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STRATEGIES FOR READING HYPERTEXT BY JAPANESE ESL LEARNERS

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Abstract

In the age of the Internet, more and more practitioners design reading activities using the World Wide Web as a means of introducing learning materials in their second language instruction. Researchers emphasize the effectiveness of Web-based reading, especially accessing authentic language materials through the activities, but those studies rarely look into the actual behaviors individual learners engage when they read Web pages. Considering these situations in the research field of reading instructions in ESL classrooms, the research in this paper tries to investigate what kinds of strategies ESL learners use when they read through the authentic Web pages on the Internet. By empirically probing into the strategy use for reading hypertext, this research will provide more objective and reliable data to support better instruction of reading in the second language with hypertext as its material. The key words of this research are intertextual reading, development of cognitively flexible approaches to reading hypertext and control of the cognitive load from reading hypertext in the second language.

1. Introduction/motivation for the study

This study was motivated by concerns about the reading instruction in the ESL classroom. More and more practitioners have incorporated reading activities using the World Wide Web into their ESL instruction these days (Collombet-Sankey, 1997; Liou, 1997; Kasper, 2000). They have shown that students became much more motivated to read texts written in English through such activities. Researchers emphasize the importance of

Web-based reading, especially to access authentic language materials through the activity (Warschauer and Healey, 1998; Felix, 1999; Ganderton, 1999). These studies, however, do not look into the actual behaviors individual learners engage in when they read Web pages. We cannot know how Web-based reading activities are effective for expanding the students' reading abilities.

On the other hand, there are two research streams that investigate the cognitive processes of the readers. One deals with reading print text (Goodman, 1967; Gough, 1972; Carrell & Eisterhold, 1988; Stanovich, 1980). This has a long tradition of analyzing the behavior of readers while reading print text. Various reading models have been advocated both in L1 and in L2. However, research perspectives have not been extended to examine the characteristics of Web-based reading, and there has been little discussion concerning the characteristics of hypertext, such as the multi-linearity and openendedness.

The other research stream investigates the cognitive processes of reading hypertext (Rouet et al., 1996; Oostendorp and Mul, 1996; Jacobson & Spiro, 1995; Niederhauser et al., 2000; Chun and Plass, 1997; Lomicka, 1998; Ridder, 2000). Researchers in that stream, however, do not deal with authentic hypertext on the Internet. Rather, they create their own hypertext specifically for the purpose of their experiments. Research findings are, therefore, limited and difficult to apply directly for reading authentic hypertext in the World Wide Web.

Furthermore, there is a research group that investigates the usability of Web pages (Morkes and Nielsen, 1997). It is categorized into a field of computer engineering and is named as a research field of human computer interactions. The two research streams that investigate cognitive processes of readers scarcely have connections with research achievements of the human computer interactions. Even the two research streams to investigate the cognitive processes of readers seem to have little exchange with each other. For example, reading models advocated for print text have not been integrated into those

related to reading hypertext. In other words, the three research streams that are related to the topic of this paper seem to have remained independent of one another.

Given this background, this paper tries to investigate the kinds of strategies ESL learners use when they read through the authentic pages on the Internet, incorporating all the knowledge about reading processes for print text both in L1 and L2, about hypertext and about Web navigation.

2. Research questions

This study investigates the following questions:

- (a) To what extent can the findings about reading strategies of ESL learners when they read print text be applied to the situation where they are reading hypertext?
- (b) What are the effects of hypertext as a new media for ESL learners to utilize strategies when they read hypertext?
- (c) How do learner variables such as familiarity with hypertext and second language proficiency influence their strategy use?

Question (a) investigates whether readers use the same kinds of strategies for print text as they do for reading hypertext. Carrell (1989) and Carrell (1998) are used as the framework of my analysis. It is expected that the three categories of strategy, local, global and meta-cognitive will be found in the strategy use by the ESL learners when they read hypertext.

