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 metaccognitive 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	*p-value*
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 form 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 adversitements) 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 voculabries 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 **Subjects**	**Printed text**	**Hypertext**
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 that 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 intergrating 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 that 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 back ….ok, 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 Bono …..was 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 semtence 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 have ….looking 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 that 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, mean-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 then 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 subjects2 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 posses 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 metacognitve 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.