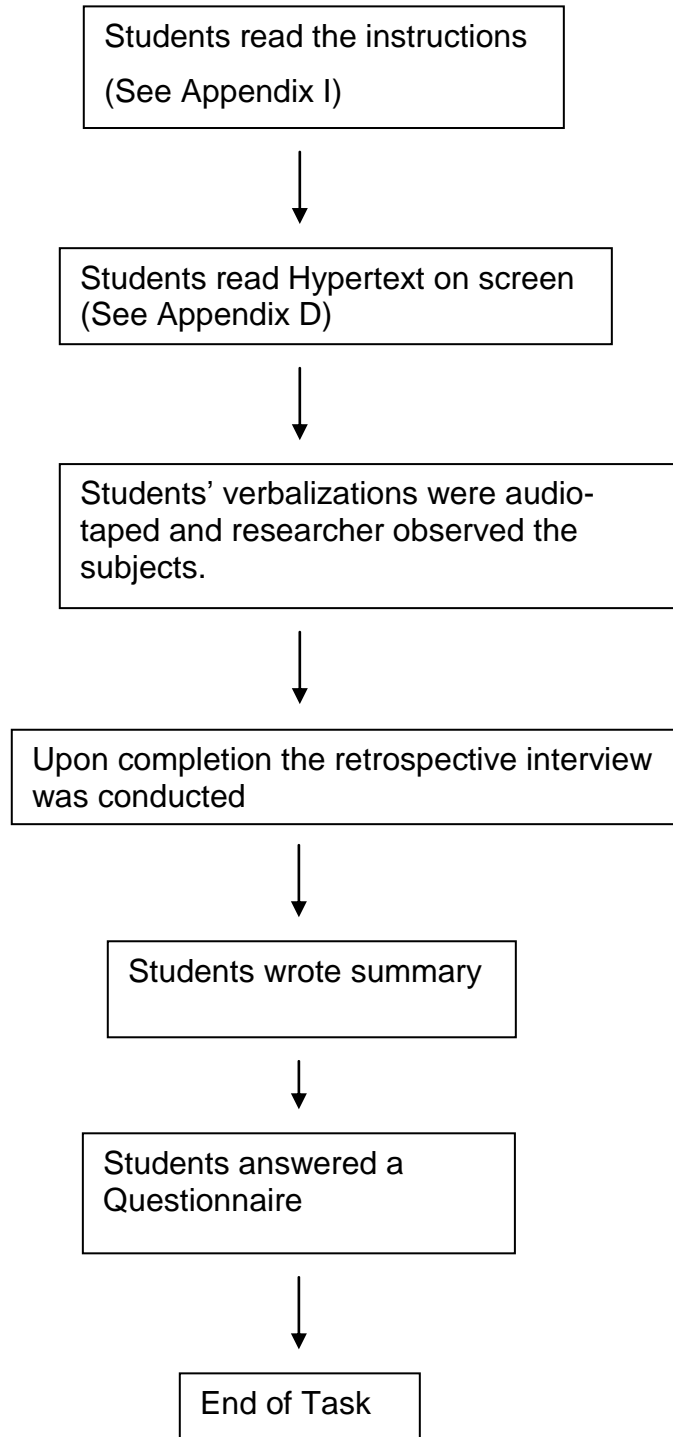
3.4.3 Procedures followed when reading hypertext during the think aloud protocol recording

When all the verbal protocols recording had been collected for the reading in print, the data collection for reading hypertext resumed. Once again individual appointments were set for each subject. At the beginning of the task each subject

was given clear instructions on what they had to do and the steps involved.

The flow chart below shows the steps involved.

Flow Chart : Think-Aloud Protocol When Reading In Hypertext



At the beginning of the actual data collection for reading hypertext, the subjects were reminded to verbalize their thoughts as they read. They were asked to read and say everything aloud regardless of how trivial the thinking might seem. The researcher also assured the subjects that they could verbalize their thoughts in either Bahasa Malaysia (L1) or English (L2) or a mixture of both the languages. They were asked to verbalize in the language that they were comfortable with and in the language that they can best express their thoughts. They were also reminded that the verbal report was not to test their proficiency but to investigate the reading strategies employed to comprehend the text. A set of the instructions was prepared for the students to read before the task. (See Appendix I).

When the subjects were clear about the instructions, they were allowed to read the hypertext on the computer. They were given a piece of blank paper and a pencil for the task. The subjects' think aloud protocol were audio-taped. The researcher's role was that of a guide and an observer. However, if the subjects kept silent for a long time, the researcher prompted the subject to describe his or her thoughts by asking such questions as "What are you thinking?" or "Why are you quiet or what are you thinking?" The role of the researcher was not to provide explanations for the text but to act as a guide and to encourage and lead the subjects to continue and complete the think-aloud report. The researcher's interventions were minimal. While the subjects were verbalizing their thoughts, the researcher took down notes for example, scrolling up and down, signs of confusion etc.

Immediately after the think-aloud task, the retrospective interview was conducted. The tape was played back and both the researcher and the subject listened to the tape. This session allowed the researcher to ask questions, clarify statements that were considered obscure by the researcher and also to obtain confirmation on statements that were incomplete.

Fontaine (1989) cited in Tung-Hsien He (2001:30) confirmed that because of playback think-aloud method, her subjects further “explained decisions that they had not been able to verbalize on tape. Some subjects clarified certain statements and also explained the long pauses. This helped reduce ambiguity and further strengthened the reliability of the data collected.”

Just before writing the summary, the subjects were given a chance to look over the text so that they might reassemble a complete, coherent version from the fragmentation that might have resulted from the continual interruption involved in think-aloud (Block, 1989). The subjects were given 40 minutes to write a summary of the text. The summary was scored for the presence of the number of main ideas, supporting details and general understanding of the text.

After writing the summary, the subjects answered the On-line Survey of Reading Strategies (OSORS) questionnaire. They were informed of the purpose of the questionnaire and of the fact that there was no right or wrong answers. They were asked to express their honest opinion by circling the appropriate number printed on the right side of each statement on the questionnaire. The 38 items of the OSORS were about their perceptions of the online reading strategies that they used.

Each subject was able to complete the questionnaire in about 15 to 20 minutes. Each completed questionnaire was manually examined, and then coded for statistical analysis.

3.5 Data Analysis

Data were obtained from the following sources:

- Think-aloud reports
- questionnaire
- retrospective interviews
- observations
- summary

3.5.1 Think –aloud report

The think-aloud reports were transcribed using a transcription system designed to preserve features of the verbal reports, including pauses, repetition, false starts and self-reports. This was done because all of these features could provide important information related to cognitive processing (Kasper, 2000). Since some of the subjects during the think-aloud sessions spoke in L2, their reports were transcribed in Bahasa Malaysia verbatim and then translated to English. Then, the English versions of transcriptions were given back to the subjects to make sure what they said and talked about while reading the two texts were all included in the transcriptions.

All the transcripts were double-checked for accuracy. Then the transcripts were coded to obtain ideas or trends of the second language learners' use of metacognitive and cognitive strategies while reading text in print and hypertext.

The researcher created a list of codes related to the research questions following Miles and Huberman's (1984) guidelines. A coding scheme of strategies was adapted from Sheorey and Mokhtari (2001) and Anderson (1991, 2003,) and from the data. The major categories of the coding scheme for reading strategies are metacognitive strategies, cognitive strategies and support strategies. It also includes an abbreviated code with a strategy term, description, and illustrative transcript excerpts.

Appendix J provides the list of strategies that were used for classifying the data in this study. The inventory assisted in identifying and determining which reading strategies students employ when reading a text in print and on screen, and guide the classification of strategies.

In order to identify the strategies used while reading in print and hypertext, two reading specialists were enlisted to work with the researcher in identifying the reading strategies used and to categorize them in a meaningful way.

After the purpose of the study was explained to the reading specialists, they were instructed to independently identify and categorize the strategies of four transcripts (2 printed texts and 2 hypertexts) using the coding system of strategies prepared by the researcher. The specialists were told that the subjects might resort to many

other strategies during reading and that they should carefully note any other type of strategy that might be used.

The method of analysis consisted of first reading the protocol transcripts and marking the parts of the think-aloud reports containing the strategies using the appropriate abbreviated codes (Pred, Rp, Prev etc) in the margins of the transcripts (See Appendix J). The specialists and the researcher then met to compare codes, calculate percentage of agreement for reliability, and resolve differences in coding. Any differences in coding, with respect to strategy type, were resolved through discussion referring back to the coding scheme and further clarifying definitions and distinctions of categories when necessary. Once the specialists were more confident and comfortable they worked on the rest of the transcripts. They then only met with the researcher to review differences in their coding. Thus, all coded data (10 transcripts of printed and Hypertext) were agreed upon by the two specialists and researcher, either in initial coding or after discussion. At the conclusion of the task, the raters were required to count the number of occurrences of those strategies.

In general, a relatively high degree of agreement was reached among the raters. Interrater reliability was 81% for the researcher and one coder, and 78% for the researcher and the other coder. Any discrepancies remaining in coding were resolved through discussion.

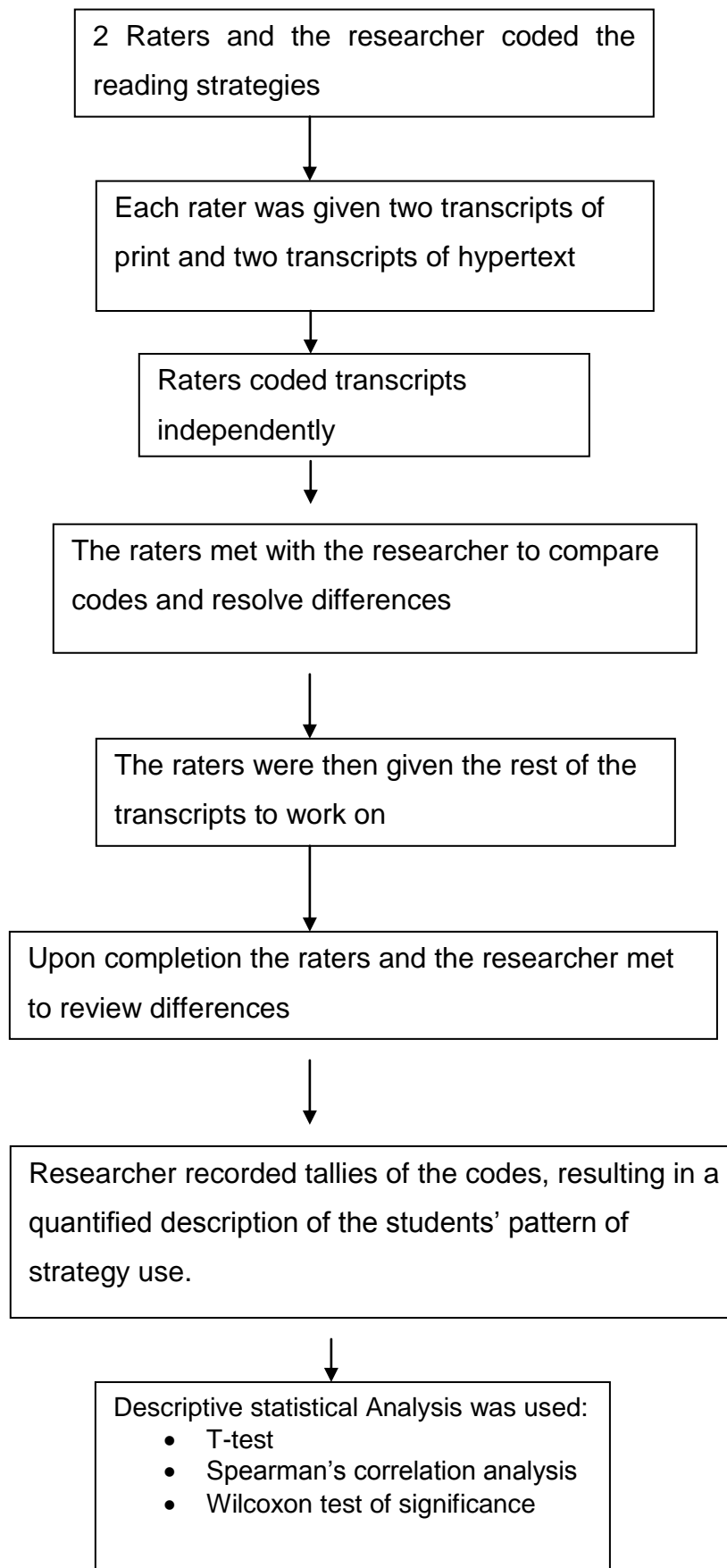
For each coded transcript, frequency counts of each strategy category were calculated, as was the proportionate use of each mode. Each occurrence of a

particular strategy was counted as one instance, whether it lasted for 1 second or 1 minute. If interrupted and resumed, a strategy was counted twice. Therefore, the response to one sentence might contain several strategies and several instances of the use of one strategy.

Qualitative descriptions of the responses of each participant for both passages were also prepared. The data were analysed using descriptive statistical procedures as well as *t*- tests, Spearman's Correlation analysis and Wilcoxon test of significance to examine whether significant differences existed between the two mediums with respect to print and hypertext, and reported strategy awareness and use while reading hypertext.

The flow chart below shows the coding process.

The Coding Process



3.5.2 Questionnaire

For the OSORS, all of the students (N=10) responses were scored for the 38 items within the three subscales (global, problem-solving and support). Scoring guidelines provided by Anderson (2003), were followed (See Appendix K). The students' responses from the OSORS were compared to the results of the think-aloud coding to see if there was triangulation

3.5.3 Retrospective Interviews

The retrospective interview was conducted with each subject to gather additional descriptive information. The subjects further explained decisions that they had not been able to verbalize on tape.

All the audio taped interviews were transcribed and where necessary the data was combined with the concurrent verbal reports.

3.5.4 Summary

The subjects were required to write a summary after reading both the printed text and hypertext. The summary was used as a method of assessing reading comprehension.

The summary was scored for the presence of the number of main ideas, supporting details and general understanding of the text. A strict criterion was adopted in which distortion of the original texts were not allowed. Paraphrases were accepted but elaborate inferences were not. The researcher enlisted the

help of a colleague to mark the summary. Interrater reliability coefficient conducted on the summary marked for both printed and hypertext was found to be 0.82. Both the scores for printed text and hypertext were compared.

3.5.5 Observation

The observation notes made by the researcher during both the think alouds, while the subjects were reading the printed and hypertext were used to clarify the primary data. The researcher just noted down certain behaviors and actions of the subjects while reading both text.

CHAPTER FOUR

DATA ANALYSIS

4.1 Introduction

The purpose of this study was to investigate the differences in the choice of metacognitive and cognitive reading strategies employed by ESL learners while reading expository texts in print and hypertext. Specifically, this study sought to answer the following research questions:

- the type of metacognitive and cognitive reading strategies ESL learners use when reading expository texts in print
- the type of metacognitive and cognitive reading strategies ESL learners use when reading hypertext
- the differences in the type of metacognitive and cognitive reading strategies employed by ESL learners while reading in print and hypertext
- the type of metacognitive and cognitive reading strategies ESL learners perceive they use while reading hypertext

This chapter discusses the process of data analysis for this study. The process of data analysis consists of:

1. transcribing of data
2. identifying and categorizing the reading strategies
3. analyzing the questionnaire
4. marking the summaries

4.2 Data transcription

The think-alouds and the retrospective think-alouds which were audio taped were transcribed verbatim

4.2.1 Think-aloud Protocol

10 subjects were required to verbalise their thoughts while reading a printed text and a hypertext. These think-aloud responses were audio taped. The recorded responses were then transcribed which included pauses, repetition, false starts and self reports. This was done because all of these features could provide important information related to the cognitive processing (Kasper, 2000). Since some of the subjects during the think-aloud sessions spoke in L2, their reports were transcribed in Bahasa Malaysia verbatim and then translated to English. The English versions of these transcriptions were given back to the subjects to make sure what they had said while reading the two texts were all included in the transcriptions. Then only were the transcripts coded. The average time taken for transcribing the think-aloud responses varied from subject to subject depending on the amount of reporting each subject did.

