

## ***Strategic Reading Process in Two On-line and Printed Environments***

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This study is an attempt to investigate whether significant differences exist between metacognitive awareness and perceived use of *hypertext* and *printed text* reading strategies of Iranian EFL learners. Twenty two Iranian EFL learners completed two questionnaires regarding metacognitive awareness of printed text and hypertext reading strategy use. The results revealed that there is a significant difference for overall reading strategies in general and problem solving and support strategies in particular. However, no significant difference was found for metacognitive awareness of global reading strategies in both mediums of on-line and print. These findings are, in fact, in line with the opinion of those scholars who believe that the process of reading in print and hypertext environment may differ from each other (Gillingham, 1993; Kamil and Chou, 2005; Konishi, 2003). They also highlight the importance of strategy awareness and training component when classroom teachers engage their learners in on-line reading tasks.

**Key words: metacognitive awareness, reading strategies, hypertext, printed text, EFL learners**

## INTRODUCTION

In recent years, the use of the World Wide Web (WWW) as a source for language learning has obtained growing popularity among language teachers. Chun and Plass (2000, p. 161) outline general capabilities of the WWW for language learning as: a) the universal availability of authentic materials, b) the communication capabilities through networking, c) the multimedia capabilities, and d) the nonlinear (hypermedia) structure of information. Scholars also maintain that the Internet provides opportunities for interacting with new text formats (e.g., hypertext and interactive multiple media that require new thought processes); new reader elements (e.g., new purposes or motivations, new types of background knowledge, high level metacognitive skills); and new activities (e.g., publishing multimedia projects, verifying credibility of images, participating in online synchronous exchanges) (Coiro, 2003, p. 2). Electronic texts, indeed, change the conventional understanding of the reader, the text, and the task.

Despite the familiarity of electronic text, usually known as hypertext, we know very little about its reading comprehension process, required strategies and the way readers approach this new form of text. Hypertext is a common feature of web-based and PC-based documents that enables readers to link from a document to external web sites, definitions, examples, and other content related to the original document (Kamil & Chou, 2005). It is described by Alton (2000) as a non-linear, multimedia, hypermedia, and interactive environment, in which text is presented in different forms accompanied by various other media, such as movie clips, sounds, graphical cues and pictures.

The structure of hypertext is, at least partially, under the control of readers, who can choose to follow a hyperlink or not (Kamil & Chou, 2005). Kamil and Chou (2005) assert that hypertext differs substantially from conventional text, in that the information encountered by an individual reader can differ as a function of following different links. Following new and different links while reading hypertext encourages readers to develop strategies for how to

approach text content, as they call upon appropriate relevant schemata, or background knowledge for how to interpret that content (Kasper, 2003). Reading hypertext, according to Kasper (2003), is a naturally dynamic, recursive and integrated process that provides multiple opportunities for readers to acquire, test and reframe knowledge through cognitive reconstruction of text and exposure to varied perspectives on issues; thus, capable of promoting increased comprehension. Furthermore, Foltz (1996) points out that hypertext incorporates many new features that are not found in linear text, such as linking, the ability to search for information, guided tours and overview maps that supply flexibility to the reader when compared to reading linear text such as books. He also mentions that this flexibility does promise an advantage of personalization and eases the burden of finding information.

Several researchers support the idea that hypertext has some clear advantages over paper media, such as the ease of searching for information, ease of updating, capability of presenting other media simultaneously, dynamic text presentation, inexpensive customizability, interactivity, and connectivity (Egan, et al., 1989). It is believed that hypertext “obviously creates empowered readers, ones who have more power relative both to the texts they read and to the authors of these texts” and increases individual freedom because “users are entirely free to follow links wherever they please” (Landow, 1997, p. 273). More precisely, Horney and Anderson-Inman (1994) identify five major elements to hypertext literacy: traditional reading skills, facility with hardware, knowledge of a document’s structure and navigation, ability to engage the text and enhancements with purpose, and ability to reevaluate the reading purpose. They point out that a student’s skill in these areas, as well as his or her motivation and perception on the task, the design of the hypertext document, the instructional context, and teacher expectations can all influence the effectiveness of a hypertext environment for a particular student.

Several researchers, in addition, report that there is a need to investigate the cognitive aspects of hypertext reading in order to understand the nature of the hypertext reading process (Esperet, 1996). Research in text comprehension

has examined a variety of factors that influence comprehension. These factors include: the role of coherence in a text, the role of the readers' background knowledge, the role of the narrative schema of the text, and the role of the reader's cognitive abilities (Foltz, 1996). In addition, studies have examined the strategies readers use when going through a text and the role these strategies can play for comprehending a text (Shih, 1992; Dreyer & Nel, 2003; Tercanlioglu, 2004). Not only do these factors play a major role in linear text comprehension, they also play an equally important role in the comprehending of hypertexts (Foltz, 1996).