With respect to question (b), there is also a possibility that readers will use new kinds of strategies specific for reading hypertext. If so, I would like to describe from the data of this study what strategies are useful for reading hypertext. The knowledge about navigation in the field of human computer interactions (Mayes et al., 1990) will be used for the analysis of the data. Moreover, the study by Urquhart and Weir (1998) about other categories of

reading behaviour than careful reading, such as skimming, scanning, search reading and browsing, would also contribute to the analysis of the data.

Question (c) investigates if reading behaviours are influenced by background variables of readers, such as their prior reading experiences, their language proficiency either in L1 or in L2 (Fitzgerald, 1995; Koda, 1987; Clarke, 1979; Bernhardt, 2000). I would like to analyze the strategy use for reading hypertext by taking these factors into consideration, focusing particularly on the aspects of the familiarity with hypertext and the second language proficiency.

3. Research Settings

3.1. Participants

Six students in total were recruited for this study. Although the participation in this study was voluntary, they received a stipend for their time and effort. The participants were Miki, Akiko, Yuta, Momoyo, Yasue and Taro. All names are pseudonyms. They were students of a major university in Melbourne, Australia. They were international students from Japan who were studying their major fields in the undergraduate and postgraduate levels at the university. Their first language was Japanese and they had studied English at school. Therefore, they were categorized as ESL learners. They constituted a convenience sample, as there was no explicit standard for choosing them as participants for this study. The background information about each participant gathered by the questionnaire is listed in Table 1 below.

Table 1: background information about each participant

Name	Gender	Major	English proficiency	Stay in English speaking countries
Miki	female	international business	TOEFL 525	1 year
Akiko	female	Architecture	TOEFL 550	9 months
Yuta	male	Australian study (law)	TOEFL 610	4 months
Momoyo	female	media and communication study	TOEFL 627	4 years
Yasue	female	Chinese	TOEFL 575	3.5 years
Taro	male	developmental study	TOEFL 613	6 months

Name	Internet experience	Weekly Internet use	Like to read Web pages	Read footnotes often	Like to read text with pictures, tables and graphs
Miki	7 years	10 hours	Yes	No	Yes
Akiko	6 years	8 hours	No	Yes	No
Yuta	4 years	5 hours	No	No	Yes
Momoyo	5 years	5 hours	Yes	No	Yes
Yasue	4 years	10 hours	No	No	Yes
Taro	3.5 years	7 hours	No	No	Yes

3.2. Tasks

Based on the meta-analysis of experimental studies on the interaction with hypertext by Chen and Rada (1996), this study adopted two types of tasks for reading hypertext: open versus closed task. Open task means a free browsing, while closed one has a specific purpose for browsing, such as to find specific information.

Moreover, this study incorporated the five types of reading Urquhart and Weir (1998) categorize. They are careful reading, skimming, scanning, search reading and browsing.

Each type of reading is used for different purposes. Depending on the purpose of reading a specific material, readers should use different kinds of strategies suitable for the reading task.

Combining the two research achievements, two types of tasks were made up for this study: Task A (browsing, skimming and careful reading) and Task B (searching and scanning).

Task A asked participants to browse through the site of a common newspaper published in Melbourne, Australia and to choose one article they found interesting. They were required to read the article through in order to report what it was about to the researcher after the session. This task was to focus on the strategies readers utilized when they carried out browsing, skimming and careful reading.

Task B asked participants to find out some information about Australian Aboriginal languages by using a popular search engine. The information they were required to search for included:

- how many languages were spoken in Australia before Western people came;
- how many of them are still used by Aboriginal people now.

Participants were asked to give the information to the researcher after the session. This task was to focus on the strategies readers utilized when they were searching and scanning.