4.2.2 Retrospective Verbal reports

Immediately after the think-aloud task, the retrospective interview was conducted. The audio taped concurrent think-aloud was played back and the researcher and the subject listened to the tape. This session allowed the researcher to ask

questions, clarify statements and also obtain confirmation on statements that were incomplete. This technique rests on the premise that confronting the subject once again with the task situation by means of audio recording provides reactive traces in short-term memory, thus allowing the subjects to report their cognitive processing with an acceptable degree of accuracy (Faerch and Kasper, 1987). Furthermore, collecting and cross-referencing data from the think-aloud protocol and cued retrospective recall interview allows checking for consistency as well as completeness of these accounts (Greene and Higgins, 1994).

The researcher stopped the tape at any point where there was a need for clarification or where there were ambiguities. The subject would then verify, validate and further clarify what was being said on the tape. This session was also audio taped. All the audio-taped interviews were transcribed and where necessary the data was combined with the concurrent verbal reports.

4.3 Identification and categorization of strategies

The researcher identified the reading strategies based on the transcripts of the think-aloud reports. All the transcripts were double-checked for accuracy. A coding scheme of strategies was adopted from Sheorey & Mokhtari (2001) and Anderson (1991, 2003). The coding scheme also includes an abbreviated code with a strategy term and a description. Given below is the table showing the list of strategies with its descriptions and codes.

Table 4.1 Reading Strategy CODE and the Description

Reading Strategy Codes adopted from Sheorey and Mokhtari (2001), and Anderson (1991, 2003).

	STRATEGY	CODE	DESCRIPTION
	METAGOGNITIVE		
1.	Reading purpose	Rp	Keeping reading purpose in mind
2	Previewing text	Prev	Skimming to get an overall view of the text and relate to what they know
3	Noting text characteristics (Recognize text structure)	NW	Looking at key words or idea, cohesive device or structure of a sentence/paragraph or length and organisation
4	Determining what to read	DM	Decide what to read closely and what to ignore eg. Unknown words
5	Using text features	TF	Eg. Tables, pictures, aids etc, to increase understanding of text
6	Using typographical aids	TA	Eg. To help identify key information
7	Confirming Predictions	Cpred	Check if guesses about the text are right or wrong
8	Evaluating / Analysing/ Commenting on what is read	EVA	Critically analyse and evaluate the information

9	Using context clues	CC+T	Context is used to understand text information
10	Read on	RO	Deciding to read on to comprehend the text
11	Monitoring Comprehension	MC	Assess his or her degree of understanding of the text, and attempts to make repairs
12	Comments on the task itself	CT	Express his or her views about the task.
13	Comments on own behaviour and process	CBP	The reader expresses awareness of the components of the process, describes strategy use in case of comprehension failure
	COGNITIVE		
14	Anticipate Contents / Making Predictions	Pred	Reader predicts what content will occur in succeeding portions of the text
15	Using prior knowledge / Background information(Think about what I know to help me understand what I read)	PK	Explain and clarify content, evaluate the veracity(truth) of content or react to content
16	Adjusting reading rate (Reading slowly and carefully)	ARR	Adjust reading rate based on text difficulty / To make sure the reader understands
17	Pausing and thinking about reading	P+TA	Before each red dot or point or idea. Hm....(short hesitation, during the think aloud)
18	Visualizing information	VIS	To help remember or comprehend the text

19	Reread	RR	Reread some portion of the text to help comprehend the text
20	Guessing meaning of unknown words / phrases (Voc.)	GM	Suffix/prefix/stem Context
21	Summarizing	Sp Sw	<ul style="list-style-type: none"> • Some portion of the text • Whole text
22	Integrating Information	IT	Connects new information with previously stated content
23	Reacting to text information	RTI	Responds affectively to text content
24	Interpreting information	II	Assesses and makes inferences or draw conclusions from the text
25	Questions information of the text	Qinf	The reader questions the significance of the content read.
26	Repeating Words	RW	The reader repeats unknown words
27	Sentence Division	SD	The reader divides the sentence into parts to make it comprehensible
28	Trying to stay focused on reading	SF	Get back on track when the reader loses concentration
	SUPPORT		
29	Taking notes	TN	While reading to help understand the text

30	Underline / circle information in the text	UT	Mark relevant / important information on the text
31	Using reference materials	RM	Using either dictionary or thesaurus.
32	Paraphrasing	Pp	Restate ideas or content for better understanding
33	Going back and forth in the text	GBF	To find relationships among ideas
34	Asking Questions / Questioning understanding	Q+W	Stating failure to understand a portion of the <ul style="list-style-type: none"> • Text • Words / Phrases • Sentence
35	Translate from English to L1	T+W T+S	<ul style="list-style-type: none"> • Word / Phrase • Sentences
36	Think about information in both L1 and L2	TEL1	Some portions in L1 and English
37	Other strategies	OS	

The inventory assisted in identifying and determining which reading strategies students employ when reading a text in print and hypertext, and guide the classification of strategies.

In order to identify the strategies used while reading in print and hypertext, two lecturers were enlisted to work with the researcher in identifying the reading strategies used and categorizing them in a meaningful way.

Firstly, the purpose of the study was explained to the raters and then they were

instructed to independently identify and categorize the strategies for four transcripts (2 printed texts and 2 hypertext) using the coding system of strategies prepared by the researcher. The raters were told that the subject might resort to many other strategies during reading and that they should carefully analyze any other types of strategies that might be used.

The method of analysis consisted of first reading the protocol transcripts and marking the parts of the concurrent verbal reports containing the strategies using the appropriate abbreviated analysis codes in the margins of the transcripts. The raters and the researcher then met to compare codes, calculate percentage of agreement for reliability, and resolve differences in coding. Any differences in coding, with respect to strategy type, were resolved through discussion referring back to the coding scheme and further clarifying definitions and distinctions of categories when necessary.

Once the raters were more confident and comfortable they worked on the rest of the transcripts. They then only met with the researcher to review differences in their coding. Thus, all coded data were agreed upon by the two other raters and researcher, either in initial coding or after discussion. At the conclusion of the task, the raters were required to count the number of occurrences of those strategies.

In general, a relatively high degree of agreement was reached among the raters.

Interrater reliability was 81% for the researcher and one coder, and 78% for the researcher and the other coder. Any discrepancies remaining in coding were resolved through discussion.

For each coded transcript, frequency counts of each strategy category were calculated. Each occurrence of a particular strategy was counted as one instance, whether it lasted for 1 second or 1 minute. Therefore, the response to one sentence might contain several strategies and several instances of the use of one strategy. Qualitative descriptions of the responses of each participant for both passages were also prepared. The data were analysed using descriptive statistical procedures. The median, standard deviation and coefficient of variation were calculated. The Spearman correlation analysis was also used to analyze the correlation between the three categories of metacognitive, cognitive and the support strategies. The Wilcoxon test of significance was used to examine whether significant difference existed between strategies used in the printed text and hypertext with respect to metacognitive, cognitive and support strategies.

4.3.1 Reading Strategies and Excerpts

The following are examples of excerpts of the metacognitive, cognitive and support strategies identified from both printed and hypertext think- aloud transcripts.

1. Reading Purpose

This strategy was identified when a subject kept the reading purpose in mind when doing the tasks. The subjects were required to write a summary after reading both texts (print and hypertext).

Example 1

“I am going to read an article about shifting paradigms and write a summary.....” ok

Example 2

“My main purpose is to memaham (understand) this passage.....”

2. Previewing Text (Prev)

This strategy is used when the subject skims through the text to get an overall view of the text and relate it to what he or she knows.

Example 1

“Let me see what this is about....hm”

Example 2

“What is this? What is this picture?”

3. Noting text characteristics (Nw)

This strategy is used when the subjects recognized or was aware of certain text characteristics like keywords, cohesive devices, structure of sentence or even the length and organization of text or paragraph.

Example 1

“There are seven paragraphs that I need to read.”

Example 2

“okaa... this sentence explains...”

“... explains the meaning of the sentence before”

Example 3

“ There are hyperlinks in this sentence

“ I want click here.”

4. Determining what to read (PM)

This strategy involved the subjects in deciding what to read closely and what to ignore.

Example 1

“ok ... I need to read back to relate”

Example 2

“I will not read it so as not confuse myself as I clearly know the meaning of ecotourism.”

5. Using text features (TF)

This strategy was utilized when a subject used the tables/pictures or aids to help increase his or her understanding of the text.

Example 1

“What does this picture has to do with it?”

Example 2

“ok ... I can see a picture of a jungle”

6. Using typographical aids (TA)

The strategy was used when a subject used typographical aids such as the highlighted words and letters, to help identify key information in the text.

Example 1

“There are seven paragraphs. I know how long it will take to finish reading”

Example 2

“This is written in blue which distinguishes it from other passages”

7. Confirming predictions (Cpred)

This strategy was utilized when a subject checked if guesses about the text are right or wrong.

Example 1

“... strengths my prediction about the passage”

Example 2

“As I expected”

8. Evaluate / Analyze / Comment on what is read (EVA)

This strategy was used when a subject critically analyzes and evaluates the information from the text.

Example 1

“ to help the problems that they have”

Example 2

*“ Mungkin dia nak jimat kot. Nak bagi jimat ...” (Maybe he wants to save.
..give savings)*

9. Using Context Clues (CC + T)

This strategy was identified when a subject used the context to understand text information.

This strategy was not utilized by any of the subjects.

10. Read On (RO)

This strategy was used when a subject decided to read on in the hope that the following sentence will help him or her comprehend the text.

Example 1

“ let just read further on”

Example 2

“ I am going and move on”

11. Monitoring Comprehension (MC)

This strategy was utilized when a subject attempts to assess his or her degree of understanding of the text and attempts to make repairs.

Example 1

“ Mm... I can't understand the whole passage, but I need to reread it again.”

Example 2

“ Still not understand about this ... ok .. moving on .”

12. Comments on the task itself (T)

This strategy was identified when a subject makes comments on the task itself.

This strategy was not utilized by any of the subjects.

13. Comments on own behaviour and process (CBP)

This strategy was identified when a subject expresses awareness of the components of the process and describes strategy use in case of comprehension failure.

This strategy was not utilized by any of the subjects.

14. Making Predictions (Pred)

This strategy was utilized when a subject predicts what will occur in succeeding portions of the text.

Example 1

“... must be about some eco ...”

... Ok maybe something about the forest”

Example 2

“... maybe a motivational passage”

15. Using Prior knowledge (PK)

This strategy was utilized when a subject uses his background knowledge to explain clarify of the text. It also includes the subjects’ reaction to the content.

Example 1

“... like the economic recession in 1998”

Example 2

“I think this is like swamp lake ... the swamp thing”

16. Adjusting Reading Rate (ARR)

This strategy was utilized when a subject deliberately reads the text slowly and carefully to try and understand a difficult sentence or phrase.

The subject would reread it very slowly. One or two subjects would say aloud that he or she is going to reread it slowly but most of them just reread slowly.

17. Pausing and thinking about reading (PTA)

This strategy was utilized when a subject hesitates for a short period of time to reflect on a word or sentence that he or she has read.

Example 1

“Hmm 21st Century”

Example 2

“Aaayesmm ... ok”

18. Visualising information (VIS)

This strategy was utilized when a subject as he/she reads visualizes what he/she reads to help him/her remember or comprehend the text.

Example 1

“Albert Einstein, I am trying to picture Albert Einstein as a person not only who had knowledge and information.”

Example 2

“ .. I am trying to picture freedom.”

19. Reread (RR)

This strategy was used when a subject rereads a part of a sentence or text to help comprehend the text.

Example 1

“ I think I should read this once more ”

Example 2

“ ... I should read The para once agains ... ”

20. Guessing meaning of unknown words phrases (GM)

This strategy was identified when a subject used suffix /prefix or context to guess meaning of unknown words.

Example 1

“ .. tour operator is the tour guide ”

Example 2

“ ok ... I think standard industry ... maybe ... travelers ”

21. Summarizing (SP)

This strategy was utilized when a subject summarized some parts of the text.

Example 1

“ ... ok so I can sum up the idea..... ”

Example 2

“ Ok, this is about outdoor activities, camping and so ...on. Ok ... ”

22. Integrating information (IT)

This strategy was utilized when a subject attempts to connect new information with information previously stated in same text.

Example 1

“ Just now Edward de Bono ... the approach lateral thinking”

Example 2

*“ I’m trying to enm Find the meaning between this sentence ...
an the previous para ...”*

23. Reacting to text information (RTi)

This strategy was identified when a subject responds affectively to the text.

Example 1

“ Asking too many questions”

Example 2

“ Ini dah biasa dengar ...” (This we always hear)

“ Ah!... that’s very vital”

24. Interpreting information (II)

This strategy was utilized when a subject makes inferences or draws conclusions from the text.

Example 1

“ Maybe this is the way they use to work in the company ... ok”

Example 2

“ Ok,,, it’s a learning concept. Alright”

25. Questions Information of the text (Qinf)

This strategy was identified when a subject questions the significance of the information in the text.

Example 1

“ ... Oh I thought lateral thinking....”

Example 2

“ What has the that got to do with child”

26. Repeating Words (RW)

This strategy was utilized when a subject repeats unknown words from the text as a means of trying to comprehend the word.

Example 1

“ Proliferation...”

Example 2

“ ... minimize the impact ...”

27. Sentence Division (SD)

This strategy was utilized when a subject divides the sentence into parts to make in comprehensible.

Example 1

“ ... this sentence is long so I will break it up ...”

Example 2

“ OK I will do like before because this sentence is long I will break it to two.”

28. Trying to stay focused on reading (SF)

This strategy was identified when a subject attempts to refocus on the text after losing concentration.

Example 1

“ ..ok let me continue .”

Example 2

“...balik...pada text” (get back to the text)

29. Taking Notes (TN)

This strategy was utilized when a subject takes down notes while reading to help understand the text.

Observation 1

The subject listed down the activities involved in ecotourism.

Observation 2

The subject wrote down the benefits

30. Underline important information (UT)

This strategy was identified when a subject marks important information in the text.

Example 1

“ Oh I would like to underline this ... better”

Example 2

“ This is important I should mark it”

31. Using reference materials (RM)

This strategy was identified when a subject uses a dictionary to understand difficult words.

For the printed text and hypertext this reading strategy was not used.

32. Paraphrasing (Pp)

This strategy was utilized when a subject tries to restate an idea or information for better understanding of the text.

Example 1

“ Oh ... that means after they travel, then they have got nothing, so it is because of the lack of regulation to std industry.

Example 2

“ Mm ,, however the money benefits is not goes to the place itself”.

33. Going back and forth in the text (GBF)

This strategy was utilized when a subject went back and forth while reading certain portions of the text. This was done to help the subject find relationships among ideas or to clarify a point.

Print

The subject would look at the sentences above or below if he or she did not understand.

Hypertext

They would just scroll up or down the text.

34. Asking questions (QT)

This strategy was utilized when a subject begins asking questions to himself when there is failure to understand a portion of the text or sentence.

Example 1

“ What is that niche? I don’t know ... ”

Example 2

“ Soft adventure is like what? aa ...ok”

35. Translate from English to L1 (T)

This strategy was utilized when a subject translates a word, phrase or sentence from English to Bahasa Malaysia.

Example 1

“ It is “tadika” (It is ...Kindergarden)

Example 2

*“ Ecotourism is something in Malay it means Pelancongan.
Pelancongan Alam Sekitar.”*

36. Think about information in both English and L1 (TEL 1)

This strategy was identified when a subject thinks of some portions of the text in L1 and English.

Example 1

“ lepas ini ... normal individuals”(after this ...normal individuals)

Example 2

*“ Oh so it shows that Dia orang tak akan mengaut any
keuntungan”.(He is not going to make any noise about the profit)*

4.4 Questionnaire

For the OSORS, all the students (N=10) responses for the 38 items were scored within the three subscales:

- Metacognitive (global)
- Cognitive (problem-solving) and
- Support

The medians, standard deviations and the coefficients of variation were calculated to identify the strategies ESL learners perceive themselves to be using when reading hypertext.

4.5 Summary

The subjects were required to write a summary after reading both the printed text and hypertext. Bernhardht, (1983) encourages the use of summary as a “method of testing foreign language reading competence which circumvents the pitfalls of traditional test design and, at the same time, focuses on the communication between reader and text”

The summary was scored for the presence of the number of main ideas, supporting details and general understanding of the text. A strict criterion was adopted in which distortion of the original texts were not allowed. Paraphrases were accepted but elaborate inferences were not. The researcher enlisted the help of a colleague to mark the summary. Interrater reliability coefficient conducted on the summary marked for both printed and hypertext was found to be 0.82. Then both the scores for printed text and hypertext were compared.