Many studies in conventional text reading strategies recognize the role of metacognitive awareness in reading comprehension. Indeed, the consensus view in these studies is that strategic awareness and monitoring of the comprehension process are critically important aspects of skilled reading (Sheorey & Mokhtari, 2001). Carrell et al. (1989), for example, consider metacognitive awareness—planning and consciously executing appropriate actions to achieve a particular goal—to be a critical element of proficient, strategic reading. Metacognition in the context of reading is usually understood to consist of two types of cognition: first, one's *knowledge* of strategies for learning from texts, and, second, the *control* readers have over their own actions while reading for different purposes (Carrell et al., 1989). Anderson (2003) divides metacognition into five primary components: (a) **preparing and planning** for effective reading, (b) deciding **when to use** particular reading strategies, (c) knowing how to **monitor** strategy use, (d) learning how to **orchestrate** various strategies, and (e) **evaluating** reading strategy use. He believes that metacognition is not any one of the five elements in isolation. Each of these five skills, according to Anderson (2003), interacts with each other. Sheorey and Mokhtari (2001) also suggest that the reader's metacognitive knowledge about reading includes an awareness of a variety of reading strategies and that the cognitive enterprise of reading is influenced by this metacognitive awareness of reading strategies.

The repertoire of metacognitive skills, in effect, has been shown to be among the factors explaining the differences between good and poor readers

(Kinnunen & Vauras, 1995). Researchers have consistently demonstrated that proficient readers typically execute one or more metacognitive behaviours as they read (Swanson & De La Paz, 1998). Poor readers are not as adept as good readers in engaging in planful activities, either to make cognitive progress or to monitor it (Garner, 1987). Poor readers, unlike good readers, have little awareness that they must attempt to make sense of text (Baker & Brown, 1984). Poorer readers are also unlikely to demonstrate that they notice major blocks to text understanding (Garner & Reis, 1981). In addition, Oakhill and Patel (1991) have shown that poor readers do not make inferences from text and do not integrate ideas from different parts of texts in order to create accurate representations. Bos and Vaughan (1994) demonstrated that even when poor readers were able to decode words correctly, they typically do not attend to the meaning of the passage, relate what is being read to their previous knowledge, or monitor their own comprehension. In Sheorey and Mokhtari's view, it is the combination of *conscious awareness* of the strategic reading processes and the actual *utilization of reading strategies* that distinguishes the skilled from unskilled readers (2001). Providing an illustration of the differences between skilled and unskilled readers, Paris and Jacobs (1984, cited in Mokhtari & Reichard, 2002) also emphasize the importance of metacognitive awareness in reading comprehension as it distinguishes between these two types of readers:

Skilled readers often engage in deliberate activities that require planful thinking, flexible strategies, and periodic self-monitoring. They think about the topic, look forward and backward in the passage, and check their own understanding as they read. Beginning readers or poor readers do not recruit and use these skills. Indeed, novice readers often seem oblivious to these strategies and the need to use them (p. 2083).

### **Aims of the Present Study**

In spite of the crucial influence of metacognitive awareness on reading comprehension and its great contribution to skilled reading, and the

exponential growth in the amount of available electronic and multimedia text, little research exists on the impact of metacognition on hypertext reading process. Electronic text on computer screens and the Internet pages is a new medium available for the students in a wide range. More research is required to investigate whether reading comprehension process is different in two different contexts of print and hypertext and whether students employ different strategies in these two different environments. Consequently, this study is an attempt to examine the metacognitive awareness of hypertext reading strategies of Iranian female EFL learners and compare it with its printed text counterparts.

Adopted from MARS (Metacognitive Awareness of reading Strategies Inventory, Mokhtari and Reichard, 2002) and OSORS (On-Line Survey of reading Strategies, Anderson, 2003), three subcategories of metacognitive reading strategies, i.e., global strategies, problem-solving strategies and support strategies are chosen to be examined for the present study. Global strategies aim at setting stage for reading act (e.g. setting purpose for reading, previewing text content, etc.), problem-solving strategies are localized repair strategies used when problems occur in understanding a text (e.g. re-reading for better understanding) and support strategies include support mechanisms or tools aimed at sustaining responsiveness to reading (e.g. use of reference materials like dictionaries). In the current study reading strategies in two electronic and print environments are compared with each other in terms of global, problem-solving and support strategies to investigate whether 12 readers employ different strategies in these environments and consequently whether they require specific training for reading in electronic environment or not.

More specifically the main research question posed in this study and its subsections are as follow:

*Main Research Question:*

Is there any significant difference between the metacognitive awareness of *hypertext* and *printed text* reading strategies of Iranian EFL learners?

*Question No.1.1.* Is there any significant difference between the metacognitive awareness of *hypertext* and *printed text* overall reading strategies of Iranian EFL learners?

*Question No.1.2.* Is there any significant difference between the metacognitive awareness of *hypertext* and *printed text* global reading strategies of Iranian EFL learners?

*Question No.1.3.* Is there any significant difference between the Metacognitive awareness of *hypertext* and *printed text* problem-solving reading strategies of Iranian EFL learners?

*Question No.1.4.* Is there any significant difference between the Metacognitive awareness of *hypertext* and *printed text* support reading strategies of Iranian EFL learners?

## **METHOD**

### **Participants**

The participants of this study consisted of 22 Iranian female sophomore students majoring in English Language and Literature at Al-Zahra University during the second semester of the academic year 2005-2006. The reason for choosing the students of this class as the participants of the present study was the point that some of their university courses, including “Media Text Reading” took place at the university’s computer laboratory. This point would give enough assurance to the researcher that the participants would have enough facilities and opportunities to practice hypertext reading.