3.3. Procedures

Each participant was met individually for a one and a half hour session. The sessions took place over a three-day period. First, each participant was asked to answer a questionnaire having questions concerning their English proficiency, familiarity with

hypertext and cognitive preferences. Then they were asked to sit in front of a personal computer that was connected to the Internet. Two video recorders were set beside the computer. After receiving instruction on how to think aloud and seeing a sample by the researcher, they had a chance to practice thinking aloud for about five minutes with a similar reading task. Next, each participant was asked to navigate through the Internet for about twenty minutes to carry out a task assigned to them individually. While they were navigating the websites, they were asked to think aloud whatever they thought about the activity. They were given two options in the language they spoke when they thought aloud: in English or in Japanese. All the participants except Taro chose to speak in Japanese, their native language. Their voice was audio-recorded for analyzing their strategy use. The computer screen they operated with was video-recorded to gather data concerning how long they stayed in a specific page, which link they clicked, what buttons they used and so on. Tracking software was also incorporated into the computer they used to trace their navigation of the websites. Their behavior during the activity was recorded, too. The data from the screen and the tracking software and their behavior were analyzed parallel to the think aloud data to specify the strategies they used for navigating the websites and reading hypertext. Each participant was observed by the researcher while they were navigating the websites as well as thinking aloud whatever they thought about the activity. After the think aloud session, each participant was interviewed to reflect on the activity. Through this process, they were given a chance to add extra explanation to the think aloud data or correct it, if necessary.

4. Data analysis

Data included the transcribed videotapes of each participant's think-aloud protocol; the behaviors of the participants during the think aloud session; recorded screens of the computer

each participant operated with during the think aloud session; the results of tracking; and the responses to the background questionnaire and to the interview.

4.1. Think-aloud data

Because the focus of this study is on the online strategy use of the readers, the think-aloud protocols served as the main data source. As all the participants except Taro chose to speak in Japanese, the think-aloud data was in Japanese. It was translated into English after the analysis, for the purpose of reporting them in English. The think-aloud transcripts were read several times with the purpose of coding the data.

Based on the study by Hartman (1995), “a think-aloud utterance” was adopted as a unit of analysis for this study. The think-aloud utterance is defined as “those words spoken aloud by a student that were preceded and followed by some period of silence” (Hartman, 1995, p.529). The think-aloud data was then chunked at the points where participants put pauses on their utterances for a few seconds.

The framework of coding of this study is theoretically grounded on the approach to reading strategies by Carrell (1989) and Carrell (1998). Based on the schema-theoretic interactive model of reading, Carrell categorizes reading strategies into two: cognitive and meta-cognitive strategies. Cognitive strategies are direct strategies to deal with the mental processing of a target language. Meta-cognitive strategies are part of the indirect strategies to self-monitor the reading activity of oneself. They also function as a goal setting of reading and revising the use of various cognitive strategies. Meta-cognitive strategies have an important role in critical reading.

Cognitive strategies include both local and global strategies. Local strategies are used in the bottom-up processing and global strategies are used in the top-down processing. Bottom-up processing is also called data-driven processing and local strategies include

identifying the meaning of a word, the structure of a sentence and the correspondence of letters and pronunciations. Top-down processing, on the other hand, is also called conceptually-driven or reader-driven processing and global strategies include the recognition of coherence and consistency of a text; utilizations of the knowledge about the text structure, inferences and background knowledge about the content of a text.

In addition to the strategies established in the research trend of ESL reading, one more category of strategies was created after looking into the think-aloud data. It has its basis in the study by Mayes et al. (1990) about the navigation through hypertext learning systems. These are navigational strategies. Readers utilize various strategies in order to navigate through the Web pages on the Internet, such as scrolling up and down a long page, moving among pages by clicking links or buttons, utilizing multiple windows and changing an active window.

4.2. Data from the questionnaire and the interview

The responses by the participants to the questionnaire and the interview served as complementary data sources to the think-aloud protocols, because this study focused on the online strategy use by the readers. The responses to the questionnaire that was collected before the think-aloud session served as a background information to grasp the features of participants, such as their English proficiency, familiarity with hypertext and the preferences for reading. The responses to the interview after the session served to confirm and clarify the online strategy use.