CHAPTER 5

RESULTS AND DISCUSSION

5.1 Introduction

This chapter presents and discusses the results of the study. The results are described, interpreted and explained in relation to the following research questions:

- What metacognitive and cognitive reading strategies do ESL learners employ in comprehending expository texts in print?
- What metacognitive and cognitive reading strategies do ESL learners employ in comprehending hypertext?
- Is there a significant difference in the metacognitive and cognitive reading strategies employed by ESL learners in comprehending expository texts in print and hypertext?
- What metacognitive and cognitive reading strategies do ESL learners perceive they use while reading hypertext?

5.2 Research Question 1 – What metacognitive and cognitive reading strategies do ESL learners employ in comprehending expository texts in print?

The first research question in this study was directed towards identifying the metacognitive and cognitive reading strategies used by ESL learners when reading printed text.

5.2.1 Individual Strategies (Printed Text)

Table 5.2.1 shows the frequencies of using the 36 individual reading strategies and the associated descriptive statistics.

It can be seen that six (6) of the reading strategies (16.7%) have median values ranging from 3.50 to 14.0, and are considered as belonging to the high usage group of reading strategies. In descending order of frequent usage, these are *pausing and thinking about reading* (median = 14.0); *monitoring comprehension* (median = 8.50); *reread* (median = 10.0); *adjusting reading rate* (median = 7.0); *paraphrasing* (median = 5.5); and *asking questions* (median = 3.5). The analysis uses the median values instead of the means because of the large standard deviations of the means of all the 36 strategies.

Three reading strategies (8.3%) have median values between 2.5 and 3.49, which qualify them for the medium usage group. In descending order of frequency, these are *questions information of the text* (median = 3.00), *evaluate/analyse information* (median = 2.50), and *reacting to text* (median = 2.50).

Again, the analysis uses median values instead of the means because of the large standard deviations, which expressed in terms of its coefficients of variation (C.V.), range from 78.2% for *questions information of the text* to 102.9% for *reading to text*. (The study will use the median instead of the mean in subsequent analyses and when making conclusions where the standard deviations are exceedingly large; however, it will also present the means for purpose of comparison). Twenty-seven reading strategies (75.0%) have mean or median values of less than 2.5, implying that these reading strategies are infrequently used.

5.2.2 Frequency of Usage by Category of Reading Strategies (Printed Text)

In this study, the strategies are further categorised into metacognitive strategies (MET), cognitive strategies (COG) and support strategies (SUP). Table 5.2.2, below which is constructed from Table 5.2.1 shows that fifteen strategies under COG have the highest overall median value of 2.90, followed by the eight strategies belonging to SUP (median =1.69), and the thirteen strategies under MET (median = 1.23). All the coefficients of variation of the means are large, hence the use of median values to represent the frequency of strategy usage by the students as a whole.

Table 5.2.2: Frequency of Strategy Usage by Category: Printed Text

Strategy Category	Mean	Median	Std. Deviation	Coefficient Variation (C.V.)
Metacognitive (MET)	1.32	1.23	0.90422	68.5
Cognitive (COG)	3.36	2.90	1.69262	50.4
Support (SUP)	1.73	1.69	0.99965	57.8
All categories	2.26	1.90	1.12828	49.9

From the above results, it appears that ESL learners tend to prefer the set of strategies designated as cognitive when reading printed text over support strategies and

metacognitive strategies, in that order. It is clear that even in the case of cognitive strategies, on the average, the students only use them moderately.

The frequency of usage for the 36 strategies as a whole manifests in the median value of only 1.90 (C.V. = 49.9%). The low median value (i.e. less than 2.50) implies that many students do not use most of the strategies listed in the study when reading printed text.

5.2.3 Top Five and Bottom Five Strategies

Table 5.2.3 illustrates the top five strategies and the bottom five reading strategies used by the ESL students when reading printed text based on the frequency of usage. In the case of the top five, these are arranged in descending order of frequency of usage (decreasing mean/median size), while in the case of the bottom five strategies, their positions relative to each other is immaterial since all have zero median values.

Table 5.2.3: Top Five and Bottom Five Strategies: Printed Text

Strategy	Strategy Category	Mean	Median	Std. Deviation	Coefficient Variation (C.V.)
1. Pausing and thinking about reading	Cognitive	16.30	14.00	8.394	51.5
2. Reread	Cognitive	10.00	10.00	5.437	54.4
3. Monitoring comprehension	Metacognitive	10.30	8.50	8.845	85.9
4. Adjusting reading rate	Cognitive	6.30	7.00	4.692	74.5
5. Paraphrasing	Support	5.90	5.50	4.999	84.7
6. Using context clues	Metacognitive	0	0	-	-
7. Comments on own behaviour and process	Metacognitive	0	0	-	-
8. Repeating words	Cognitive	0	0	-	-
9. Trying to stay focused on reading	Cognitive	0	0	-	-
10. Taking notes	Support	0	0	-	-

Three of the top five strategies in the table belong to the cognitive category. These are *pausing and thinking about reading* (median = 14), *reread* (median = 10.0), and *adjusting reading rate* (median = 7.0). The other two strategies, namely, *monitoring comprehension* (median = 8.50) and *paraphrasing* (median = 5.50), in descending order, belong to the metacognitive and support strategy, respectively. All the five strategies have median values in excess of 3.50, implying that they are highly used.

The bottom five strategies, in which the relative position to each other is of no consequence, have zero mean/median values. In other words, the students have not used these strategies at all. These are *using context clues*, *comments on own behaviour and process*, *repeating words*, *trying to stay focused on reading*, and *taking notes*. In fact, there is another strategy with a zero mean/median, namely, *using reference materials*. Of these six strategies, two belong to the metacognitive category, two are under the cognitive and two belong to the support category of strategies.

5.2.4 Correlation between Different Categories of Reading Strategies

The focus of this section is on whether there is a correlation between the three categories of strategies used by students when reading printed text. The study uses Spearman Correlation analysis (a non-parametric Correlation Analysis) as the individual observation values (frequencies of usage by each of the students) are not normally distributed. Table 5.2.4 summarises the results of the correlation analysis.

Table 5.2.4: Correlation Analysis between Categories of Strategies Used in Printed Text

	Spearman statistics	Metacognitive	Cognitive	Support
Metacognitive (MET)	Correlation coefficient	1.00	0.541	0.253
	Sig. (2-tailed)	0.000	0.106	0.481
Cognitive (COG)	Correlation coefficient	0.541	1.000	0.742*
	Sig. (2-tailed)	0.106	0.000	0.014
Support (SUP)	Correlation coefficient	0.253	0.742*	1.000
	Sig. (2-tailed)	0.481	0.014	0.000

Correlation is significant at the 0.05 level (2-tailed)

Cognitive strategies are positively and fairly strongly correlated with support strategies ($r = 0.742$; $p = 0.014 < 0.05$). That is, the Spearman's correlation coefficient of 0.742 is statistically significant at the 0.05 level. The interpretation of this relationship is that students who use cognitive strategies in the reading of printed text are more likely to use support strategies as well. However, there is no correlation between metacognitive and cognitive strategies ($p = 0.106 > 0.05$) and between metacognitive and support strategies ($p = 0.481 > 0.05$). That is, both the coefficients of correlation are not statistically significant at the 0.05 level.

5.3 Research Question 2 – What metacognitive and cognitive reading strategies do ESL learners employ in comprehending hypertext?

The second research question focused on identifying the metacognitive and cognitive reading strategies used by ESL learners when reading hypertext.

5.3.1 Individual Strategies (Hypertext)

Table 5.3.1 shows the frequencies of using the 36 individual reading strategies and the associated descriptive statistics.

Six (6) reading strategies (16.7%) have median values ranging from 3.5 to 17.0, and are considered as belonging to the high usage group of strategies. In descending order of frequent usage, these are *pausing and thinking about reading* (median = 17.0); *monitoring comprehension* (median = 10.0); *reread* (median = 9.0); *adjusting reading rate* (median = 6.0); *asking questions/questioning understanding* (median = 3.5); and *interpreting information* (median = 3.5). As with printed text, the analysis here uses the median values instead of the means because all the standard deviations are too large with the coefficients of variation ranging from 51.8% for *reread* to 96.4% for *interpreting information*. Similarly, there are also six statements with median values in the high usage category for the printed text.

In contrast with the printed text there are three strategies (8.3%) considered as medium usage. Only one strategy (2.8%), namely, *reacting to text* (median = 2.5), falls under this category of usage for hypertexts. Besides the six reading strategies mentioned above, the students rarely use the other thirty strategies (83.3%) when reading hypertext. Similarly when reading printed text, besides the six reading strategies frequently used, the ESL students rarely used the 75 per cent of the other strategies. In fact, there are five strategies (13.9%) which the students do not use at all. In the case of the printed text, there are six strategies (16.7%) which the ESL students do not use at all.

5.3.2 Frequency of Usage by Category of Reading Strategies (Hypertext)

Table 5.3.2 (derived from Table 5.2.1) shows the means, medians and other related statistics of the strategies categorised into metacognitive strategy (MET), cognitive

strategy (COG) and support strategy (SUP). The fifteen cognitive strategies have the highest median value of 3.30, followed by that of the 13 metacognitive strategies (1.65), and that of the eight support strategies (0.94). That is, there is an indication that, these ESL learners tend to prefer the cognitive reading strategies when reading a hypertext over the metacognitive and support strategies, in that order.

Table 5.3.2: Frequency of Strategy Usage by Category: Hypertext

Strategy Category	Mean	Median	Std. Deviation	Coefficient Variation (C.V.)
Metacognitive strategy	1.63	1.65	0.96473	58.9
Cognitive strategy	3.66	3.30	1.8818	51.4
Support strategy	1.16	0.94	0.86613	74.5
All categories	2.38	2.26	0.90599	38.1

In the case of the printed text, the cognitive reading strategies are relatively the most commonly used by the students, albeit only moderately. It is no different in the case when these ESL students read hypertext. There is a slight difference, though, in that in the former the students seem to prefer supportive strategies to metacognitive strategies, while for the hypertext the ESL students prefer metacognitive and support strategies. The overall median value of 2.26 (i.e. less than 2.5) for the 36 individual strategies supports the earlier finding that, apart for several strategies, students do not seem to have used most of the strategies listed in the study when reading hypertext.

5.3.3 Top Five and Bottom Five Strategies Used While Reading Hypertext

Table 5.3.3 shows the top five and bottom five strategies in descending order of frequency of usage (based on the median values).

Table 5.3.3: Top Five and Bottom Five Strategies: Hypertext

Strategy	Category	Mean	Median	Std. Deviation	Coefficient Variation (C.V.)
1. Pausing and thinking about reading	Cognitive	21.10	17.00	17.723	84.0
2. Monitoring comprehension	Metacognitive	10.10	10.00	7.894	71.1
3. Reread	Cognitive	9.60	9.00	4.971	51.8
4. Adjusting reading rate	Cognitive	6.30	6.00	4.111	65.3
5. Interpreting information	Cognitive	4.20	3.50	4.050	96.4
6. Using context clues	Metacognitive	0	0	-	-
7. Comments on the task itself	Metacognitive	0	0	-	-
8. Comments on own behaviour and process	Metacognitive	0	0	-	-
9. Underline important information	Support	0	0	-	-
10. Using reference materials	Support	0	0	-	-

Four of the top five reading strategies belong to the cognitive category of reading strategies. These are *pausing and thinking about reading* (median = 17.0), *reread* (median = 9.0), *adjusting reading rate* (median = 6.0), and *interpreting information* (median = 3.50). The other reading strategy is *monitoring comprehension* (median = 10.0), which belongs to the metacognitive category, and it is the second most frequently used strategy. All of the above reading strategies have median values of 3.5 or higher, implying that these strategies are highly used by the students.

Fifteen reading strategies in this section have a zero median value each. Of these thirteen reading strategies, five belong to the metacognitive category, six belong to the cognitive category, and four to the support category. One or two students have reported using them, but their means are not only very small, they also have large standard deviations, which imply that these means are statistically of little value (i.e. they do not represent the majority of the students).

The bottom five reading strategies in the table are *bona fide* non-entity as reading strategies, at least as far as these ESL students under study are concerned, with none of the students using them even once. As the table indicates, three of these belong to the metacognitive category and two are under the support category.

5.3.4 Correlation between different Categories of Reading Strategies

An analysis was carried out to determine whether the three categories of reading strategies are correlated with one another. As the observation values (frequency of

strategy usage) are not normally distributed, the analysis uses Spearman Correlation (a non-parametric correlation analysis). Table 5.3.4 summarises the results of the above analysis.

None of the coefficients of correlation are statistically significant at the 0.05 level ($p > 0.05$). The study concludes, therefore, that the three categories of strategies are independent of each other. In other words, preference for one strategy in no way affects the preference for the other categories of strategies.

Table 5.3.4: Correlation Analysis between Categories of Strategies Used in Hypertext

	Spearman statistics	Metacognitive	Cognitive	Support
Metacognitive (MET)	Correlation coefficient	1.00	0.128	-0.390
	Sig. (2-tailed)	0.000	0.724	0.265
Cognitive (COG)	Correlation coefficient	0.128	1.00	0.323
	Sig. (2-tailed)	0.724	0.000	0.362
Support (SUP)	Correlation coefficient	0.390	0.323	1.00
	Sig. (2-tailed)	0.265	0.362	0.000

Correlation is significant at the 0.05 levels (2-tailed)

5.4 Research Question 3 – Is there a significant difference in the metacognitive and cognitive reading strategies employed by ESL learners in comprehending expository texts in print and hypertext?

For research question 1, the results indicate that ESL learners while reading printed text tend to use the cognitive group of strategies more than the support group and metacognitive group of strategies, in that order. For research question 2, the ESL learners seem to rely on cognitive strategies to the metacognitive and support group of strategies, in that order. The focus for this research question is on whether these ESL learners actually differ in their use of each of the three categories of strategies, namely, metacognitive, cognitive and support strategy when they read printed text and when they read hypertext.

The required analysis involves statistical test of significant difference between the strategies in the printed text and those in the hypertext with respect to metacognitive, cognitive and support category of strategies. As the analysis involves the same set of students, it uses the paired sample test. Moreover, the non-parametric Wilcoxon test of significance is adopted, as the observation values are not normally distributed.

Table 5.4 shows the results of the Wilcoxon test for all the individual strategies as well as for the three categories.