### **Instrument**

To collect data for this study, two reading strategies inventories, one for printed reading strategies and the other one for hypertext reading strategies were utilized.

*Metacognitive Awareness of Printed-text Reading Strategies Inventory*

The students' metacognitive awareness of printed reading strategies was assessed through the use of the Metacognitive Awareness of Reading Strategies Inventory (MARSI) (Mokhtari & Reichard, 2002) (see appendix A), which was designed for measuring adolescent and adult students' awareness and use of reading strategies while reading academic or school-related materials. The MARSI instrument measures three broad categories of strategies including: (1) Global Reading Strategies (GLOB), which consists of 13 items and can be thought of as generalized or global reading strategies aimed at setting the stage for the reading act (e.g., setting purpose for reading, previewing text content, predicting what the text is about, etc.) (items 1, 3, 4, 7, 10, 14, 17, 19, 22, 23, 25, 26, 29); (2) Problem-Solving Strategies (PROB), which include 8 items and are considered as localized, focused problem-solving or repair strategies used when problems develop in understanding textual information (e.g., checking one's understanding upon encountering conflicting information, re-reading for better understanding, etc.) (items 8, 11, 13, 16, 18, 21, 27, 30); and finally (3) Support Reading Strategies (SUP), which contain 9 items and involve using the support mechanisms or tools aimed at sustaining responsiveness to reading (e.g., use of reference materials like dictionaries and other support systems) (items 2, 5, 6, 9, 12, 15, 20, 24, 28). However, it should be mentioned that to distinguish this inventory from that of hypertext reading strategies, the word "printed" was added to the original name of this inventory; so, the inventory's original name was changed in to the "Metacognitive Awareness of Printed Reading Strategies Inventory (MAPRSI)."

This 30-item instrument was validated by Mokhtari and Reichard (2002), using a large participant population ( $n = 825$ ). The internal consistency reliability coefficients (as determined by Cronbach's alpha) for its three documented subscales (Global, Problem-Solving, and Support Reading strategies), which were based on the results of factor analysis, were as follows: Global Reading Strategies (0.92), Problem Solving Strategies (0.97),



and Support Reading Strategies (0.97). The reliability for the total sample was measured as 0.93, indicating a reasonably dependable measure of metacognitive awareness of reading strategies.

The answers to the items of MARSII were on a 5-point Likert-scale, ranging from “never” to “always”. “Never” was valued as 1; “occasionally”, 2; “sometimes”, 3; “usually”, 4, and “always”, as 5. According to Mokhtari and Reichard (2002), the average score of 2.4 or below on the questionnaire indicated a low degree of awareness, between 2.5 and 3.4, a moderate degree of awareness; and 3.5 or above, a high degree of awareness. It is worth mentioning that for the present study, a Persian translation of MARSII was administered to the participants.

#### *Metacognitive Awareness of Hypertext Reading Strategies Inventory*

To examine the metacognitive awareness of hypertext reading strategies of the participants, the On-Line Survey of Reading Strategies (OSORS) adopted from Anderson (2003) (see appendix B), was administered to the participants. The OSORS included 38 items and was intended to measure metacognitive reading strategies. The OSORS was originally adapted from the Metacognitive Awareness of Reading Strategies Inventory (MARSII) (Mokhtari and Reichard, 2002). The same three categories were maintained, global reading strategies (18 items; an additional 5 items were added), problem solving strategies (11 items; an additional 3 items were added), and support strategies (the original 9 items were maintained: items 1, 2, 3, 5, 6, 8). Each item was modified to include the phrase “online” each time a reading task was referred to. Anderson (2003) reported the overall reliability of the OSORS as 0.92. The reported reliabilities for each subsection are Global Reading Strategies, 0.77; Problem solving Strategies, 0.64; and Support Strategies, 0.69. These data indicate that OSORS is a reliable instrument for assessing the metacognitive on-line reading strategies. For the purpose of this study and to distinguish this inventory from that of printed reading strategies, the name of the instrument was changed to the “Metacognitive Awareness of Hypertext Reading

Strategies Inventory (MAHRSI)" by the researcher. For the present study, a Persian translation of the OSORS was administered to the participants and its estimated Cronbach's alpha value was 0.82, indicating a reliable measure of metacognitive awareness of hypertext reading strategies.

## **PROCEDURES**

### **Preparing the Instruments**

Since the original versions of the metacognitive awareness of reading strategies inventories were in English and the participants of this study were all non-native speakers of English; the participants' probable lack of proficiency in English could have affected their understanding of the inventories items and their consequent responses. As a consequence, the first step of this study for the researcher was to translate the two metacognitive awareness of reading strategies inventories into Persian. Then, the translated versions of the inventories were negotiated with two other experts in applied linguistics to ensure the comparability of the items. On the basis of their comments about the wordings and the content of the items, the inventories were modified.