5. Findings and discussions

5.1. Strategy use

The strategy use by the participants while they were carrying out the tasks is discussed

first. The subcategories of the strategies they used are cognitive strategies (including local and global strategies), meta-cognitive strategies and navigational strategies.

5.1.1. Local strategies

Every participant except Momoyo utilized local strategies often when they read through hypertext on the Internet. They often commented when they were not sure enough of the meaning of a word. Though the participants in this study were high intermediate or advanced ESL learners, utilization of local strategies was still a hurdle for them to comprehend text written in English. This situation can be applied not only for Task A that include traditional type of reading in ESL classes as careful reading, but also for Task B, scanning and searching.

Yuta mentioned explicitly the grammatical interpretation of a sentence. He also commented on the pronunciation of words. He reported in his interview that he did not have enough confidence to understand the content of the article after re-reading the same sentence several times. He chose to read an article about a public execution in Thailand. He was not sure whether the execution was made public or not after all because he had a problem understanding the grammatical meaning of a sentence key to the judgment.

Miki reported in her interview that the lack of vocabulary in English was more influential than the effect of background knowledge. She read an article about dispatching Japanese Defense Forces. She had read the same news in Japanese, so she had some background knowledge about it. However, it was hard for her to understand the content of the article because she found several words she did not know in the article.

The examples of local strategies participants utilized in this study are as follows:

[comments on the meaning of a word]

Miki: The Australian team is abused? What does this mean?

Akiko: I don't understand proper nouns well. He may be a president of a TV network or something.

Yuta: I don't understand the meaning of 'narcotics traffickers'.

Yasue: 'Distinct' means clear, so there were 250 before Western people came.

Taro: Social science, what is social science? Archeology, what is archeology?

[commenting on the pronunciation and the grammatical interpretation]

Yuta: 'Up-reezing'? It should be pronounced as 'uprising', shouldn't it?

Yuta: Didn't they carry it out after all? Is this subjunctive? No, it isn't.

Past tense of the future? They didn't do it, did they?

5.1.2. Global strategies

Every participant utilized many global strategies when they read hypertext on the Internet: making inferences and connecting new information in the text with their background knowledge. Most of them are the same kinds of strategies readers utilize when they read print text, especially used in reading a single text carefully. However, some particularly reflect the characteristics of the tasks to search for information among hypertext with many blocks of text linked one to another. Yasue checked the consistency or evaluated the importance and the trueness between the two sources. The strategy was adopted because she was given a chance to search information not from one text but from multiple Web pages. This aspect of strategy use is significant and attention needs to be paid to it in further research. Though the reading instruction in ESL classes have tended to focus on comprehending the

content of a single text, reading activities incorporating Web-based reading needs to take intertextual reading into consideration. The examples of global strategies participants utilized in this study are as follows:

[activating background knowledge]

Akiko: I think “Reality TV” was called “Real Show” in Japan.

Yuta: Is there any country that has punishment like that in this modern age?

Momoyo: But I have heard that the Chinese people call friends of their father or mother uncle and so on. Is it similar to that situation?

Yasue: I think I have heard the name “David Nathan” before.

Taro: WA. Washington? No, there is no Washington in Australia. Western Australia.

[making inferences]

Miki: I haven’t heard news about anthrax these days. A 94-year-old woman has died. What was the cause of her death? Also by mail?

Momoyo: Borrowing from Aboriginal languages. I assume koala and kangaroo are borrowed words from them.

[checking coherence within a text]

Yuta: What is “squat”? Isn’t there any explanation upwards?

[checking consistency between two sources]

Yasue: It is written that there are 200 languages in this site, but another site said 250. Which is correct? The answer is between 200 and 250, isn’t it?