Table 5.4: Differences in Strategy Usage When Reading Printed Text and Hypertext

	Hypertext – Printed text (Strategy)		N	Mean Rank	Wilcoxon test statistics	P-value
Meta cognitive strategy	Reading purpose	Negative Ranks ¹	0	.00	-1.000	0.317
		Positive Ranks ²	1	1.00		
		Ties ³	9			
		Total	10			
	Previewing text	Negative Ranks	2	2.00	-0.378	0.705
		Positive Ranks	2	3.00		
		Ties	6			
		Total	10			
	Noting text characteristics	Negative Ranks	0	.00	-1.000	0.317
		Positive Ranks	1	1.00		
		Ties	9			
		Total	10			
	Determining what to read	Negative Ranks	0	.00	-2.041	0.041*
		Positive Ranks	5	3.00		
		Ties	5			
		Total	10			
	Using text features	Negative Ranks	0	0.00	-2.692	0.007**
		Positive Ranks	9	5.00		
		Ties	1			
		Total	10			
	Using typographical aids	Negative Ranks	0	.00	-1.913	1.000
		Positive Ranks	0	.00		
		Ties	10			
		Total	10			
	Confirming predictions	Negative Ranks	4	2.50	-1.841	0.066
		Positive Ranks	0	.00		
		Ties	6			
		Total	10			
Evaluate/analyse information	Negative Ranks	6	4.92	-1.620	0.105	
	Positive Ranks	2	3.25			
	Ties	2				
	Total	10				
Using context clues	Negative Ranks	0	.00	-0.240	1.000	
	Positive Ranks	0	.00			
	Ties	10				
	Total	10				
Read on	Negative Ranks	3	2.67	-0.137	0.891	
	Positive Ranks	2	3.50			
	Ties	5				
	Total	10				

Table 5.4: (Continues)

Meta cognitive strategy	Monitoring comprehension	Negative Ranks	5	4.10	-0.715	0.475
		Positive Ranks	5	6.90		
		Ties	0			
		Total	10			
	Comments on the task itself	Negative Ranks	1	1.00	-1.000	0.317
		Positive Ranks	0	.00		
		Ties	9			
		Total	10			
	Comments on own behaviour and process	Negative Ranks	0	.00	-1.000	1.000
		Positive Ranks	0	.00		
		Ties	10			
		Total	10			
Cognitive strategy	Making predictions	Negative Ranks	5	4.30	-0.513	0.608
		Positive Ranks	3	4.83		
		Ties	2			
		Total	10			
	Using prior knowledge	Negative Ranks	6	4.42	-2.120	0.034*
		Positive Ranks	1	1.50		
		Ties	3			
		Total	10			
	Adjusting reading rate	Negative Ranks	6	5.00	-0.257	0.797
		Positive Ranks	4	6.25		
		Ties	0			
		Total	10			
	Pausing and thinking about reading	Negative Ranks	3	6.00	-0.969	0.333
		Positive Ranks	7	5.29		
		Ties	0			
		Total	10			
	Visualizing information	Negative Ranks	1	1.00	-1.000	0.317
		Positive Ranks	0	.00		
		Ties	9			
		Total	10			
	Reread	Negative Ranks	7	5.57	-1.174	0.240
		Positive Ranks	3	5.33		
		Ties	0			
		Total	10			
	Guess meaning of unknown words	Negative Ranks	3	3.33	-0.707	0.480
		Positive Ranks	2	2.50		
		Ties	5			
		Total	10			

Table 5.4: (Continues)

Cognitive strategy	Summarising	Negative Ranks	2	1.50	-1.225	0.221
		Positive Ranks	3	4.00		
		Ties	5			
		Total	10			
	Integrating information	Negative Ranks	2	2.50	-1.186	0.236
		Positive Ranks	4	4.00		
		Ties	4			
		Total	10			
	Reacting to text	Negative Ranks	3	5.83	-0.071	0.944
		Positive Ranks	5	3.70		
		Ties	2			
		Total	10			
	Interpreting information	Negative Ranks	2	4.00	-1.411	0.158
		Positive Ranks	6	4.67		
		Ties	2			
		Total	10			
	Questions information of the text	Negative Ranks	5	6.20	-1.025	0.305
		Positive Ranks	4	3.50		
		Ties	1			
		Total	10			
	Repeating words	Negative Ranks	0	.00	-1.841	0.066
		Positive Ranks	4	2.50		
		Ties	6			
		Total	10			
	Sentence Division	Negative Ranks	3	2.00	-0.368	0.713
		Positive Ranks	1	4.00		
		Ties	6			
		Total	10			
Trying to stay focused on reading	Negative Ranks	0	.00	-2.060	0.039*	
	Positive Ranks	5	3.00			
	Ties	5				
	Total	10				

Table 5.4: (Continues)

Support strategy	Taking notes	Negative Ranks	0	.00	-1.342	0.180
		Positive Ranks	2	1.50		
		Ties	8			
		Total	10			
	Underline important information	Negative Ranks	3	2.00	-1.604	0.109
		Positive Ranks	0	.00		
		Ties	7			
		Total	10			
	Using reference materials	Negative Ranks	0	.00	-1.604	1.000
		Positive Ranks	0	.00		
		Ties	10			
		Total	10			

1. Negative Ranks mean hypertext < printed text
2. Positive Ranks mean hypertext > printed text
3. Ties mean hypertext = printed text
 - * *P-value* is statistically significant at the 0.05 level
 - ** *P-value* is statistically significant at the 0.01 level

In the case of the individual strategies, there are two reading strategies belonging to the metacognitive category in which students differ in their usage between when reading printed text and when reading hypertext. The results show that, on the average, the students *determine what to read* ($p = 0.041 < 0.05$) and *use text features* ($p = 0.007$), relatively more often when reading hypertext than when reading printed text. Both the differences are statistically significant at the 0.05 level. In addition, there are two strategies belonging to the cognitive category in which the students differ in their usage when reading printed text and when reading hypertext; on the average, the students *try to stay focused on the reading* ($p = 0.039 < 0.05$) and *use prior knowledge* ($p = 0.034 < 0.05$) relatively more frequently when reading hypertext than when reading printed text. The difference is statistically significant at the 0.05 level.

Table 5.4.1 shows the results of the significance tests between categories of strategies. None of the *p-values* for the metacognitive, cognitive and support group of reading strategies is statistically significant at the 0.05 level ($p > 0.05$); neither is all the strategies as a whole ($p = 0.646 > 0.05$).

The results imply that the students do not use different reading strategies when reading printed text or the hypertext, except for the four individual strategies discussed earlier. By category (i.e. metacognitive, cognitive and support), they also do not differentiate whether the category of reading strategies they use are specific to the printed text or the hypertext.

In other words, and on average, when a student uses a set of reading strategies in reading printed text, he/she tends to use the same set of strategies when reading hypertext. However, the two metacognitive and two cognitive reading strategies that differ in their usage between reading printed and hypertext indicate that the two metacognitive and two cognitive reading strategies may be more needed or used while reading hypertext. In other words, the students in this study found using these strategies helpful in comprehending the hypertext.

Table 5.4.1: Test of Significance Difference in Strategies between Reading Printed Text and Reading Hypertext

Strategy Category	Hypertext – Printed text	Mean Rank	Wilcoxon test Statistics	<i>p-value</i>
Metacognitive	Negative ranks ¹	6.33	-0.866	0.386
	Positive ranks ²	5.14		
Cognitive	Negative ranks	6.75	-0.051	0.959
	Positive ranks	4.67		
Support	Negative ranks	5.57	-1.172	0.241
	Positive ranks	5.33		
All strategies	Negative ranks	5.75	-0.459	0.646
	Positive ranks	5.33		

1. Negative ranks mean hypertext < printed text
2. Positive ranks mean hypertext > printed text

5.5 Students' Perception on Reading Strategies Used in Hypertext

In the earlier section, the study discussed the strategies students reported to help them comprehend the hypertext. The purpose of this section is to find out whether these students' perceptions are consistent with what they have reported.

There is a possibility that the students inadvertently reported as strategies they used, as discussed earlier might be different from what they perceive to be doing. Therefore, a perception survey was carried out involving the same students. The 10 students were provided with a Questionnaire. The questionnaire had a list of 38 statements adopted from Anderson (2003), Online Survey of Reading Strategies and their perception of what they perceive to be doing in terms of reading strategy is gauged using a scale from 1 (never) to 5 (always). Based on the outcome of this perception survey, the study will draw a conclusion whether the measures they reportedly used are consistent with the reading strategies they perceive to have been using.

Table 5.5 shows the descriptive statistics of the 38 statements, listed in descending order of mean/median size. The size of the means, the medians, the standard deviations and the coefficients of variation imply that for some statements, the individual scores are normally distributed, while for some other statements they are not. Therefore, the study will use the means or the medians wherever appropriate.

Table 5.5: Mean Scores of Statements on Reading Strategies

Statement (strategy)	Mean	Median	Std. Deviation	C.V.
1. When on-line text becomes difficult, I re-read it to increase understanding	4.60	5.00	0.699	15.2
2. Try to get back on track when I lose concentration	4.30	4.50	0.823	19.1
3. When reading on-line, I decide what to read closely and what to ignore	4.10	4.00	0.568	13.9
4. I review the on-line text first by noting its characteristics like length and organisation	4.00	4.00	1.054	26.4
5. I Scan the on-line text to get a basic idea of whether it will serve my purpose before choosing to read it	4.00	4.00	0.816	20.4
6. I try to guess what the content of the on-line text is about when reading	4.00	4.00	0.667	16.7
7. When on-line text becomes difficult, I pay closer attention to what I am reading	4.00	4.00	0.816	20.4
8. I read slowly and carefully to understand what I am reading on-line	4.00	4.00	1.054	26.4
9. Think about what I know to help understand what I read on-line	3.90	4.00	0.738	18.9
10. I check my understanding when I come across new information	3.80	4.00	0.789	20.7
11. Critically evaluate the on-line text before choosing to use information when I read on-line	3.80	4.00	0.789	20.8
12. I am not aware of what I do to understand the text	3.80	4.00	0.632	16.6
13. Try to visualise information to help remember what I read on-line	3.70	3.50	0.823	22.2
14. Paraphrase to better understand what I read on-line	3.70	4.00	0.823	22.2
15. I guess the meaning of unknown words or phrases when reading on-line	3.70	4.00	0.675	18.2

Statement (strategy)	Mean	Median	Std. Deviation	C.V.
16. I go back and forth in the on-line text to find relationships among ideas in it	3.60	4.00	1.174	32.6
17. Think about whether the content of the on-line text fits my reading purpose	3.60	4.00	1.350	37.5
18. Adjust reading speed according to what I am reading on-line	3.60	4.00	0.843	23.4
19. I print out a hard copy of the on-line text then underline or circle information to help understand it	3.60	4.00	1.350	37.5
20. I use context clues to help better understand what I am reading on-line	3.50	3.00	0.707	20.2
21. Stop from time to time and think about what I am reading on-line	3.50	4.00	0.972	27.8
22. I use typographical features like bold face and italics to identify key information	3.30	3.00	1.252	37.9
23. Read aloud to help me to understand when reading gets difficult	3.30	3.00	1.252	37.9
24. I take an overall view of the on-line text to see what it is about before reading it	3.30	3.00	1.059	32.1
25. I can distinguish between fact and opinion in on-line texts	3.20	3.00	0.919	28.7
26. I have purpose in mind when read online	3.20	3.00	1.398	43.7
27. I critically analyse and evaluate the information presented in the on-line text	3.20	3.00	0.789	24.7
28. I use tables, figures and pictures in the on-line text to increase understanding	3.20	3.00	1.135	35.5
29. I translate from English into native language when reading on-line	3.10	3.50	1.101	35.5
30. I look for sites that cover both sides of an issue when reading on-line	3.10	3.00	0.568	18.3
31. I read pages on the internet for academic purposes	3.10	3.00	1.197	38.6

Statement (strategy)	Mean	Median	Std. Deviation	C.V.
32. I think about information in both English and mother tongue when reading on-line	3.00	3.00	1.155	38.5
33. I ask myself questions when reading on-line text	3.00	3.00	1.054	35.1
34. I check to see if guesses about the on-line text are right or wrong	2.80	3.00	1.033	36.9
35. I take notes while reading on-line to help understand the reading	2.80	3.00	1.476	52.7
36. I use reference materials to help understand what I read on-line	2.60	2.50	1.265	48.7
37. I participate in live chat with native speakers of English	2.50	2.50	1.080	43.2
38. I participate in live chat with other learners of English	2.40	2.00	1.075	44.8
Overall	3.4711	3.6951	0.49083	14.1

Adopted from Anderson (2003), Online Survey of Reading Strategies

More than half (21 out of 38 or 55.3%) of the statements have mean scores or median scores of at least 3.50. That is, on the average, each student uses 21 or 55.3 per cent of the 38 reading strategies listed.

Table 5.5 (a): Reading Strategies Students' Perceive they Use the Most

Statement (strategy)	Mean
1 When on-line text becomes difficult, I re-read it to increase understanding	4.60
2 Try to get back on track when I lose concentration	4.30
3 When reading on-line, I decide what to read closely and what to ignore	4.10
4 I review the on-line text first by noting its characteristics like length and organisation	4.00

5	I scan the on-line text to get a basic idea of whether it will serve my purpose before choosing to read it	4.00
6	I try to guess what the content of the on-line text is about when reading	4.00
7	When on-line text becomes difficult, I pay closer attention to what I am reading	4.00
8	I read slowly and carefully to understand what I am reading on-line	4.00
9	Think about what I know to help understand what I read on-line	3.90
10	I check my understanding when I come across new information	3.80
11	Critically evaluate the on-line text before choosing to use information when I read on-line	3.80
12	I am not aware of what I do to understand the text	3.80
13	Try to visualise information to help remember what I read on-line	3.70
14	Paraphrase to better understand what I read on-line	3.70
15.	I guess the meaning of unknown words or phrases when reading on-line	3.70
16.	I go back and forth in the on-line text to find relationships among ideas in it	3.60
17.	Think about whether the content of the on-line text fits my reading purpose	3.60
18.	Adjust reading speed according to what I am reading on-line	3.60
19.	I print out a hard copy of the on-line text then underline or circle information to help understand it	3.60
20.	I use context clues to help better understand what I am reading on-line	3.50
21.	Stop from time to time and think about what I am reading on-line	3.50

The results from Table 5.5(a) show that the students always use the following strategies

- *when on-line text becomes difficult, reread it to increase understanding (mean = 4.6).*
- *Try to get back on track when lose concentration (mean = 4.30),*
- *When reading on-line, I decide what to read closely and what to ignore (mean=4.10)*

- *I review the on-line text first by noting its characteristics like length and organization (mean=4.00)*
- *I Scan the on-line text to get a basic idea of whether it will serve my purpose before choosing to read it (mean=4.00)*
- *I try to guess what the content of the on-line text is about when reading(4.00)*
- *When on-line text becomes difficult, I pay closer attention to what I am reading (Mean=4.00)*
- *I read slowly and carefully to understand what I am reading on-line (Mean=4.00)*

The above reading strategies are quite popular with the students as they use them frequently when reading on-line. Therefore, in general the students' perceptions on reading strategies used are consistent with what they reported.

5.5.1 Open-Ended questions

The students were required to answer two open-ended questions. The questions are as follows:

- Question 1
Do you have difficulty reading on-line? Yes / No
Why
- Question 2
What reading strategies do you think is important to help you read and comprehend a text better on screen?

5.5.1.1 Question 1 - Difficulty reading

90% of the students reported that they had difficulty reading on-line. The reasons given by the ESL learners as to why they have difficulty reading on-line are:

- *I dislike to scroll through to get to another page because it makes me confused.*
- *It takes a long time compared to when I am reading on hardcopy*
- *It restricts me from writing notes*
- *I prefer to print it out and read with my dictionary next to me to get a better understanding*
- *On-line materials are not permanent and I cannot put marks, underline or circle on it to make me understand more on the passage. I have also been induced to click the hyperlinks or allured by unrelated pictures (i.e advertisements) which makes me forget or loose focus on the purpose of my reading.*
- *I can't refer to a dictionary*
- *I have difficulty to focus*
- *I have difficulty reading on-line because I was attracted to the pictures, hyperlinks more that the sentences provided. Normally when I read a text/ paper, I will directly jot down points or highlight the important phrases so after I read I can refer to it back easily. I think its comfortable for me than scrolling on the screen.*

It can be summarized that the main reasons these ESL students have difficulty reading online are as follows:

- cannot refer to a dictionary

- cannot underline and take down notes
- loose focus because of hyperlinks
- time consuming

5.5.1.2 Question 2 -Reading Strategies for better comprehension of Text on Screen

Below are the statements given by the students (verbatim) when asked what reading strategies do they think is important to help them read and comprehend a text better on screen.

- *“First I have to focus on the reading by avoiding all elements which could distract me. The reading skills which are important are through skimming and then analyse it.”*
- *“Long attention span, a little code switching because on-line writers tend to use slangs (US writers use the word ‘chums’ instead of ‘friends’). And critical reading because at times, you have to distinguish facts from opinions.”*
- *“Must know vocabularies a lot and try to find further information regarding the passage concerned by clicking on certain parts available with the passage.”*
- *“Reread, read it slowly and look at the general idea of the passage.”*
- *“Rereading, try to put the sentence in another way, guess the meaning, read slowly, read out loud and take note the important points.”*

- *“Read only the information you need, ignore other: slow reading of facts, reread to understand the meaning of the sentences: visualized the sentences, use everything within your environment; define or paraphrase the sentence in your own words.”*
- *“Read, understand and take note are important. Picture it in my imagination also help me understand about the article.”*
- *“Read fast and able to distinguish the information.”*
- *“The reread and read on are important skills that I always practice because sometimes I will miss looked for the information given in the passage and the explanation is at the future sentences. That’s why reread and read on the skills that I use.”*
- *“Visualising, scroll back and forth for information, take down notes separately, have your own assumption and lastly make a conclusion”.*

It can be summarized that the reading strategies the students feel they need that will help them comprehend a text better on screen are:

- Skimming
- Critical reading
- Re-read (monitoring comprehension)
- Guess the meaning of words
- Paraphrase
- Reading information you only need
- Scrolling back and forth

- Visualizing information
- Taking notes
- Reading fast.