### **Administrating the Instruments**

To satisfy the requirements of this study, the instruments were administered during two phases. In the first phase, to explore the printed reading strategies of the participants, the Metacognitive Awareness of Printed Reading Strategies Inventory (MAPRSI) was administered with the help of the classroom instructor who was familiar with the overall objective of the research project, during the final 15 minutes of her regular class period. The items of the questionnaire were explained to the students and their questions about the meaning of the items were answered thoroughly. Students answered the

30-item questionnaire after spending some time on reading academic printed texts while reminded that there were no 'right' or 'wrong' responses to the statements. On the average, the students completed it in 12 minutes.

A procedure quite similar to the one used by Mokhtari and Reichard (2002) was adopted to score the MAPRSI. Each item included in the inventory had five response options. These options were given values from 1 to 5, where value 5 indicated the highest degree of awareness and 1 indicated the least. The missing items up to four were given a value equal to the average score of the answered items. If more than four items were missed, the participants' responses to the instrument were put wholly aside as recommended by Mokhtari and Reichard (2002). The Individual scores for each statement were recorded, and the scores for each of the statements of the subscales were added up and were divided by the number of statements for each subscale to get the average for the subscale. The average for the whole inventory was calculated by adding up subscale scores divided by 30, because the instrument had 30 items. Therefore, the possible score range was from 30 to 150, and the lowest possible mean for each of the subscales could be 1; whereas the highest mean could be 5.

During the second phase, to compare the participants, perceived use of printed text reading strategies with that of their hypertext reading, the Metacognitive Awareness of Hypertext Reading Strategies Inventory (MAHRSI) was administered to the participants in a similar way during the final 30 minutes of their regular class period at university's computer laboratory after the students were oriented to the items of the questionnaire. First, their teacher engaged the participants in various on-line tasks which required hypertext reading; then, after a brief overview of the purpose of the study, a description of the instrument, and an explanation of the steps involved in completing it, the students were instructed to read each of the 38 statements in the MAHRSI and circle the number which best described their perceived use of the strategies described in the statements using a Likert scale ranging from 1 (I never or almost never use this strategy) to 5 (I always or almost always use this strategy). On the average, the students completed it in

15 minutes. It is worth mentioning that the on-line tasks the participants were required to engage in were not provided by the researcher and had been planned by the teacher herself. Also both the printed and on-line texts were newspaper articles to ensure that both types of texts were as similar as possible to allow the researcher to make a valid comparison of reading strategies in two different text mediums of on-line and print. A procedure quite similar to the one used by Anderson (2003), adopted from Mokhtari and Reichard (2002) was implemented to score the MAHRSI.

## **RESULTS**

The research question in the present study was directed toward investigating the probable differences between metacognitive awareness of hypertext and printed text reading strategies of Iranian EFL learners. To answer this question, first, the descriptive statistics of the participants' scores on both reading strategies inventories are presented to provide some preliminary perspectives in the trends of measures employed in this study. These statistics specify the participants' mean, standard deviation, and variance in both MAPRSI and MAHRSI. As Table 4.1 next page shows, the overall reported printed text reading strategy mean ranged from a high of 4.58 to a low of 2.52, with a mean of 3.70 ( $SD = 0.39$ ), indicating a high overall use of reading strategies according to the established strategy usage criteria defined by Mokhtari and Reichard (2002). The lowest mean of reported printed text reading strategies belonged to the subscale of support strategies with the value of 2, and the highest mean belonged to the subscale of problem solving strategies with the value of 5. For hypertext reading, the means of overall reported reading strategies ranged from a high of 4.05 to a low of 2.59, with a mean of 3.44 ( $SD = 0.35$ ), indicating a moderate overall use of reading strategies. The lowest mean of reported hypertext reading strategies belonged to the subscale of support strategies with the value of 2.11, and the highest mean belonged to the subscale of global strategies with the value of 4.28.

As noticed, the *overall* reported printed text reading strategy mean was higher than that of hypertext reading, meaning that students had more awareness of reading strategies in print medium than in hypertext environments ( $X_P = 3.70 > X_H = 3.44$ ). When it comes to the subscales of the MAPRSI and MAHRSI, the same is true for *problem solving* and *support* strategies, since the reported mean of problem solving strategies ( $X_{PP} = 4.14$ ) and support strategies ( $X_{PS} = 3.13$ ) in the context of print were more than those of hypertext setting [Problem Solving Strategies ( $X_{HP} = 3.69$ ) and support strategies ( $X_{HS} = 2.96$ )]. In other words, students reported more usage of problem solving and support strategies for printed text reading. However, for global strategies, the reported mean in hypertext environment was higher than print medium ( $X_{PG} = 3.67 > X_{HG} = 3.64$ ), indicating that students reported more usage of global strategies for hypertext reading. A thorough illustration of the descriptive statistics of the participants' scores on both MAPRSI and MAHRSI is provided in Table 4.2 below.