[evaluating the importance or trueness of what is written]

Yasue: This seems easier to understand than that one before or easier to find the information that I need.

5.1.3. Meta-cognitive strategies

All participants utilized meta-cognitive strategies effectively when they read hypertext on the Internet. They set their own goal of reading, monitored their understanding of the text and revised their strategy use. Some of them are the same kinds of strategies readers utilize when they read print text, especially used for reading a single text carefully. However, others particularly reflect the characteristics of the tasks such as reading hypertext with multimedia; and skimming and search reading among multiple pages. The participants understood the characteristics of their tasks well enough to be reflected in their meta-cognitive strategy use. These data show the necessity to expand its perspective of meta-cognitive strategies when investigating Web-based reading activities. The examples of the meta-cognitive strategies participants used in this study are as follows:

[goal setting for skimming]

Miki: The topic I'm interested in and easy to understand for me is soccer, so I'll read an article about soccer.

[goal setting for searching]

Momoyo: I prefer a page with more explanation.

Momoyo: Then, first of all let's see the page about Victoria."

Taro: I have to search for information about Aboriginal languages, so a standard way of searching the information is to enter the word 'Aborigine' in this box, and press the search button, but there may be tons of information. It's better to search from these menus.

[monitoring of understanding]

Akiko: I feel I understand better now.

Akiko: Let's re-read it more. I'll go back to the top.

[monitoring of scanning]

Yasue: This information is not relevant to what I am looking for, so I'll stop reading it.

Yasue: Anyway it is not relevant, so let's go back.

[revising strategy use]

Yuta: Aren't there any pictures? No. Then, I don't care about it. Let's go back again.

5.1.4. Navigational strategies

Because the participants of this study were all skilled users of the Internet, they utilized various navigational strategies and coped with problems navigating through Web pages well. Though they coped with the problems, it was possible that those problems caused some cognitive burden on them while they kept carrying out the task they were assigned to. These navigational strategies should be looked into more precisely in relation to the cognitive load readers have to handle when they are involved in hypertext reading. Some examples of the navigational strategies participants utilized in this study are illustrated below.

Miki clicked a link but the page was not found. She did not become irritated at all and changed her mind to read another page quickly. She commented in her interview that she experienced those situations so often when she navigated through the Internet that she was accustomed to them.

Akiko experienced that a picture did not appear in a page. She felt that the article was rather difficult for her to understand and the picture would help her understand the content of the article. Therefore, she tried to reload the picture and after a few trials she succeeded in retrieving the picture on the screen. According to her comment in the interview, she was used to such a situation and she knew well how to cope with that situation with her favorite browser software.

Yuta got lost and didn't know where he had already finished reading, when he scrolled down along a long article. He took some time to identify the point. This seems a less common problem when reading text printed on paper.

Momoyo thought that she did not click a link effectively, when a new window opened behind the currently active window. She noticed it immediately and changed the active window into a new one. She also noticed that special software was necessary when she tried to listen to Aboriginal music. Therefore, she was not troubled by the situation and went back to the information search without delay.

Yasue utilized multiple windows by keeping them open simultaneously to retain the information in different pages. After spending some time comparing the information in several pages, she judged whether to keep the window open to retain the information or to close it.

Taro noticed that the highlight of a link to a Web page that he thought he had not visited had changed into the one showing that the page had been visited before. He felt doubt about it, but he decided to click the link anyway.

5.2. Task A (browsing, skimming and careful reading)

The behaviors of the three participants who were assigned to Task A are compared in terms of browsing, skimming and careful reading. Miki and Yuta carried out skimming through some articles before deciding on one specific article to read carefully, while Akiko chose one article to report from the titles of the articles listed in the top page without clicking to open any other articles from the list. Miki chose an article about a soccer game; Yuta chose the one about the discussion over a public execution in Thailand and Akiko chose the one about a TV program called "Reality TV". Akiko commented in her interview that she was sure that the article she chose was the only one she could understand well enough to

report to the researcher after the session.