5.6 Summary

The subjects were required to write a summary after reading both the printed text and hypertext respectively. The summary was scored for the presence of main ideas, supporting details and general understanding of the text.

Given below are the scores of the summary of the printed text and hypertext. The scores are upon 20.

Table 5.6: Summary Scores for the Printed and Hypertext

Scores	Printed text	Hypertext
Subjects		
1	13	14
2	15	16
3	15	10
4	12	9
5	15	10
6	11	10
7	16	15
8	10	8
9	10	15
10	15	10
Mean	13.2	11.7

The summary mean scores for the printed and hypertext reveal that the scores for the printed text were slightly higher than the scores for the hypertext.

On the whole, the summary for the printed text contained more main ideas than supporting details. However, the summary for the hypertext contained more details than main ideas. Also, the length of the summaries for the printed text was longer than those of the hypertext.

In addition, the subjects in general wrote a more coherent reconstruction of the printed text than the hypertext. Most of the summaries for the printed text stated the thesis statement of the text as well as what the subjects perceived to be the major focus and was quite successful in integrating the information in the text. On the other hand, the summaries for the hypertext, with the exception of subjects 2,7, and 9 were not coherent. Ideas were presented in a somewhat random fashion.

Finally, the analysis of the summaries for both the printed text and hypertext suggest that the subjects interacted with the printed text at a more global level than the hypertext.

5.7 Readers' Profiles

The reader's profile looks into how each reader individually approached the printed text and hypertext and how his or her approach was reflected in his or her summary score. A number of important themes based on what might be seen in the way of differences between the two types of texts are discussed.

Important themes included:

- Reader's background
- Types of reading strategies used
- Approach to hypertext
- Scores

These themes provided a guiding framework in constructing the reader profiles that follow. To facilitate the comparison of strategy use between both printed and hypertext and across participants, an adjustment was made in how the frequencies of strategy use were recorded. Some subjects were more verbose than others during the think-aloud protocol process. Therefore, in order to control this and to provide a better perspective strategy frequency, a proportion score was calculated by summing the total number of strategies reported for each subject. The number of times that a given strategy was reported was then divided by the total number of strategies reported by that subject. This procedure was used to reach a proportion score for each individual (Neil J. Anderson, 1991). Therefore, an individual's total proportion score will total up to 1.0.

5.7.1 Subject 1

Subject 1 can be described as a good user of the language and therefore has a satisfactory command of the language. She verbalized her thoughts in English with much ease and there were no promptings from the researcher for both the printed text and hypertext. In addition, she also acknowledged the importance of reading academic materials on the computer and spent an average amount of time between 6 to 10 hours reading academic materials on the computer.

Subject 1 used a total of 109 reading strategies for the hypertext and 102 reading strategies when reading the printed text. She used 17 different types of reading strategies for printed text and 12 different types of reading strategies when reading the hypertext.

Subject 1 used more cognitive strategies (83.5%) as compared to support strategies (10.1%) and metacognitive strategies (6.4%) when reading hypertext. A similar order of preference was used when reading the printed text, cognitive strategies (71.1%) followed by support strategies (22.3%) and then metacognitive strategies (6.7%).

The think-aloud protocol revealed that subject 1 was very focused and determined to understand the information in both the texts. For both the texts, printed and hypertext, she used more cognitive or problem solving strategies such as pausing and thinking about reading, rereading and adjusting reading rate. There was very little demonstration of her monitoring her comprehension. In other words she used only a few metacognitive strategies to self monitor both the reading task. However, she did ask questions or question her understanding for both the texts.

Example:

- *“What is that meant by creative.....?”*
- *“Why the ecotourism market...?”*

Also there was more rephrasing of ideas in her own words when reading the printed text as compared to the hypertext.

Example:

- *“Oh! Meaning that we are born.....”*
- *“Meaning that there is no limit.....”*

In contrast, there was more use of cognitive reading strategies of interpreting information when reading hypertext than the printed text.

Example:

- *“So because of the awareness there is”*
- *“Ok, must be in the jungle”*

Interestingly, she did not use any of the hyperlinks. This is in keeping with what she said that hyperlinks only confuse her. Her summary scores for both the printed text and the hypertext were very similar, 13/20 and 14/20 respectively. Both the summaries had more main points and very few details.

5.7.2 Subject 2

Subject 2 has a good command of the language, obtaining a high band (Band 5) in the Malaysian University English Test. He verbalized his thoughts in English with confidence for both the printed text and hypertext. In addition, he stated that reading academic materials on the computer was very important and spent between 11 to 15 hours per week reading academic materials on the computer.

Subject 2 used a total of 57 reading strategies when reading the hypertext and 55 when reading the printed text. He used 15 different types of reading strategies for hypertext and 13 types of strategies for the printed text. Unlike subject 1, 50.8% of the reading strategies he used when reading hypertext were cognitive, followed by 43.9% metacognitive and then a mere 5.3% support strategies.

When reading the printed text he used more of the cognitive strategies (60.1%), followed by 38.1% metacognitive strategies and then only 1.8% support strategies. Although, subject 2 read both texts rapidly, with less comments and a smaller total number of strategies reported as compared to the other subjects, the summaries indicated that he actually retained a lot of information from the readings.

The think-aloud transcripts showed that subject 2 frequently monitored his understanding of both the texts. This monitoring helped him stay focused on the purpose of the reading task.

Example:

- *“I need to read back and relate.”*
- *“Actually, the para makes sense at the end.”*
- *“This hyperlink does not help me in any way.”*

The subject’s transcripts also highlighted a high usage of questioning information and reacting to the text information when reading hypertext.

Example:

- *“I wonder what is happening to the ecotourism activity”*
- *“Is this a package or what”*
- *“I have never heard of this organization”*

He used all the hyperlinks and he used them wisely. He would skim through the information to see if it was useful or not. If it was not useful he would go back to the original text telling himself that, “What’s this.....this does not help.” However, if he felt it was helpful, he just read enough and then told himself that, “I think I get it” and would move on.

His summary scores for both the printed text and the hypertext were high, 15/20 and 16/20 respectively. Both the summaries had most of the main points and it was coherent.

5.7.3 Subject 3

Subject 3 can be described as having a satisfactory command of the language. She verbalized most of her thoughts for both the printed text and hypertext in English. However, there were a few words and sentences that she verbalized in L1.

Although she acknowledged the importance of reading academic materials on the computer, she spent very little time, less than 5 hours per week reading academic materials on the computer.

Subject 3 used a total of 78 reading strategies when reading the hypertext and 114 when reading the printed text. She used 17 different types of reading strategies for hypertext and 18 types of strategies for the printed text. 56.3% of the reading strategies she used when reading printed text were cognitive, followed by 23.7% metacognitive and then 20.1% support strategies. However, when reading the hypertext she used more of the metacognitive strategies (48.8%), followed by 44.9% cognitive strategies and then only 6.5% support strategies.

The think-aloud transcripts showed that subject 3 frequently monitored her understanding when reading the hypertext than when reading the printed text.

Example:

- *“mm..I’m confused. I will read this again.”*
- *“I don’t like to go to the hyperlink but I think I have to because I cannot understand what....system.....”*
- *“I don’t have the answer maybe the author does.”*
- *“I am confused and I think....I should read once more.”*

Her summary for the hypertext was below average (10/20) while her score for the printed text was above average (15/20). Subject 3 comprehended the general meaning of the printed text better than the hypertext. She read both the texts quite rapidly.

However, she was able to retain a lot more information from the printed text as she demonstrated an overall understanding of the main ideas expressed in the printed text.

In contrast, she did poorly for the summary of the hypertext, her construction of the summary lacked coherence and contained more supporting details than main ideas. She only used 2 hyperlinks and ignored the rest.

5.7.4 Subject 4

Subject 4 can also be described as having a satisfactory command of the language. She verbalized her thoughts in English and with much ease for both the printed text and hypertext. There was no interference of L1. She also stated that reading academic materials on the computer was very important and spent between 11 to 15 hours per week reading academic materials on the computer.

Subject 4 used a total of 40 reading strategies when reading the hypertext and 48 when reading the printed text. She only used 10 different types of reading strategies for hypertext, and 13 types of strategies for the printed text. 67.5% of the reading strategies she used when reading hypertext were cognitive, followed by 20% metacognitive and then 12.5% support strategies.

When reading the printed text she used again more of the cognitive strategies (79.3%), followed by 14.6% metacognitive strategies and then only 6.3 support strategies.

The think-aloud transcripts showed that subject 4 paused a lot to think about the reading for both the texts. Some of the pauses lasted for almost 7 seconds. She used the least number of strategies as compared to all the other subjects when reading the hypertext.

She monitored her understanding when reading the hypertext more closely than the printed text.

Example:

- *“Ok,...I think I need to read it one more time silently.”*
- *“I don’t understand this.”*

Subject 4’s scores were higher for the summary of the printed text (12/20) than the hypertext (9/20). Her summary for the hypertext contained a lot of irrelevant details and was not coherent. It is important to note that she did a lot of rereading for both texts. She only used one hyperlink and even that she only glanced at the hyperlink text.

5.7.5 Subject 5

Subject 5 can be described as having a satisfactory command of the language. She also verbalized her thoughts for both the printed text and hypertext in English. There was no interference of L1. She too acknowledged the importance of reading academic materials on the computer and spent an average amount of time between 6 to 10 hours per week reading academic materials on the computer.

Subject 5 used a total of 104 reading strategies when reading the hypertext and only 51 when reading the printed text. She used 18 different types of reading strategies for hypertext and 12 types of strategies for the printed text. 50% of the reading strategies she used when reading hypertext were cognitive reading strategies, followed by 26.9% metacognitive and then 23.1% support strategies.

However, when reading the printed text she used 60.8% cognitive strategies followed by 21.6% support strategies and then 17.6% metacognitive strategies.

The analysis of the think aloud protocols revealed that subject 5 reread a lot of the text for better understanding and paused a lot to think about reading when reading the hypertext.

She also monitored her comprehension more when reading the hypertext than the printed text.

Example:

- *“I don’t understand this sentence.”*
- *“I don’t have any idea yet.”*

The Think-aloud protocols showed evidence of her questioning the information and reacting to the information a lot more when reading printed text than hypertext.

Example:

- *“I think so ... This is true.”*
- *“I agree with this one.”*
- *“Yes, I think this is what parents should do.”*

Interestingly, there was use of prior knowledge when reading the printed text and not for hypertext.

Example:.

- *“Ya... this happen to me before..”*
- *“.... Like the economic recession...1998...”*
- *“ Win-win situation.. I heard in my class”*

When reading hypertext she used a lot of reading strategies that required her to reread and read on.

Example:

- *“I think I am going to start again from these days.”*
- *“I am going to move on.”*

She used four out of the six hyperlinks. Subject 5 would at first read every line on the hyperlink page but only to realize that the hyperlinks did not help her comprehend the text better.

Example:

- *“mm.... I’m going backok, still not understand about this article, actually.”*
- *“Hmm....I’m going back to the previous page. I don’t understand what accreditation system.”*

It was not surprising that she obtained a high score (15/20) for the summary of the printed text. She was actively engaged when reading the printed text. However, her score for the summary of the hypertext was poor (10/20). The summary for the hypertext lacked coherence and it contained quite a few irrelevant details.

5.7.6 Subject 6

Subject 6 can be described also as having a satisfactory command of the language. She also verbalized most of her thoughts for both the printed text and hypertext in English. However, there were a few words and sentences that she verbalized in L1. Although she acknowledged the importance of reading academic materials on the computer, she spent very little time, less than 5 hours per week reading academic materials on the computer.

Subject 6 used a total of 97 reading strategies for the hypertext and only 52 reading strategies when reading the printed text. She used 18 different types of reading strategies for hypertext and only 10 different types when reading the printed text. 53.5% of the reading strategies she used when reading hypertext was cognitive strategies followed by 38.2% metacognitive strategies and only 8.3% support strategies.

A similar order of preference was used when reading the printed text, cognitive strategies (55.8%) followed by metacognitive strategies (26.9%) and then support strategies (17.3%).

The analysis of the think-aloud protocols revealed that subject 6 monitored her understanding of the text more when reading hypertext than the printed text.

Example:

- *“I can’t understand the word retrenching. So I don’t understand this sentence.”*
- *“Ok..I understand this sentence.”*
- *“I understand ectourism..but aa.. and then I don’t understand this ecological.”*

The protocols also showed that there was more paraphrasing and questioning of information of the printed text than hypertext.

Example:

- *“So this sentence is talking about Edward De Bonowas Edward De Bono making an observation about creative thinking with Management Times.”*
- *“How does creativity flourish in freedom..?”*
- *“Why, Why does the writer put teachers in this sentence?”*

All the hyperlinks were used. One hyperlink, “ecotourism” was only used after she had read the whole paragraph. For the rest of the hyperlinks, she would start by reading word for word but half way through she would leave the text and go back to the original text when she realized that the hyperlink was not helping to clarify. She appeared to be an intense reader for both the texts. However, her summary scores for both the printed text and hypertext were low, 11/20 and 10/20 respectively.

5.7.7 Subject 7

Subject 7 like subject 2 has a very good command of the language, obtaining a high band (Band 5) in the Malaysian University English Test. Although he was proficient in English, he was more comfortable verbalizing his thoughts for both the printed text and hypertext in L1 (Bahasa Melayu). He felt he would be able to express himself better and more confidently. In addition, he stated that reading academic materials on the computer was very important and spent between 11 to 15 hours per week reading academic materials on the computer.

Subject 7 used a total of 155 reading strategies when reading the hypertext and 173 when reading the printed text. He used 19 different types of reading strategies for hypertext as compared to 23 types of strategies for the printed text. 74.8% which is almost three quarters of the total number of reading strategies used when reading hypertext was cognitive, followed by 24.1% metacognitive and then a mere 1.3% support strategies.

When reading the printed text he once again used more of the cognitive strategies (62.1%), followed by 25.7% metacognitive strategies and then only 12.3% support strategies.

The think-aloud transcripts showed that subject 7 closely monitored his understanding of printed text more than the hypertext.

Example:

- *“I am going back to try and understand what he is talking about.”*

- *“Ok, I am going to divide this sentence so that it will be easy for me to understand.”*
- *“I am not very sure what it means.”*

Also, what was interesting is that he used background knowledge to interact when reading the printed text and not the hypertext at all.

Example:

- *“Bono, macam penyanyi kumpulan U2, mm..”(Bono is like the U2 singer..)*
- *“Siapa yang creative? Albert Einstein, I picture Albert Einstein not as a person only with knowledge and information.”*

He also attempted to guess meaning of unknown words more when reading printed text than hypertext.

Example:

- *“From what is said by this sentence, I will try to come up with the meaning.”*
- *“Streamlining and downsizing in order.....em...maybe it is progress in business, therefore this sentence means, is there another way for a company to progress in their business. Maybe that’s the meaning.”*

In addition, a large portion of the time during the think-aloud protocol was spent pausing and thinking about reading. What was also interesting was that this was the only subject who used sentence division to try and help him comprehend the texts. However he used more of this reading strategy when reading hypertext than printed text.

Example:

- *“Aa... ayat ini panjang, jadi saya akan bahagikan kepada dua.”*
(Aa...this sentence is too long, I have to divide it into two)
- *“ Ayat in panjang, jadi saya akan bahagikan kepada 3 bahagian untuk aaa... memberikan sesuatu gambaran ataupun untuk saya summarise untuk melihat apakah yang cuba dimaksudkan dengan ayat tersebut.”*
(This sentence is too long.I have to divide into three parts for aaa.. so that I can get a picture or summarise so that I can get the meaning of the sentence)

Another interesting finding was that this was once again the only subject who tried to visualize the information for both print and hypertext. He used more of this strategy for printed text than hypertext.