**TABLE 1**  
**Descriptive Statistics of Metacognitive Awareness of Printed text and Hypertext Reading Strategies Inventories**

Instrument	Strategy Type	N	Mean	SD	Min	Max
Printed Text reading Strategies Inventory	Overall		3.70	.3963	2.52	4.58
	Global	22	3.64	.5108	2.31	4.54
	Problem solving		4.14	.3908	3.25	5
	Support		3.31	.4962	2	4.44
Hypertext reading Strategies Inventory	Overall		3.44	.3529	2.59	4.05
	Global	22	3.67	.4279	2.67	4.28
	Problem Solving		3.69	.4848	2.72	4.27
	Support		2.96	.5007	2.11	3.78

Tables 4.2 and 4.3 on next page classify reported strategies into three high, medium, and low usage category in two print and hypertext medium based on the established criteria defined by Mokhtari and Reichard (2002), illustrating the frequency of strategies falling in these categories. Table 4.2 on this page displays that for reading in print medium, 19 of 30 strategies reported (63%) fell in the high usage category (mean of 3.5 or higher), one strategy (3%) fell

in the low usage category (mean below 2.4), while the remaining 10 strategies (33%) had means between 2.5 and 3.49 indicating medium usage of these strategies. For reading in hypertext environment, Table 4.3 on this page displays that 24 of the 38 (63%) strategies reported fell in the high usage category, 4 strategies (10%) fell in the low usage category, and the remaining 10 strategies (6%) had means in the medium use range. A closer examination of Tables 4.2 and 4.3, on this page, reveals that in high usage category, problem solving strategies (42%) were given priority in print medium with the frequency of 8 out of 19, followed by seven global (36%) and four support strategies (21%); whereas in hypertext environment, global strategies were reported being highly used with the frequency of 12 out of 24 (50%), followed by nine problem solving (37.5%) and three support (12.5%) reading strategies. In low usage category, on the other hand, the only reported strategy in print medium went to the subscale of support strategies; however, for hypertext reading three of four (75%) strategies reported to be in low usage category belonged to the subscale of global strategies and the remaining one (25%) strategy went into the support strategies subscale. A thorough report of the degrees of metacognitive awareness of reading strategies for the three subscales of global, problem solving and support strategies in three categories of high, medium, and low usage of reading strategies in both mediums of hypertext and printed text is provided in detail in Tables 4.2 and 4.3 below.

**TABLE 2**  
**The Degrees of Metacognitive Awareness of Printed Reading Strategies of Iranian EFL Learners**

		Overall	Global	Problem Solving	Support
Printed Text	3.5 or higher = High	19 (63%)	7 (36%)	8 (42%)	4 (21%)
Reading Strategies	2.5 - 3.4 = Medium	10 (33%)	6 (60%)	-	4 (40%)
(n=30)	2.4 or lower = Low	1 (3%)	-	-	1 (100%)

**TABLE 3**  
**The Degrees of Metacognitive Awareness of Hypertext Reading Strategies of Iranian EFL Learners**

		Overall	Global	Problem Solving	Support
Hypertext	3.5 or higher = High	24 (63%)	12 (50%)	9 (37.5%)	3 (12.5%)
Text Reading Strategies	2.5 - 3.4 = Medium	10 (26%)	2 (20%)	2 (20%)	6 (60%)
(n=38)	2.4 or lower = Low	4 (10%)	3 (75%)	-	1 (25%)

The descriptive statistics presented above demonstrated a quite noticeable difference between metacognitive awareness of hypertext and printed text reading strategies. However, to examine whether this difference was statistically significant or not, a paired samples t-test was run between the scores obtained from MAPRSI and MAHRSI. As it is shown in Table 4.4 the observed difference in the overall means of the two questionnaires was statistically significant ( $t [21] = -2.864$ ;  $p < 0.05$ ). To examine whether there was a statistically significant difference between the subscales of MAPRSI and MAHRSI, a series of further paired samples t-tests were also performed. The results revealed that for the subscales of problem solving and support strategies the observed differences, as well, were statistically significant (problem solving strategies:  $t [21] = -3.717$ ;  $p < 0.05$ , support strategies:  $t [21] = -2.455$ ;  $p < 0.05$ ). Nevertheless, no statistically significant difference was found between metacognitive awareness of hypertext and printed text reading strategies. The results are wholly illustrated in Table 4.4 next page.

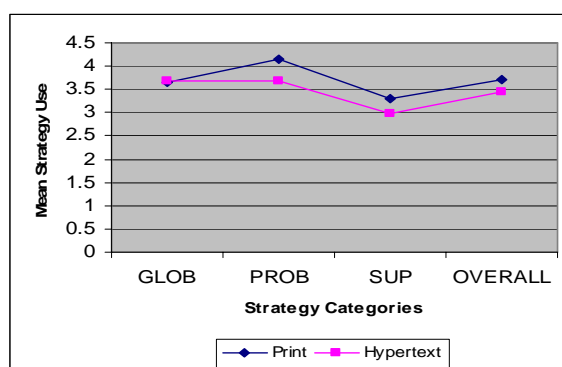
**TABLE 4**  
**Differences in Metacognitive Awareness of Hypertext and Printed Text Reading Strategies of Iranian EFL Learners**

Strategy Type	Printed Text Reading (n=22)		Hypertext Reading (n=22)		t (21)	p-Value
	Mean	SD	Mean	SD		
Overall Strategies	3.772	.3675	3.446	.3529	-2.864	.009*
Global Strategies	3.722	.4769	3.679	.4279	-.233	.761
Problem Solving Strategies	4.118	.3645	3.690	.4848	-3.717	.001*
Support Strategies	3.411	.4857	2.970	.5007	-2.455	.007*