Miki tended to be involved more deeply in decoding the sentences, as she commented about unknown words more often than Akiko and Yuta did. On the other hand, Akiko and Yuta activated their background knowledge and showed their opinions about the content of the article they were reading more often than Miki did.

5.3. Task B (searching and scanning)

The behaviors of the three participants who were assigned to Task B are compared in terms of searching and scanning. Taro tried to use the subcategories of the menus in the top page of the search engine, while Momoyo and Yasue typed in a key word directly. Taro could not use the subcategories successfully after all, so he had to come back to the standard way of using the search engine, to type in a key word in a search box. He worried too much that he would receive too many search results if he typed in a key word directly. Because he took time for checking the subcategories of the menu, he could not spend enough time on searching the definite information he needed to find.

Furthermore, Taro used “Aborigine” as his first key word after spending almost half of the assigned time searching for the information, while both Momoyo and Yasue typed in “Australian Aboriginal language(s)” that led them into more relevant pages smoothly. Yasue was so efficient in locating the information and judging whether a page would be useful for her purpose that she had enough time to try other key words such as “endangered languages”, “Western colonization”, “Western settlement” and “Australian Aborigines”. She had background knowledge in linguistics, thus she seemed to be able to think flexibly in approaching the search by picking up different key words.

Yasue was the only participant that compared and integrated the information from several Web pages she read during the session. She commented in the early stage of the

session, “The answer is between 200 and 250, isn’t it? And half of them have lost.” She also commented around the end of the session as a summary, “I think I’ve finished searching the information. To summarize, there were between 200 and 250 languages, depending on the source”. The navigational strategy she used to keep multiple windows open for retaining information seemed to contribute much to her behavior as integrating and summarizing the search results.

5.4. Cognitive flexibility for reading hypertext

The unique behaviors that some of the participants took in this study are discussed. They seem to be connected with characteristics of hypertext. Having electronic nodes and links, hypertext systems inherently have connectivity and intertextuality (Rouet et al., 1996; Snyder, 1996; Ebersole, 1997; Hunter, 1998). Hypertext is also characterized by multi-linearity and openendedness (Kaplan, 1995; Landow, 1992).

As blocks of text are interconnected, there are multiple pathways in reading through hypertext. It has no mandatory starting point or absolute finishing point. Because of these characteristics, reading hypertext requires constant integration of new information and monitoring of understanding to guide decisions about what to read next. Readers need to make decisions about which content to access and what sequence to take including the starting point or the finishing point by clicking links.

This can be seen as a negative aspect of reading hypertext. It may cause a cognitive load when readers comprehend the content of hypertext. However, if readers have a high degree of cognitive flexibility, they can enjoy a new aspect of pleasure in reading that is not possible for reading print text. Hypertext allows readers to expand the interests by clicking links that lead into much more information both directly relevant and rather irrelevant to the original text. When readers are cognitively flexible enough to explore into further Web

pages by clicking links, they can come across unexpectedly attractive and useful information. The examples of the behaviors participants took in this study that seem to reflect this kind of advantage are reviewed below.

Akiko who was assigned to Task A went into a real estate search page after she had enough confidence in reporting the article about “Reality TV” in the entertainment section. According to her comment in the interview, she got interested in trying the real estate search, because she felt that she read the article enough to report to the researcher, though she knew that the search page was not directly connected to the task she was given. She seemed to enjoy using the search page very much and to learn a lot from the searching process.

Momoyo who was assigned to Task B started reading pages about Aboriginal English extended from the information about Aboriginal languages. She seemed to enjoy reading them from the bottom of her heart. She commented in her interview that the pages about Aboriginal English were so interesting that she forgot about the original task she had to perform, which was to find the number of Aboriginal languages. She confessed that she would often take this kind of behavior when reading hypertext on the Internet. She admitted that it was a very attractive aspect of reading hypertext to be able to expand her intelligent curiosity by clicking links she would find interesting.