Example:

- *“Saya akan visualize, akan menggambarkan apa yang cuba digambarkan melalui apa yang saya hadapi dalam kehidupan sehari-hari at home, in school at work.”*
(I am going to visualize what is said and relate to my daily life, school and work)
- *“Aa..freedom, freedom saya bayangkan freedom, perkataan freedom saya bayangkan aa...saya punya ..memandangkan saya pelajar.”*
(Aa..freedom, freedom I visualize freedom, the word freedom I visualize aa....I havelooking it as a student)

Yet, another interesting finding is that when reading the hypertext, he kept reminding himself of the reading purpose which he did not do when reading the printed text.

Example:

- *“What is important for me here is ecotourism and not the World Tourism Organization figures.”*
- *“My main purpose is to understand this passage.”*

Before he clicked on a hyperlink, he would pause and decide if he needed to use it or not. If he did he would scan through the information in the passage to see if it was relevant or useful.

Example:

- *“There is a link about ecotourism here, but I will not read it so as not to confuse myself even more as I already know the meaning of ecotourism.”*
- *“I don’t wish to stray away from my objective of wanting to understand the passage, and I am not going to be tempted with clicking the hyperlink.”*

His summary scores for both the printed text and the hypertext were high, 16/20 and 15/20 respectively. Both the summaries had most of the main points and it was coherent.

5.7.8 Subject 8

Subject 8 can be described as having a satisfactory command of the language. She verbalized most of her thoughts for both the printed text and hypertext in English. However, there were a few words that she verbalized in L1. Although she acknowledged the importance of reading academic materials on the computer, she spent very little time, less than 5 hours per week reading academic materials on the computer.

Subject 8 used a total of 69 reading strategies when reading the hypertext and 82 when reading the printed text. She used 18 different types of reading strategies for hypertext and 19 types of strategies for the printed text. 59.5% of the total number of reading strategies used when reading hypertext was cognitive, followed by 26.2% metacognitive and then a mere 14.5% support strategies.

When reading the printed text she once again used more of the cognitive strategies (59.8%), followed by 22% metacognitive strategies and then 18.2% support strategies. There appeared to be a similar distribution of strategies used for both the texts.

The analysis of the think-aloud transcripts revealed that for both texts, pausing and thinking about reading, monitoring comprehension and reacting to text were the top three strategies.

Example:

- *“What’s this word suppose to mean? Ok.. Lets read further.”*
- *“ That’s ok.., if we don’t understand we read the next paragraph.”*

- *“mm.. I feel I agree with his opinion.”*
- *“ Oh..this appropriate for people who love the environment.”*

Interestingly, she utilized her prior knowledge when reading only the printed text.

Example:

- *“Ah... reminds me of Habib Jewels...”*
- *“I remember young children love to play with things like that.”*

Another interesting point is that when she was reading the hypertext, she only clicked on the hyperlinks after reading the whole text. She only then wanted to find out if the information in the hyperlinks would further enhance her comprehension of the text. Her summary scores for both the printed text and the hypertext were low, 10/20 and 8/20 respectively. The summary for the hypertext contained more details than main ideas and was also less coherent.

5.7.9 Subject 9

Subject 9 can also be described as having a satisfactory command of the language. She verbalized most of her thoughts for both the printed text and hypertext in English. However, there were a few words that she verbalized in L1. She spent very little time, less than 5 hours per week reading academic materials on the computer even though she acknowledge the importance of reading academic materials on the computer.

Subject 9 used a total of 85 reading strategies when reading the hypertext and 90 when reading the printed text. She used 18 different types of reading strategies for hypertext and 17 types of strategies for the printed text.

69.5% of the total number of reading strategies used when reading hypertext was cognitive, followed by 21.3% support strategies and then a mere 9.2% metacognitive strategies.

While 56.7% of the total reading strategies used when reading printed text was also cognitive strategies followed by 22.3% support strategies and then 21% metacognitive strategies

The analysis of the think-aloud protocol revealed that for hypertext the top three reading strategies used was pausing and thinking about reading, interpreting information and reacting to text.

Example:

- *“Maybe they just..., maybe some of the travelers.. they just gamble.”*
- *“So this was to make us aware of the importance of environment.”*
- *“Wah!... that is a lot.”*
- *“Oh!.. maybe they need some rules.”*

For the printed text the top three strategies were rereading, pausing and thinking about reading and evaluating information.

Subject 9 used all the hyperlinks. She would skim through the information first and then comment.

Example:

- “...Oh! Ok. So this thing has got to do with ecotourism and then they try to imply it in any way.”
- “Hmm...Gorden’s Park is one of the examples. Oh...yes so many things I can do in this Gorden’s park, ok.”

Surprisingly, unlike most of the other subjects her summary score for the hypertext was above average (15/20) while her score for the printed text was poor (10/20). Subject 9 comprehended the general meaning of the hypertext text better than the printed text. She was able to retain a lot more information from the hypertext as she demonstrated an overall understanding of the main ideas expressed in the hypertext.

In contrast, she did poorly for the summary for the printed text, her construction of the summary lacked coherence and contained more supporting details.

5.7.10 Subject 10

Subject 10 can be described as having a satisfactory command of the language. She verbalized her thoughts for both the printed text and hypertext in English with ease.. There was no interference of L1. She acknowledged the importance of reading academic materials on the computer and spent an average amount of time between 6 to 10 hours per week reading academic materials on the computer.

Subject 10 used a total of 63 reading strategies when reading the hypertext and 46 when reading the printed text. She used 15 different types of reading strategies for hypertext

and 12 types of strategies for the printed text. 74.5% which is almost three quarters of the total number of reading strategies she used when reading hypertext were cognitive, followed by 14.4% metacognitive and then 11.1% support strategies.

When reading the printed text she used 60.9% cognitive strategies followed by 26.1% support strategies and then 13.1% metacognitive strategies.

The analysis of the think aloud protocols revealed that subject 9 reread a lot of the text for better understanding and paused a lot to think about reading when reading the hypertext. She also monitored her comprehension more when reading the hypertext than the printed text.

Example:

- *“Mm... I can't understand the whole passage, but I need to reread it again.”*
- *“I don't understand this.”*

When reading the printed text, the top three reading strategies used were rereading, adjusting reading rate and pausing and thinking about reading.

She was very intent on extracting the meaning of the text that there was very little interaction with the text. She only used 2 hyperlinks and both these hyperlinks she read the whole text slowly and in detail only to comment at the end that she did not understand the texts. Although she used a similar set of strategies for hypertext and print, her summary scores for print were much higher than for the hypertext, 15 and 10 respectively.

5.8 Summary

This study represents a quantitative and qualitative investigation into the metacognitive, cognitive and support reading strategies used by 10 ESL learners as they read in print and hypertext. The researcher sought to identify the types of metacognitive, cognitive and support reading strategies these readers use when reading in print and hypertext. In other words, the study looked into the differences in the choice of reading strategies used by ESL learners in comprehending printed and hypertext. Think-aloud protocol and retrospective interviews were used to identify the reading strategies used by these ESL learners.

The findings suggest that there is no significant difference in most of the strategies used when reading in print and hypertext except for two reading strategies belonging to the metacognitive category and two belonging to the cognitive category. Although the findings suggests that the processes and choices made by the subjects to comprehend hypertext were similar to print, there were some cognitive reading strategies that were used more when reading hypertext.

The two metacognitive reading strategies are *determine what to read and use text features* in which on the average the ESL learners used relatively more when reading hypertext then when reading printed text. The two strategies belonging to the cognitive category, *trying to stay focused and use of prior knowledge* in which the students utilized more frequently when reading hypertext than when reading printed text.

In general, the findings imply that the students do not use any specific set of strategies for either printed text or hypertext, except for the four reading strategies discussed earlier. Similarly by category with reference to metacognitive, cognitive and support reading strategies, there is also no significant difference in preference when reading printed or hypertext. In other words, an ESL learner uses almost the same set of reading strategies when reading print and hypertext. However, individually learners used different types of reading strategies within the metacognitive, cognitive and support categories.

Based on the reader's profiles, the researcher observed in general three types of readers for hypertext in this study.

- Firstly, the Novice Reader is one who clicks on all or most of the hyperlinks in the hypertext he or she is reading. They do not skim through the text but rather read almost everything in that hyperlink. At the end, the reader either loses focus on the reading purpose or leaves the hyperlink even more confused and disorientated.
- Next, is the Cautious Reader who ignores all the hyperlinks or maybe just one or two hyperlinks or just clicks on the hyperlink only when he or she has finished reading the paragraph, page or the whole text. This reader does this so as not to be confused or distracted. There is no active engagement with the other texts present in the hyperlinks.

- Finally, there is the Skilled Reader who monitors his comprehension of the text before he decides whether to click on the hypertext or not. If he or she finds that he has understood the paragraph or page he/she does not click on the hyperlink. However, if he/she entered a hyperlink he/she would only scan and skim through the text to see if it would help him/her understand the text better. These readers exhibit good decision making skills necessary for effective navigation for reading hypertext. They constantly relied on their prior knowledge to help with the decision making.

The readers' profiles reveal that reading hypertext is an active, constructive, meaning-making process (RRSG, 2003). The readers are actively constructing meaning as they interact with the various texts present in the hyperlinks (Kintsch, 1998). The subjects used their prior knowledge to comprehend the texts, integrate new ideas and to make choices on whether to click on a hyperlink or not. As Spiro, et al. (2004) reported reading on the Internet requires the ability to reassemble existing knowledge into new knowledge applications to suit each new reading situation.

Burbules & Callister, 2000, described hypertext as “a kind of informational environment in which textual materials and ideas are linked to one another in multiple ways” (p. 43). Links embedded within hypertext are constructed so that readers must select a target location (rather than just turning the page) in order to move through the text (Rouet & Levonen, 1996).

When compared to print-based texts, hypertexts require readers to take a much more active role in determining the quality and coherence of the texts they read. Some of the challenges the 10 ESL Readers in this study experienced while reading the hypertext are discussed below. These challenges are similar to other readers of hypertext reported by other researchers like Coiro, 2003; Anderson, 2001; Kamil and Lane, 1998; and Henry, 2005.

1. Reading Path

The genre of hypertext gives the reader the choice of becoming the author of the text. The reader can choose the path or direction he or she wants to take through the hyperlinks. The reader decides which link to enter, starts to read and then decides which reading path to follow. The reader can either integrate the information read on the hyperlink with the main text or abandon the main text and just move in a totally new path provided by the various hyperlinks.

It must be remembered that the path the reader chooses when reading hypertext depends on the reading purpose. The reading purpose in this study was to write a summary of the text. The subjects who were focused on the reading purpose did not click on every link. Their prior knowledge helped them realize that not all hyperlinks contribute to a deeper comprehension of the main text. However, this may be different for readers who are just searching for information. They may have to click on every hyperlink, as well as make the choice not to return to the main text, if the texts in the hyperlinks prove to be more useful or meet their reading purpose. There is also the other possibility that they may get lost in the hyperlinks maze. For these readers the skill of navigation, processing and synthesizing information is very important. Therefore, knowledge construction in hypertext shifts from the responsibilities of the writer to the shared responsibility with

the reader. Therefore more so in hypertext than print, no two readers will construct exactly the same meaning from a text.

2. Reading Order

The findings in the study revealed that no two subjects shared a similar reading order. In reading hypertext the reader chooses the reading order by deciding which hyperlink to click and when. Therefore multiple links and connections make up the structure of hypertext. A printed text which is linear in nature has an obvious beginning and end, while hypertext appears to have no end. The reading order for readers of the printed text is the same because everyone gets the same text. However, hypertext lends itself to different reader paths because of the variety of ways of connecting the variety of texts. Reading hypertext is characterized by a combination of the reader choosing an entry point and then exercising power over the depth of processing (Nielsen, 2000).

3. Managing Information Overload

Another challenge that needs to be addressed was that some of the subjects in the study did not know how to manage the wealth of information they read. There is a need for them to be skillful in evaluating then deciding which information is relevant, inaccurate or incomplete. This is where critical thinking skills play a very crucial role.

Bolter (1998), states that “Hypertext seems to embody a model of reading as the active construction and critique of meaning. Social constructivists agree that students, ought to be critical readers who understand their role in the process of meaning construction” (p.10). There is a need for reading instruction to include and stress on the skills of

critical thinking. The goal is to produce critical hypertext readers, so that the students can make better choices as they navigate the hypertext.

4. English Proficiency

Students with limited English vocabulary found it a barrier to activate reading strategies for reading hypertext or forage quickly through the various texts. It was observed that subjects 3,4 and 5, whose overall language proficiency was not as good as subjects 2 and 7 had difficulty effectively reading the various texts. Gelderen et al.(2004) reported that both metacognitive awareness and vocabulary knowledge contributed significantly in L2 reading comprehension in contrast to metacognitive awareness alone in L1 reading comprehension. Therefore, readers of hypertext must possess a good command of vocabulary knowledge.

5. Unpredictability –Taking risks

In reading hypertext readers constantly encounter uncertainties because of the hyperlinks. One of the reasons could be the lack of confidence and practice in reading hypertext. This is especially true of subjects 3, 5, 6 and 8 who spent less than five hours per week on reading on the computer. They lacked the prior knowledge of organizational and structural features of hypertext. Readers like subject 2 and 7 who have had more time and practice reading hypertext integrated their prior knowledge of hypertext genre as they read the hypertext in the study.

6. Prior Knowledge

The lack of background knowledge was seen as an obstacle in understanding the text. Anderson and Pearson, (1984) stated that schemata assist the readers in initially making sense of what the reader reads and, relating new information acquired to prior knowledge. The findings suggested that reading hypertext appeared to require prior knowledge as they read the hypertext. The two types of prior knowledge that skilled readers drew upon while reading hypertext were prior knowledge of topic and prior knowledge of website structures. Subject 2 and 7 drew from their prior knowledge of hypertext structure to guide them reading the hypertext. This knowledge included how to deal with hyperlinks and decisions-making skills.

7. Managing Hyperlinks

Hyperlink is a feature of hypertext which allows the readers to navigate between the associated links or nodes in a text. The way in which each reader chooses to move between the links is unique. The reader must consider where they are in the text and whether the information fits their purpose or helps enhance comprehension of the text. Due to this, reading hypertext becomes a more active and dynamic process than printed text, for the reader. However, readers must be able to move in and out of these links in an effective way depending on their reading purpose. As reported in this study each subject had a unique way of navigating the hyperlinks in relation to the reading purpose. The aim of reading the text is for the subjects to comprehend the text and then write a summary of it. Subject 8 only chose to click on the hyperlink after she had read the text, while subject 2, 7 and 9 questioned whether there was a need to click on the hyperlink and tried to guess whether the information would help comprehension.

Subjects 5 and 6 clicked on every link in the text. They felt obligated as it was present in the text.

8. Metacognitive strategies

Cognitive and metacognitive strategies are especially important for reading. According to Kasper, 1997 and Carrell, 1989 high level of metacognitive awareness is associated to high level of reading comprehension ability. The subjects in this study for both the printed text and hypertext used more cognitive strategies than metacognitive strategies. However, when reading hypertext the subjects used more of the metacognitive strategies of *determine what to read and use text features*. Despite the large repertoire of cognitive and metacognitive reading strategies used, most of the subjects were not able to write a good summary of the hypertext. Schwartz et al, (2004) reported that monitoring one's own learning becomes more important because hypertext structures are more demanding.

Therefore these challenges need to be addressed by teachers, researchers and educators.

The conclusions implications and as well as a proposed framework for hypertext literacy are discussed in the next chapter.

CHAPTER 6

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

In this concluding chapter, the summary, implications and recommendations are discussed relative to the findings of this study. The discussions must be viewed within the limitations of this research. The conclusions that have been drawn are tentative and could be reinforced with further research.

6.1 Introduction

Most of the research on reading process, strategies and text processing of L1 and L2 reading in English are from printed texts. Therefore, a great deal of what we know about reading and comprehension is through research conducted using printed texts. However, the Internet and the electronic text or hypertext has significantly changed how we read (McDonell, 2003). Now, students do most of their academic reading and research on the Internet. These texts or academic materials that they read on screen can be referred to as electronic texts or hypertext.