\* Significance at  $p < 0.05$

## DISCUSSION

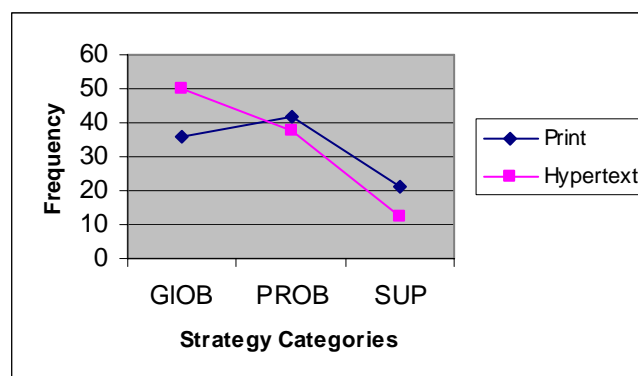
The results of this current research continue to add to our understanding of how strategies used by L2 readers within the context of on-line might differ from those in print medium. The results obtained from the instruments revealed that L2 readers had more awareness of printed text reading strategies than those of hypertext, since the overall reported mean score on MAPRSI was higher than that of MAHRSI. In other words, in print medium learners reported high overall awareness of reading strategies, while in hypertext environment, they demonstrated moderate overall use of strategies. Considering the subscales of MAPRSI and MAHRSI, while L2 readers reported more use of problem solving and support strategies in the context of print in comparison with those of a hypertext environment, they demonstrated more use of global strategies in a hypertext setting. Nevertheless, the overall pattern of strategy use in both mediums was the same (Figure 5.1 on next page). L2 readers had a clear preference for using problem solving strategies, followed by support strategies and global reading strategies in both contexts. Actually, this finding is in line with that of Mokhtari and Reichard (2004) who found similar pattern of using reading strategies for native and non-native speakers of English for printed text reading.



**FIGURE 1**  
Mean Strategy Use in Print and Hypertext Settings



However, considering the frequency of strategies reported in High Usage Category (mean = 3.5 or higher) demonstrated in Figure 5.2 below, it was observed that problem solving strategies were given priority, followed by global and support strategies in print setting; on the other hand, in hypertext context, global reading strategies were given priority, followed by problem solving and support strategies. One possible explanation for this pattern is that these readers may not be as skilled as in print medium, as Mokhtari and Reichard (2004) maintain that problem solving strategies associate with skilled reading. There was the possibility of lack of experience with hypertext reading for the participants in comparison with hard-copy reading since just two courses of the students met at the computer laboratory of the department and the rest were regular classes. Moreover, the moderate awareness of hypertext reading strategies may also confirm this explanation. The overall reported hypertext reading strategy mean was lower than that of printed text reading and indicated a moderate use of reading strategies based on the established criteria defined by Mokhtari and Reichard (2002).



**FIGURE 2**  
Frequency of Strategies Reported in High Usage Category (mean = 3.5 or higher) in both Hypertext and Print Mediums

Moreover, the paired samples t-tests computed between the results of

MAPRSI and MAHRSI, demonstrated that there is a statistically significant difference between metacognitive awareness of hypertext and printed text overall reading strategies. Taking the subscales into account, a statistically significant difference between metacognitive awareness of hypertext and printed text reading strategies was found for problem solving and support strategies as well. However no statistically significant difference was found between metacognitive awareness of hypertext and printed text global reading strategies.

Also the statistical significant difference found in metacognitive awareness of printed text and hypertext overall reading strategies, in general, and problem solving and support strategies in particular confirms the opinion of those scholars who believe that the process of reading in print and hypertext environment may differ from each other (Foltz, 1996; Alton, 2000; Coiro, 2003; Kasper, 2003; Kamil & Chou, 2005).

Perhaps the greatest outcome of this research is the importance of metacognitive on-line reading strategies for second language learners. This strategy type plays a more important role in L2 reading instruction specifically in web-based learning environment. Research shows that the Internet environment deserves special emphasis due to the fact that it is considered an “ill defined” environment in which the strategies employed are not explicit or predefined (Rimor & Kozminsky, 2002). In this environment the users do not receive any external feedback regarding their progress and are required to monitor and assess their own progress independently; accordingly, reading on the web demands a high level of metacognitive skills.

The current study has provided some insights into the nature of L2 reading strategies on the web-based environment. This work can be very important in prompting reading researchers to examine the readers’ awareness of their cognitive and motivational processes while reading Internet texts as well as their awareness of the actions they use to monitor comprehension. Since research in this field is just beginning, we need to know more about the reading process on the Internet, and the required skills and strategies to perform effectively in this environment. Because students encounter a great

volume of hypertext in both their instructional and recreational reading, there is a need for guidance in how to read hypertext. We need to understand more comprehensively the differences between reading printed text and reading pages of the Internet with hypertext links. Knowing the differences between these two types of reading will help teachers teach students to do more than just evaluate web pages. Such research provides teacher educators and practicing teachers with practical suggestions for helping struggling readers increase their awareness and use of reading strategies while reading Internet texts. A strategy awareness and training component seem essential when classroom teachers engage their learners in on-line reading tasks. It is important for the readers to be aware of the significant strategies proficient reading requires in both contexts of hard copy and on-line.