Yasue controlled herself consciously to carry out the task she was assigned to, but she commented in the interview that it was difficult for her to restrict herself to reading only those pages that seemed to have relevant information she had to find. She was often tempted to go into the pages that interested her but seemed irrelevant to the task. As a matter of fact, she went into a page about a scholar named David Nathan, because she thought she had heard the name before. After she enjoyed viewing the pages including his name card even with laughter, she decided to go back to the top page of the search engine, commenting “Anyway it is not relevant, so let’s go back.” As a result, she succeeded in

carrying out the task, but her comment and behavior showed that she had the same kind of tendency as Akiko and Momoyo.

The behaviors that Akiko and Momoyo took and Yasue was tempted to take in this study should be given much attention when incorporating Web-based activities into the reading instruction in ESL classes. It is the extensive network of hypertext on the Internet that makes it possible for readers to expand the reading behavior guided by their intelligent curiosity. Instructors have to consider how to encourage students to fully utilize this unique aspect of the hypertext system, especially in the university level reading instructions. University students who are high intermediate or advanced levels of ESL learners have high enough ability to enjoy the cognitively flexible approach to hypertext reading both in their levels of English proficiency and in their levels of cognitive development. The effects of mastering the linguistic knowledge as well as the content knowledge become much greater when learners are motivated to read the material with active intelligent curiosity.

6. Conclusion

By investigating the actual behavior readers took while reading hypertext in this study, the strategies used for reading hypertext by ESL learners could be analyzed. Readers utilized various strategies such as cognitive strategies including local and global strategies, meta-cognitive strategies and navigational strategies.

Some of the strategies seemed similar to those used for reading print text, especially for reading a single text carefully. Others seemed to be influenced by the special condition assigned to the participants as a task to focus on other types of reading behavior than careful reading, such as browsing, skimming, searching and scanning. For example, in Task A, data show that participants often gave up reading an article because it was not interesting enough to be chosen as an article to report. That can be judged as a typical behavior only when

browsing around and skimming to find some interesting information. In Task B, participants decided to go back to the original page because it seemed not to have relevant information they had to find. That can be judged a typical behavior only when searching and scanning specific information among many sources. These strategies may not be utilized when reading a single text carefully. It was the multi-linear and open-ended characteristics of hypertext that required readers to utilize these intertextual strategies.

All the participants utilized several strategies unique to reading hypertext. These strategies are categorized as navigational strategies. Because all the participants in this study happened to be skilled users of the Internet, they successfully coped with some difficulties in navigating through the network of Web pages. The navigational strategies were mainly influenced by the characteristics of hypertext, especially by hypermedia. Some of the participants commented about pictures in the hypertext. The strategies were also influenced by the factors of reading multiple texts, the characteristics hypertext inevitably has. It is paraphrased as intertextual reading. They were also related to the factors as other kinds of reading tasks than careful reading, such as browsing, skimming, searching and scanning. The participants had to scroll up and down often, go into other pages by clicking links or change an active window in order to locate the information they needed.

The most significant finding from this study is that some participants expanded their intelligent curiosity over the extent of the tasks they were assigned to and voluntarily went into more pages to read, even though they understood that those pages did not contribute to the task directly. It is the characteristics of hypertext such as multi-linearity and openendedness that made those behaviours possible. However, those behaviours might also be possible because participants had high enough English proficiency to read more pages and high enough cognitive flexibility to pursue their interests. These have considerable implications for further research and practical applications in the ESL reading instruction.

Though this study has some new findings concerning strategy use for reading hypertext by ESL learners, these findings have not yet been fully integrated into a comprehensive taxonomy of strategies utilized when ESL learners read hypertext. Further research is necessary to investigate this topic to integrate all the previous research achievements about reading strategies and hypertext into depicting a holistic structure of strategy use for reading hypertext by ESL learners.

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