Hypertext has features and capabilities that are fundamentally different from printed text. As Winkleman (1995) points out that while printed text is static, hypertext is dynamic. Hypertext is linked to a variety of information in different forms. The meaning of what is read is not limited to the words on that page, but rather linked elsewhere depending on the writer's cognitive map of space. In addition, reading hypertext has the possibility of drowning students in information overload because of the hyperlinks. Kamil and Lane 1998, argue that hypertext can be looked at from three situations:

- the literary version of hypertext, where the reader can create his or her own path;
- hypertext which allows one to add information by providing readers the opportunity to explore the text in greater depth;
- and the hypertext which allows students to study.

There is only a small but growing body of research on hypertext and very few empirical studies that discuss “the cognitive consequences of reading this type of non traditional text” (p.773). This study has tried to provide additional insight into the metacognitive and cognitive reading strategies of ESL learners when reading hypertext

One of the challenge of reading hypertext is the unpredictability of knowing where one will go when choosing the hyperlink. As Kamil and Lane (1998) state there is no way to predict whether or not that link will be useful. Therefore, without proper training and sufficient practice students will have difficulty to create a mental representation of a disjointed or multi-linear text. This in turn will affect the way the information in the text is comprehended by the students. In the end, the students might not be able to put this reading into any form of comprehensible output for their research or any other task.

Internet technology has had a significant impact upon reading strategies, resulting in the need to reassess our thinking about classroom reading instruction or practices. The question raised is whether there is a need to pay more attention to certain specific cognitive and metacognitive reading strategies that are useful to help students decode

meaning while reading hypertext. Therefore, given the prediction that in the future most of our reading would be hypertext or electronic text, we need to equip our students with skills and strategies in the reading instruction that will make them effective on-line readers.

Thus, this study using think-aloud protocol identified and compared the difference in metacognitive and cognitive strategies used by ESL learners while reading printed and hypertext. Ericsson and Simon (1980) strongly endorsed the think-aloud protocol as a method of collection of verbal data and analysis, within the framework of the human information-processing paradigm. The subjects in this study were required to verbalize their thoughts while reading a printed and hypertext. Immediately after the think-aloud task, the retrospective interview was conducted. This interview session allowed the researcher to ask questions and clarify statements that were considered vague or unclear. It was also to obtain confirmation on statements that were incomplete.

After the subjects had completed the think aloud reports and the retrospective reports the subjects were asked to write a summary of the text. The summary was used to assess the subjects' comprehension of the text. It was not a primary method for data collection but rather used to clarify or support the primary findings.

6.2 Conclusion

Before the main findings are discussed, it must be once again stressed that this study was investigative in nature, and that in view of its limited scope and research sample, this study can only make tentative postulations. Hence, the findings in this study

should be viewed as preliminary and suggestive, rather than conclusive.

The research design of this study involved two different types of text, one printed and the other hypertext. The research subjects read a printed text and then a hypertext. Think-aloud verbal protocol methodology (Pressley and Afflerbach, 1995; Ericsson and Simon, 1989) was used to identify reading strategies used by 10 Law students from MARA University of Technology, while reading text in print and hypertext. The students ranged in age from 20 to 23 years. Older students were chosen based on the premise that older individuals would be better at verbalizing their thoughts than younger children. This would add validity and credibility to the verbal reports collected.

During the think-aloud protocol, participants read and simultaneously verbalized their thoughts. Studies using think-aloud protocol reveal details of sequences of information processes reflecting the reader's short-term memory (STM). It is claimed that readers can be involved with think-aloud protocols without altering their cognitive processes (Ericsson and Simon, 1989).

Retrospective Interviews were used to help clarify statements made as well as provide details that have been omitted. According to Ericsson and Simon (1989), during retrospective interviews, participants can retrieve the trace of preceding cognitive processes and reveal information preserved partially in STM and partially in long-term memory (LTM).

Therefore, in this study a combination of both think-aloud protocols and retrospective interviews were used to identify the different metacognitive reading

strategies used by ESL learners while reading printed texts and hypertext. This was to ensure that the think aloud protocol analysis was thus capable of providing useful insights into the cognitive processes that drive the working of this mechanism in reading events. Spires and Estes (2002) recommend the think-aloud protocol be used “to help uncover potential cognitive processes inherent in Web-based reading environments...” (p. 123).

The main findings, presented below, fall under five categories:

1. The metacognitive and cognitive reading strategies used by ESL learners when reading printed text.
2. The metacognitive and cognitive reading strategies used by ESL learners when reading hypertext.
3. The differences in the choice of reading strategies used by ESL learners while reading in print and hypertext.
4. Students’ perception on reading strategies used when reading hypertext
5. Reader Profiles

6.2.1 Metacognitive and cognitive reading strategies used by ESL learners when reading printed text.

Six of the reading strategies used by ESL learners when reading printed text had median values ranging from 3.50 to 14.0, and are considered as belonging to the high usage group of strategies.

These strategies of frequent usage are

- *monitoring comprehension (Metacognitive Strategy)*
- *pausing and thinking about reading (Cognitive strategy)*
- *reread (Cognitive Strategy)*
- *adjusting reading rate (Cognitive Strategy)*
- *paraphrasing(Support Strategy) and*
- *asking questions(Support Strategy).*

It can be concluded that these ESL learners tend to use the set of strategies designated as cognitive when reading printed text over support and metacognitive reading strategies, in that order.

6.2.2 Metacognitive and cognitive reading strategies used by ESL learners when reading hypertext.

Six of the reading strategies used by the ESL learners when reading hypertext also had high median values ranging from 3.5 to 17.0 and are considered as belonging to the high usage group of strategies.

These strategies of frequent usage are

- *monitoring comprehension(Metacognitive Strategy),*
- *pausing and thinking about reading (Cognitive strategy)*
- *reread (Cognitive strategy)*
- *adjusting reading rate (Cognitive Strategy)*
- *interpreting information(Cognitive Strategy) and*
- *asking questions(Support Strategy)*

Again, these ESL learners tend to prefer the cognitive reading strategies when reading hypertext over the metacognitive and support strategies, in that order.

However, when reading printed text ESL students seem to prefer support strategies to metacognitive strategies and when reading hypertext they prefer metacognitive to support strategies. In general, the students preferred to use the same cognitive and metacognitive reading strategies when reading printed and hypertext.

6.2.3 The differences in the choice of reading strategies used by ESL learners while reading in print and hypertext.

In the case of the individual strategies, there are two reading strategies belonging to the metacognitive category in which students differ in their usage when reading printed text and when reading hypertext. The results show that, on the average, the students used the strategies *determine what to read* and *use text features*, relatively more often when reading hypertext than when reading printed text. These two

strategies were used to decide what and how much to read when they were confronted with a hyperlink. They needed to use these strategies to help them make useful decisions, firstly whether to click on the hyperlink and if so how much of the text should be processed. The constant entry and exit of the hyperlinks can result in the read becoming disoriented and confused. What to read and the depth of processing of the many frames of pages in the hyperlink are important skills to acquire for on-line reading.

In addition, there are two reading strategies belonging to the cognitive category in which the students differ in their usage when reading printed text and when reading hypertext; on the average, the students used the strategies *try to stay focused on the reading* and *use prior knowledge* relatively more frequently when reading hypertext than when reading printed text. This is because the subjects did not want to get lost in all the information of the various texts in the hyperlinks. Also subjects who spent more time reading on the computer than the others used their prior knowledge to help them in deciding on what hyperlink to click on and how to read the text in the hyperlink. This confirms what Rouet and Levonen, 1996 stated that skilled hypertext readers plan and monitor choices about where to go in particular text and in what sequence to move. In light of this, subject 2, 7 and 9 who spent more hours reading on the Internet, managed their reading of hypertext well and was able to integrate the information read in the hyperlinks to write a fairly coherent summary of the hypertext.

On the whole, the results imply that the students do not differentiate whether the reading strategies they use are specific to the printed text or pertinent to the

hypertext, except for the four individual strategies discussed earlier. By category (i.e. metacognitive, cognitive and support), they also do not differentiate whether the category of reading strategies they use are specific to the printed text or the hypertext. Also when a student uses a set of reading strategies in reading printed text, he/she tends to use the same set of strategies when reading hypertext for the greater portion. However, many reading researchers like Coiro, 2003; Sunderland, 2002; Anderson, 2001; Leu, 2002; Rouet & Levonen and Salmon et al, 2005, agree that reading hypertext involves additional cognitive processes. This is because the text structure of printed and hypertext differ.

Many reading theorists argue that after reading a number of texts with the same genre, a person formulates patterns or frameworks called schemas. The reader then invokes his/her schema to anticipate what will occur next, make inferences to fill in missing gaps and to decide which aspect of the text is important for comprehension. However, when the text, like hypertext sets incoherent expectations they create comprehension problems for the readers. Reading programs should have instructions and exercises that provide learners with ample exercises to practice these strategies

Therefore, if we want students to become skilled on-line readers, practice and training in reading hypertext will help them plan and monitor their comprehension of hypertext.

6.2.4 Students' Perception on Reading Strategies Used When Reading Hypertext

Each student on the average perceives that they use 21 of the 38 reading strategies in the questionnaire (Refer to Table 5.5). The 8 reading strategies that they perceive they most frequently use in descending order are:

- When on-line text becomes difficult, I re-read it to increase understanding (*Reread*)
- Try to get back on track when I lose concentration (*Try to stay focused*)
- When reading on-line, I decide what to read closely and what to ignore (*Determine what to read*)
- I review the on-line text first by noting its characteristics like length and organization (*Noting texts characteristics*)
- I scan the on-line text to get a basic idea of whether it will serve my purpose before choosing to read it (*Previewing text*)
- I try to guess what the content of the on-line text is about when reading (*Making Predictions*)
- When on-line text becomes difficult, I pay closer attention to what I am reading (*Adjusting reading rate*)
- I read slowly and carefully to understand what I am reading on-line (*read slowly when reading on-line*)

A comparison of the five reading strategies that the students' perceive they most frequently use and the strategies that they reportedly use in the think-aloud protocol are given below in Table 6.2.4

Table 6.2.4: Most Frequent Strategies used as Perceived and Reported by Subjects when Reading Hypertext

	Subjects perceive they use	Subjects reportedly used
1.	<i>Reread</i>	<i>Pausing and thinking about reading</i>
2.	<i>Try to stay focused</i>	<i>Monitoring comprehension</i>
3.	<i>Determine what to read</i>	<i>Reread</i>
4.	<i>Noting texts characteristics</i>	<i>Adjusting reading rate</i>
5.	<i>Previewing text</i>	<i>Interpreting information</i>

Only the reading strategy *reread* appears in both the columns. The students seem aware that the following reading strategies, *try to stay focused*, *determine what to read*, *noting text characteristics* and *previewing text* are important reading strategies to use when reading hypertext but they were not frequently used except for a few subjects when reading hypertext. Practice and training will help guide students on how to use these strategies to enhance hypertext reading.

The findings in the open-ended questions indicated that majority of the students have difficulty reading on-line text. The reasons given by the students showed that they lacked confidence in:

- Reading hypertext
- Using electronic dictionary
- Using the tool bar to aid comprehension.

In addition, the students reported that reading hypertext was too time consuming as some of them took a long time to complete the reading task. This because of the time spent reading the various texts embedded in the hyperlinks. There was also a lot of rereading because every time the students returned to the main text some were disoriented. Skilled hypertext readers, like three of the subjects in this study, plan and monitor choices about where to go, what sequences to move and how much to read.

6.2.5 Reader Profiles

Based on the findings, observation and reader's profiles, in general there are three types of readers for hypertext in this study.

- The Novice reader is one who clicks on all or most of the hyperlinks in the hypertext he/ she is reading. The reader does not skim through the text in the hyperlink but rather reads almost every line in the text in the hyperlink. At the end, the reader is seen to loose focus on the reading purpose or leaves the hyperlink even more confused and disoriented. It seemed to the researcher that these readers felt they had to read the whole text since they clicked on the hyperlink. This is because in reading instructions and practices using printed text, students are required to read the whole text, from beginning to end as there is only one set of text to read. However, when reading hypertext the students have the choice to read not only the main text but also various texts provided by the hyperlinks embedded in the hypertext. More exposure and prior knowledge on hypertext will guide them to be skilled hypertext readers who will be able to manage and comprehend frames of pages that can lead to information overload. When the reader is not able to get the clarification he/she wants, he/she leaves the hyperlink. The readers assume that hyperlinks are placed for the purpose to

help comprehension of the text. However this is not true in some cases. The purpose of some hyperlinks is just to provide additional information either in the form of visuals or more texts.

The summary scores these ESL students obtained for the hypertext were below average. In general the summary contained more supporting details and it was not very coherent.

- The Cautious reader is one who ignores all the hyperlinks or just clicks on the hyperlink only when he/ she has finished reading the paragraph, page or the whole text. Even then, he / she glanced over the text and did not engage in actively reading its contents. This reader does this so as not to be confused or distracted by the information in the hyperlinks. This is her/his way of avoiding information overload. The researcher felt that these readers approached the hypertext very much like a printed text. The summary scores these ESL learners obtained for the hypertext were in general average and above average. The summaries on the whole were fairly coherent, although there were two ESL learners whose summaries lacked coherence.
- The Skilled reader is one who monitors his/her comprehension of the text before he/she decides whether or not to click on the hyperlink. If he / she finds that he/she has understood the paragraph or page he/ she would not click on the hyperlink. This appeared to be an effective strategy so that they would not waste time or get distracted. However, if he/ she entered a hyperlink he /she would only scan and skim through the text to only see if the information is relevant or

not. They read selectively and did not feel that they had to finish what they started. Also, it was noted that these readers spent more hours per week on the computer than the rest of the subjects. It would seem that the exposure and prior knowledge helped them in their reading decisions and knowledge of website structure.

The summaries scores for these three ESL learners for hypertext were high. Two of these ESL Learners also obtained high scores for their summaries of the printed text. These two students were also more proficient in English as compared to all the other subjects. They had obtained a Band 5 for the MUET Exam. Although the other student's summary score for the hypertext was high, her summary score for the printed text was low.

6.3 Limitations of the study

This study is limited by the relatively small sample size of just 10 subjects. Additionally, only one faculty, namely the faculty of Law, UiTM was involved in this study. A wider cross-section of subjects may have provided a different set of findings. Hence, the findings of this study may not be applicable to ESL students from other faculties in UiTM or other institutions of higher learning. In addition, it would be difficult to draw strong generalizations due to the limited number of students.

In addition, although the think-aloud protocol is a widely used method to investigate the reading processes of learners, sometimes subjects do not report all the strategies they employ while reading the texts.

Another limitation of this study is related to the reading text used in this study. The possibility of text-related variables such as background knowledge and linguistic complexity of the texts influencing the individual reader's performance was not thoroughly examined. The topics for the texts were selected on the basis of what the subject lecturers considered as appropriate for their students.

Since this study is investigative in nature and that in view of its limited scope and research, this study can only make some tentative postulations that may be significant.

6.4 Implications of the Study

Today, the way we view literacy and reading instruction is evolving in new directions as a result of the Internet. In light of this, Leu (2000) argues that the internet has become a central position in the classroom and that the literacy community must continue to explore these contexts for literacy and learning if we wish to prepare children to be literate in the near future. Therefore, improving reading comprehension of hypertext is pertinent (RRGS, 2002).

As Sutherland-Smith (2002) reports that when observing students interacting with text resulting from an Internet search, these students perceive WEB text reading as different from print text reading. The subjects in this study also perceived it as different and difficult as compared to printed text. However, most of them read the hypertext like a printed text. At the end most of them were not able to effectively summarize the information coherently.

Although the research sample for this study was relatively small, only 10 subjects and it involved subjects from one faculty, the findings of this study to a certain extent have significant implications on teachers, reading instruction, curriculum design, research and material production.

Firstly, the most prominent outcome of this study has been in verifying the metacognitive and cognitive reading strategies that ESL learners used to aid comprehension of a hypertext. This study has identified 2 metacognitive, and 2 cognitive reading strategies that students used more frequently when reading hypertext than when reading printed text. Due to the structure of hypertext and the hyperlinks, the metacognitive reading strategies of *determining what to read* and *the use of text features* were frequently used in the reading process. This was also true for the cognitive reading strategies of *trying to stay focused* and *using prior knowledge* that the subjects used to aid comprehension. It would seem that the subjects depended on the above reading strategies more to help them read and manage information found on the hypertext than printed text.