The present study revealed that there is a significant difference for overall reading strategies in general and problem solving and support strategies in particular in two different contexts of print and electronic. This finding suggests that electronic reading should not be treated the same way as hard copy reading and teachers need to provide enough assistance and guidance for their students while asking them to use the Internet to equip them with appropriate strategies to tackle the challenges introduced by this new medium. Another implication of this study is for the writers of digital texts. They must be far more aware of the cognitive processes that readers use in processing hypertext. This awareness will help designers and writers of the Internet to better prepare pages for their audience.

In closing, teachers should always remember that technology is just a tool; more important than the use of the Internet per se is the quality of what is done with this medium (Rosenberg, 2001). The present study demonstrated that the reading process in two environments of on-line and print is different from each other in terms of overall reading strategies in general and problem-solving and support strategies in particular. This finding calls for more attention to the requirements of electronic reading process and necessitates providing an appropriate training for the on-line readers to deal with the challenges of this new medium. There is much still to be learned about L2

reading on the Web, both in terms of theoretical understanding and practical implementations. Electronic text reading in L2 environment, in effect, is yet open to extensive and thorough exploration in detail.

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**APPENDIX A**  
**Metacognitive Awareness of Reading Strategies Inventory**  
**(Version 1.0)**  
**Adopted from Mokhtari and Reichard, 2002**

Directions: Listed below are statements about what people do when they read *academic or school-related materials* such as textbooks or library books.

Five numbers follow each statement (1, 2, 3, 4, 5), and each number means the following:

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

After reading each statement, circle the number (1, 2, 3, 4, or 5) that applies to you using the scale provided. Please note that there are no right or wrong answers to the statements in this inventory.

**Type Strategy Scale**

- |   |           |
|---|-----------|
| GLOB 1. I have a purpose in mind when I read.                                       | 1 2 3 4 5 |
| SUP 2. I take notes while reading to help me understand what I read.                | 1 2 3 4 5 |
| GLOB 3. I think about what I know to help me understand what I read.                | 1 2 3 4 5 |
| GLOB 4. I preview the text to see what it's about before reading it.                | 1 2 3 4 5 |
| SUP 5. When text becomes difficult, I read aloud to help me understand what I read. | 1 2 3 4 5 |
| SUP 6. I summarize what I read to reflect on important information in the text.     | 1 2 3 4 5 |
| GLOB 7. I think about whether the content of the text fits my reading purpose.      | 1 2 3 4 5 |
| PROB 8. I read slowly but carefully to be sure I understand what I'm reading.       |           |

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	1 2 3 4 5
SUP 9. I discuss what I read with others to check my understanding.	1 2 3 4 5
GLOB 10. I skim the text first by noting characteristics like length and organization.	1 2 3 4 5
PROB 11. I try to get back on track when I lose concentration.	1 2 3 4 5
SUP 12. I underline or circle information in the text to help me remember it.	1 2 3 4 5
PROB 13. I adjust my reading speed according to what I'm reading.	1 2 3 4 5
GLOB 14. I decide what to read closely and what to ignore.	1 2 3 4 5
SUP 15. I use reference materials such as dictionaries to help me understand what I read.	1 2 3 4 5
PROB 16. When text becomes difficult, I pay closer attention to what I'm reading.	1 2 3 4 5
GLOB 17. I use tables, figures, and pictures in text to increase my understanding.	1 2 3 4 5
PROB 18. I stop from time to time and think about what I'm reading.	1 2 3 4 5
GLOB 19. I use context clues to help me better understand what I'm reading.	1 2 3 4 5
SUP 20. I paraphrase (restate ideas in my own words) to better understand what I read.	1 2 3 4 5
PROB 21. I try to picture or visualize information to help remember what I read.	1 2 3 4 5
GLOB 22. I use typographical aids like boldface and italics to identify key information.	1 2 3 4 5
GLOB 23. I critically analyze and evaluate the information presented in the text.	1 2 3 4 5
SUP 24. I go back and forth in the text to find relationships among ideas in it.	1 2 3 4 5
GLOB 25. I check my understanding when I come across conflicting information.	1 2 3 4 5
GLOB 26. I try to guess what the material is about when I read.	1 2 3 4 5
PROB 27. When text becomes difficult, I reread to increase my understanding.	



	1	2	3	4	5
SUP 28. I ask myself questions I like to have answered in the text.	1	2	3	4	5
GLOB 29. I check to see if my guesses about the text are right or wrong.	1	2	3	4	5
PROB 30. I try to guess the meaning of unknown words or phrases.	1	2	3	4	5

### Scoring Rubric

1. Write your response to each statement (i.e., 1, 2, 3, 4, or 5) in each of the blanks.
2. Add up the scores under each column. Place the result on the line under each column.
3. Divide the subscale score by the number of statements in each column to get the average for each subscale.
4. Calculate the average for the whole inventory by adding up the subscale scores and dividing by 30.
5. Compare your results to those shown below.
6. Discuss your results with your teacher or tutor.