Although, the subjects in the study were proficient in English and had above average grades for their reading, most of the subjects reported that they have difficulty in reading hypertext. Firstly, difficulty here refers to reading hypertext on screen. Most students are more comfortable printing online materials and reading them. Secondly, would be deciding on which hyperlink to enter and which to ignore which in turn affects the reading order. Thirdly, would be the depth of

processing the various frames of pages embedded in the hyperlinks. Finally, would be integrating the information read from the hyperlinks with the main text. An organizer that can help them to map out the different information read would be helpful. Therefore, it is not surprising that most of the subjects' scores for the summary were below average as compared to their summary scores for the printed text.

This shows that text structure plays a significant role in reading comprehension. This further strengthens the notion that ESL learners need to be trained to be skilled readers of hypertext. Today, particularly in the educational context for many students, reading is undoubtedly one of the most important skills and with the Internet playing a prominent role in education, ESL readers need to be skilled readers of hypertext.

The findings of the study further concur with other hypertext reading researchers that reading hypertext is not a simple process. In this study the subjects were engaged in various cognitive processes as the hypertext just does not involve one text but rather a number of texts because of the presence of hyperlinks. This points to the fact that Educators and Curriculum designers should not treat reading hypertext as a simple act or a mere transfer of skills from print to hypertext. There is a dire need to implement reading comprehension instruction that would help ESL learners to manage the unique characteristics of hypertext such as the openendedness and multi-linearity of it.

In light of this, reading strategy instruction for the mentioned metacognitive and cognitive reading strategies as well as other relevant reading strategies like

comprehension monitoring should be viewed seriously. These metacognitive and cognitive strategies will help the ESL learner process the information from hypertext into some form of comprehensible output for the students. Comprehension monitoring is also crucial because readers need to possess the ability to be aware of what kind of reading problems they are encountering and what kind of strategies could be used to solve them.

Moreover, the ability of comprehension monitoring enables readers to integrate different types of new information. The sole aim is to equip ESL learners with skills to help them function efficiently and independently in their studies as well as their career. Therefore, teachers now have to reassess the reading instructional goals and practices in the classroom to incorporate the multi-linear and open-ended characteristics of hypertext that require readers to build their prior knowledge and also utilize a different set of strategies.

Another significant educational implication addresses the selection and the use of hypertext readings for classroom purposes. Hypertext represents a new genre because it extends beyond traditional text. It not only allows students to interact with the text but also take part in creating a text of their own. As the form is still fairly new, it can prove to be a challenge for ESL students who are not familiar with the structure. It can cause confusion and students should be introduced to the various formats of hypertext readings. Therefore, there is a need to utilize hypertext readings for classroom purposes.

According to Smith (1986) knowledge of the organization and presentation of a text can help readers interact and comprehend text. The different ways in which various texts present their information is called “genre schemes” by Smith. These genre schemes differentiate one type of text from another. Genre schemes have become conventional in that they signal readers regarding the characteristics they might expect to encounter while reading a particular text. These expectations allow readers to predict what a text will look like. Since readers have become accustomed to the genre schemes they regularly encounter, a text that does not comply with the characteristics of its genre scheme may cause problems for readers.

Smith (1986) goes on to say that, if we do not know the relevant structures then we will not understand the text, or our reading of it will be distorted. The findings of this study are consistent with the above notion. Therefore, since structure and organization play an important role in the skills readers employ in order to comprehend text, teachers and those involved in producing reading materials must seriously take heed of this. There should be a tangible shift from teaching reading comprehension using printed text to teaching reading comprehension using hypertext

ESL Learners need to have instructions to guide them to manage the features of hypertext in their reading decisions as well as knowledge of website structures. This will help minimize disorientation or getting lost in the hypertext and in turn build their confidence to become skilled on-line readers. The aim of educators and curriculum designers should be to seriously rethink the reading instructional goals and aim to make students become skilled hypertext readers.

In the past, L2 researchers have agreed that there is a need to consider an interaction between the ESL reader's language ability and the particular reading task for the reading process. Due to this, the ESL learner had to attain a certain threshold of language ability. This study further contributes to the findings of other research that there is an interaction between the ESL reader's awareness of text structure and hypertext. It also showed that if you are a good reader for printed text, it does not automatically mean you are a skilled hypertext reader. Therefore, for reading hypertext ESL learners should attain a certain threshold of schemata and strategies to be a skilled hypertext reader. Comprehending hypertext is not only limited to the words on the page but the ability to process the information read in the many frames of pages in the hyperlinks.

Yet another implication of this study is that it supports the notion that reading instruction which takes into consideration developing the reader's schemata, reading strategies, purpose for reading, reading rate and navigational skills, will be successful readers on the Internet. A reader who is not trained nor has any prior knowledge on hypertext can drift aimlessly from text to text, forgetting their initial purpose. The subjects in this study who spent more hours reading on the Internet were identified as skilled hypertext readers.

Curriculum designers and teachers at schools as well as Institutions of higher learning must seriously consider the demands of hypertext and in turn, incorporate appropriate reading strategy instruction for hypertext in the curriculum. This would enhance the ESL learners reading of hypertext, knowledge of text organizational patterns and familiarity through practice of reading hypertext.

Therefore, in today's rapidly changing economic environment, students need highly refined skills to be successful. Teachers, especially reading teachers, must be very clear about the skills their students require and be able to meet their students' learning needs (Lefever-Davis, 2002). The technologies of literacy are rapidly changing and we must quickly expand our vision if we hope to prepare children for the future.

As a result, children today need to be prepared for much more than book literacies. Teaching students how to locate, effectively use hyperlinks, read and interpret search materials on the Internet should be important focus on reading comprehension instruction today (Henry, L.A. (2005). This study has further highlighted the fact that text literacy is necessary and valuable, but students need to be taught to be successful readers on the Internet.

6.5 Recommendations

It is crucial for teachers, educators and curriculum designers especially in schools and Institutions of Higher Learning to understand and examine closely the current needs of ESL readers, as the Internet has a significant impact on reading. In addition, Coiro (2003) believes that the comprehension process is different on the Internet, and some tasks on the Internet require readers to extend their use of traditional comprehension skills to new contexts for learning while others demand fundamentally different sets of new literacies not currently covered in most language curriculums. She goes on to say that reading on the Internet is different and the definition as well as the teaching of

reading comprehension needs to reflect those differences. Therefore, educators now should envision new constructs of reading comprehension that introduce and reinforce students to strategies for interacting with on-line texts.

A model of reading pedagogy on recognizing the complexity of the reading process of hypertext based on the text characteristics should be considered. It has been found that the metacognitive reading strategies of “determine what to read” and “text features” and the cognitive reading strategies of “trying to stay focused” and “prior knowledge” played a significant role in the reading process for hypertext for the ESL subjects in this study. However, this study was limited to a small research sample and the subjects came from only one faculty – Faculty of Law. Replication of this study with a larger number of subjects and from varied disciplines might provide different insights.

Furthermore, in the reader’s pursuit of information when reading on the internet, the readers are presented with a number of alternatives. These alternatives are the vast amount of information the readers encounter. Therefore, the readers must discern and eliminate these alternatives in order to reduce the amount of uncertainty. According to Smith comprehension is a state opposite to confusion. Smith asserts that, we comprehend when we have no unanswered questions because we have no doubts about alternative interpretations or decisions in our mind. Information enables us to make sense of a situation, and comprehension aids that making sense. As a result uncertainty is eliminated or reduced. Therefore, for comprehension to take place, uncertainty must be eliminated or reduced. However, comprehension does not result necessarily from reading all of the information in a text but also from using the skill of knowledge to

acquire information necessary to reduce uncertainty. This multiple entry and exit of the links can create reader disorientation and cognitive overload (Conklin, 1986). When students read printed text the page retains the information about the topic that the students are reading so that the students may look back and forth in a text.

As a result, there is a need to implement new classroom reading practices. Firstly, there should be a gradual but significant shift from using printed reading texts to hypertext. ESL learners need to be aware of the text structure and characteristics of hypertext for reading comprehension exercises. Secondly, as Shetzer and Warschauer (2000) suggest teachers need to rethink our instructional goals, techniques, and objectives in order to prepare students for literacy in both paper and electronic mediums. As educators, we are not being fair to our students if we expect them to read, comprehend, and extract information from the Web without first providing explicit instruction in the unique skills needed for these tasks. Moreover, these are the skills that modern academia and the global workplace will demand of our students in the future.

Although, the 10 subjects in this study were fairly homogeneous in their reading ability, language proficiency and were considered good readers, their summary scores for the hypertext on the whole were below average except for three subjects. This only shows that language proficiency is not the only issue but rather the need for explicit reading strategy instruction and practice in reading hypertext. Rapidly finding, evaluating, using, and communicating information should become central instructional issues in a reading program. Highly literate individuals should be able to skim webpages, link to other webpages, and generally sift through large amounts of

information in a short time. Individuals who read slowly and haltingly will still be evaluating the first screen of information by the time a more rapid reader has already completed the informational task.

Future research should continue to focus on two important aspects. Firstly, other studies should be conducted on a broader range of online reading tasks. This study was limited to a hypertext that was selected by the researcher. Future studies should investigate how readers generate their own search tasks, use search engines and process the frames of pages in the hyperlinks. In addition, research should continue to explore how low achieving readers from a diverse population read hypertext.

6.5.1 A Basic Framework for Hypertext Literacy

ESL learners today are reading more from the internet than from printed text. Samuel, (2008), in an article entitled, *Reconfiguring English in the classroom* said that for a student in the 20th century, his journey was from page to the screen, but for a student of the 21st century, his journey is from screen to page.

One of the major challenges a student encounters today is trying to deal with the vast amount of information available on the internet. Therefore, managing this vast amount of information, creating knowledge as well as organizing the information into some form of comprehensible output will depend very much on the learners' ability to locate, sort, select, evaluate and use the information.

In view of this, an important question that needs to be addressed is, what should reading instruction and programs today include to prepare students to face tomorrow's world?

According to Samuel (2008), classroom teaching especially reading needs to go beyond the use of textbook only. Grabe (2002), advised that there is a need to identify aspects of reading instruction that students need the most help and thereby provide the necessary guidance. In answer to this the researcher would like to propose a framework for hypertext literacy which advocates that reading instruction develops readers' schemata, navigational skills and reading strategies.

The Framework for Hypertext literacy is based on the literature review of hypertext as well as the findings and suggestions given by ESL learners in this study. In addition, the list of cognitive challenges reported and observed while reading hypertext, formed the basis for the Framework. The cognitive challenges discussed in chapter five are:

- Reading path
- Reading order
- Managing information overload
- English proficiency
- Unpredictability - Taking risks
- Prior knowledge
- Managing Hyperlinks
- Metacognitive strategies

Today's reading instructions will need to address these cognitive challenges. The framework is aimed to increase the readers' efficient engagement when reading hypertext and enhance comprehension of the texts. It also might help remedy the comprehension difficulties faced by ESL readers when reading hypertext.

The framework is designed to help teachers, educators and curriculum designers to include or highlight these key elements in their existing instructional reading course or program. Using the framework as a guideline, teachers and curriculum designers can hopefully develop a reading program that will produce skilled and confident on-line readers.

The framework consists of key components that need to be included in reading instruction in order for students to be able to select, evaluate and use the information. This in turn will help to increase students' efficient engagement while reading hypertext and enhance comprehension of the text. The components or key elements in the framework define and discuss skills, strategies and knowledge students need to become proficient readers in an environment that is significantly shifting towards e-literacy. The researcher feels that this basic framework will help focus attention on what needs to be taught as well as ensuring that ESL students receive sufficient amounts of teaching in each area.

The Framework includes six basic components of skills, strategies and knowledge. There should be equal emphasis on these six aspects in the reading instruction. Each of these elements are listed in table 6 and explained below.

Figure 6: A Basic Framework for Hypertext Literacy

	Elements/components	Explanation
1.	Metacognitive Reading Strategies	These are strategies that require thinking about the topic, backtracking and constant self monitoring. Active awareness of one's comprehension while reading and the ability to use fix-up strategies when faced with comprehension difficulties are essential to become better hypertext readers.
2.	Building prior knowledge	Sufficient exposure to reading hypertext will help the students gain confidence. Prior knowledge of website structures and topics will definitely improve decision making skills and enhance comprehension.
3.	Managing Hyperlinks	Extensive reading practice using hypertext will benefit the students' by increasing their knowledge and confidence in dealing with hyperlinks
4.	Managing Information Overload	Sorting, selecting, evaluating and then organizing the information into some form of comprehensible output are important skills.
5.	Critical Evaluation	Developing skills of critical thinking is essential for hypertext reading. Teaching students to evaluate information, establish facts, make inferences and assumptions and think logically and analytically enhances comprehension of hypertext.
6.	Mind mapping	Mind mapping can aid students' map out or organize the wealth of information encountered clicking on hyperlinks. It is a tool that trains individuals to select key points and store these points, acting as a blueprint of your concrete presentation of key ideas and concepts found in the hyperlinks.

1. Metacognitive Reading strategies

Metacognitive reading strategies can be divided into three categories, planning, monitoring and evaluation. The category of planning refers to the learner identifying the purpose for reading and making decisions to reach one's reading goals for the text. Comprehension monitoring and redirecting one's efforts during reading will help to fulfill the reading purpose. The last category is evaluating one's cognitive abilities to fulfill the task.

A metacognitive awareness strategy instruction program should incorporate detail explanations of why these strategies are useful and when to use them. Most important is the extensive modeling of the strategies while using hypertext. The students should have adequate opportunities to practice these strategies so that they will be confident reading hypertext. A high level of metacognitive awareness is associated to high levels of comprehension ability (Kasper, 1997; and Carrel, 1989).

2. Building Prior Knowledge

Sufficient exposure and extensive practice reading hypertext will help build students prior knowledge of hypertext. The students need to be exposed to how hypertext is organized or structured and learn to make appropriate decisions when dealing with hypertext. This is important because hypertext structure does differ from printed text. Therefore students need experience and instructions in dealing with it. Reading a text with the understanding of its text framework helps readers organize information and better comprehend the text.

3. Managing Hyperlinks

Building students' prior knowledge will help them better manage hyperlinks. It helps them be aware that not all hyperlinks are useful or need to be read from beginning to end. The reading purpose has to be kept in focus because it dictates how you manage and comprehend the texts in the links. The learner will know when to scan, select only the main ideas or just ignore the text in the hyperlink. The very nature of hyperlinks shape the way information is managed and interpreted.

4. Managing Information Overload

The wealth of information available on the Internet can be overwhelming for most ESL learners. Sorting, selecting, evaluating and then organizing the information into some form of comprehensible output are skills the students need to be taught and given ample practice using hypertext.

5. Critical Evaluation

The information available on the various websites need to be evaluated for accuracy. It is crucial to evaluate the extent to which the information contains factual and updated details that can be verified. That would be verification of information for reliability and level of trustworthiness. In addition the information needs to be evaluated in relation also to its relevance to the topic, question or problem. The teaching of critical thinking skills can prove to be very beneficial for the students.

6. Mind Maps

A mind map allows you to focus on the subject and at the same time helps demonstrate connections between isolated pieces of information. Since it gives you a clear picture of both the details and the big picture, you can group and regroup

concepts, encouraging comparisons between them. Viewing the whole picture helps an individual think logically and therefore, assesses the information appropriately. Mind Maps help you to learn, organize, and store as much information as you want, and to classify it in natural ways that give you easy and instant access to whatever you want.

Therefore mind maps can act as a blueprint of your concrete presentation of key ideas and concepts found in the hyperlinks. This in turn, helps to recognize relationships of the various subjects and how they relate to other information, other related issues and experiences. When an individual is able to visualize the whole picture, it becomes easy to analyze, synthesis, evaluate and also encourages problem solving by allowing the individual to see new creative pathways.

The framework was designed on the premise that an effective reading instruction which caters to the needs of the students can help most students to become better online readers. This framework tries to offer some direction and guidance in areas of concern in hypertext reading. However a more thorough review of literature and a study using wider cross-section of subjects will definitely provide a far more comprehensive framework. Furthermore, future research could explore the effectiveness of the hypertext literacy framework. The findings might expand our understanding of hypertext reading as well as uncover other elements needed for online reading.

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