*Key to averages:* 3.5 or higher \_ high 2.5–3.4 \_ medium 2.4 or lower \_ low

*Interpreting your scores:* The overall average indicates how often you use reading strategies when reading academic materials. The average for each subscale of the inventory shows which group of strategies (i.e., global, problem solving, and support strategies) you use most when reading. With this information, you can tell if you score very high or very low in any of these strategy groups. Note, however, that the best possible use of these strategies depends on your reading ability in English, the type of material read, and your purpose for reading it. A low score on any of the subscales or parts of the inventory indicates that there may be some strategies in these parts that you might want to learn about and consider using when reading.

**APPENDIX B**  
**Metacognitive Awareness of Hypertext Reading Strategies**  
**Inventories Adopted from Neil J. Anderson, 2003**

The purpose of this survey is to collect information about the various strategies you use when you read on-line in English (e.g., surfing the Internet, doing on-line research, etc.). Each statement is followed by five numbers, 1,2,3,4, and 5, and each number means the following:

- 1 means “I never or almost never do this” when I read on-line.
- 2 means “I do this only occasionally” when I read on-line.
- 3 means “I sometimes do this” when I read on-line. (About 50% of the time).
- 4 means “I usually do this” when I read on-line.
- 5 means “I always or almost always do this” when I read on-line.

After reading each statement, circle the number (1, 2, 3, 4, or 5) that applies to you using the scale provided. Please note that there are no right or wrong answers to the statements in this inventory.

Statement	Never	Always
1. I have a purpose in mind when I read on-line.	1	2 3 4 5
2. I participate in live chat with other learners of English.	1	2 3 4 5
3. I participate in live chat with native speakers of English.	1	2 3 4 5
4. I take notes while reading on-line to help me understand what I read.	1	2 3 4 5
5. I think about what I know to help me understand what I read on-line.	1	2 3 4 5
6. I take an overall view of the on-line text to see what it's about before reading it.	1	2 3 4 5
7. When on-line text becomes difficult, I read aloud to help me understand what I read.	1	2 3 4 5
8. I think about whether the content of the on-line text fits	1	2 3 4 5

- my reading purpose.
- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 9. I read slowly but carefully to be sure I understand what I'm reading on-line.                             | 1 | 2 | 3 | 4 | 5 |
| 10. I review the on-line text first by noting its characteristics like length and organization.              | 1 | 2 | 3 | 4 | 5 |
| 11. I try to get back on track when I lose concentration.  | 1 | 2 | 3 | 4 | 5 |
| 12. I print out a hard copy of the on-line text then underline or circle information to help me remember it. | 1 | 2 | 3 | 4 | 5 |
| 13. I adjust my reading speed according to what I'm reading on-line.   | 1 | 2 | 3 | 4 | 5 |
| 14. When reading on-line, I decide what to read closely and what to ignore.                                  | 1 | 2 | 3 | 4 | 5 |
| 15. I use reference materials (e.g. an on-line dictionary) to help me understand what I read on-line.        | 1 | 2 | 3 | 4 | 5 |
| 16. When on-line text becomes difficult, I pay closer attention to What I'm reading.                         | 1 | 2 | 3 | 4 | 5 |
| 17. I read pages on the Internet for academic purposes.  | 1 | 2 | 3 | 4 | 5 |
| 18. I use tables, figures, and pictures in the on-line text to increase my understanding.                    | 1 | 2 | 3 | 4 | 5 |
| 19. I stop from time to time and think about what I'm reading on-line.                                       | 1 | 2 | 3 | 4 | 5 |
| 20. I use context clues to help me better understand what I'm reading on-line.                               | 1 | 2 | 3 | 4 | 5 |
| 21. I paraphrase (restate ideas in my own words) to better understand what I read on-line.                   | 1 | 2 | 3 | 4 | 5 |
| 22. I try to picture or visualize information to help remember what I read on-line.                          | 1 | 2 | 3 | 4 | 5 |
| 23. I use typographical aids like boldface and italics to identify key information.                          | 1 | 2 | 3 | 4 | 5 |
| 24. I critically analyze and evaluate the information presented in the on-line text.                         | 1 | 2 | 3 | 4 | 5 |
| 25. I go back and forth in the on-line text to find relationships among ideas in it.                         | 1 | 2 | 3 | 4 | 5 |

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26. I check my understanding when I come across new information. 1 2 3 4 5
27. I try to guess what the content of on-line text is about when I read. 1 2 3 4 5
28. When on-line text becomes difficult, I reread to increase my understanding. 1 2 3 4 5
29. I ask myself questions I like to have answered in the on-line text. 1 2 3 4 5
30. I check to see if my guesses about the on-line text are right or wrong. 1 2 3 4 5
31. When I read on-line, I try to guess the meaning of unknown words or phrases. 1 2 3 4 5
32. I scan the on-line text to get a basic idea of whether it will serve my purposes before choosing to read it. 1 2 3 4 5
33. I read pages on the Internet for fun. 1 2 3 4 5
34. I critically evaluate the on-line text before choosing to use information I read. 1 2 3 4 5
35. I distinguish between fact and opinion in on-line texts. 1 2 3 4 5
36. When reading on-line, I look for sites that cover both sides of an issue. 1 2 3 4 5
37. When reading on-line, I translate from English into my native language. 1 2 3 4 5
38. When reading on-line, I think about information in both English and my mother tongue. 1 2 3 4 5