HOW ESL LEARNERS WITH DIFFERENT PROFICIENCY LEVELS HANDLE UNFAMILIAR VOCABULARY IN READING

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Abstract

This article presents findings from research into spontaneous vocabulary handling strategies employed by a sample of 20 Singapore secondary students from a typical neighborhood school. Following the definition of the term 'strategy' referring to a specific action or step, I identified 21 types of strategies used by the participants, and compared the way the high and low proficiency students employed them by comparatively examining the majority usage strategies of the two groups. To find the evidence of their strategy use, think-aloud protocols paired with immediate retrospective interviews and general interviews when necessary were analyzed. The study showed that the students mobilized multiple strategies on individual words and that the high proficiency students used strategies both more flexibly and effectively than their low proficiency counterparts. The differences in the use of strategies between the groups suggest a need for learner strategy training and awareness raising, an issue which is also discussed in this article.

Keywords: vocabulary handling strategies, think-aloud protocols interviews

INTRODUCTION

Reading is the primary means by which academic knowledge is transmitted and research on vocabulary handling strategy in reading has received rigorous scrutiny. However, Ruddell (1994, p. 423) claims that "very little of the research on procedural vocabulary knowledge addresses the question of how learners learn words strategically from the learner's point of view, …" and McDonough (1999, p. 14) repeats this appeal in his state-of-art article, stating "at the most basic level, there is a mass of work on reading and writing, but far less on natural vocabulary learning…" This

appeal is largely due to the fact that the general strategy under the denomination of guessing or inferencing holds the lion's share of attention.

Viewing vocabulary learning in reading as a dynamic process involving metacognitive choice and cognitive implementation of a whole spectrum of strategies, researchers in recent years adopted a more natural process-oriented view of vocabulary learning in reading. Parry (1997) presented two reading and vocabulary handling 'portraits' by analytically comparing the think-aloud data of the two students, a Greek, Dimitri and a Korean, Ae Young. She came up with the conclusion that they employed quite different strategies with the Greek speaker adopting the holistic approach and the Korean an analytic one. When Dimitri glossed a word, he did not like to isolate it, but to interpret the larger unit in which it appeared. But the Korean student, Ae Young, was more likely to give as a gloss a single word or phrase that could replace the one in question. The holistic approach seemed to help Dimitri to read more easily and more fluently. But though Ae Young read much slower, stopping at more words, she used dictionary more and with greater familiarity. Intriguingly, the percentages of the words glossed 'correct' and 'partly correct' by Ae Young were obviously higher. Besides, Ae Young performed better on both the pre-test and the post-test and got a better grade on the anthropology course, though Dimitri did all the course reading and attended most of the lectures but Ae Young actually read very little of the text. This suggested that neither approach of the two students was fully satisfactory, based on which Parry concluded that ESL teachers should spend more time on metacognition discussing the advantages and disadvantages of the two approaches of vocabulary learning and comprehension in accordance with particular circumstances and purposes.

Harmon (1999) examined the vocabulary handling strategies two proficient middle-school readers employed to understand unfamiliar words in their self-selected reading in a seventh-grade literature-based reading classroom in the U.S. Methodological tools for his study were verbal protocols, formal and informal interviews and written questionnaires. In data analysis, Harmon adopted the constructs of text-based reference location, content connections, word-level analysis and dictionary use. The location of text-based reference was further divided into distant context and local context, and content connections into ideas beyond the text, knowledge of story line, and focus on immediate events and language structures. Data analyses revealed quite a few similarities between the two capable readers: Both of them employed multiple strategies to gain knowledge of new words including making use of distant and local context, drawing on different types of content connections, doing word–

level analysis, using syntactically appropriate synonyms, and as a last resort, using the dictionary. In all cases, they drew on analyses of events surrounding the problem words, i.e. local context, to construct meanings but rarely made use of distant context. Nevertheless, the two students obviously differed in the use of content connections. Marian, the girl student, was more global, preferring to use her knowledge of story to help with individual words, whereas Shawn, the boy student, was more analytic, mainly relying the immediate content by using his knowledge of sentence content and language structures to construct word meanings. As for dictionary use, both students claimed to use the dictionary as a last resort. Marian used the dictionary with five words (n=10) and Shawn looked up six words (n=18). Dictionary entries compatible with their meaning constructions served to confirm their inferences. When interacting with incompatible word definitions, they tended to superimpose their initial impressions of the words over the dictionary definitions.

The above studies have cast much light on how ESL learners encounter unfamiliar words in reading and revealed some insights into why learners achieve what they achieve and thus offered some practical and insightful pedagogical insights for L2 instructions. Nonetheless, the studies have only focussed on case studies. One cannot help but wonder whether these hand-picked qualitative case studies, instead of being typical, were idiosyncratic. Furthermore, the term strategy has been used inconsistently. While Harmon (1999) apparently refer to strategies as specific actions, Parry (1997) uses them to indicate general approaches. What would be the result with more students studied, especially with their total think-aloud protocols systematically coded and tallied by referring strategies as specific actions or steps (Cohen, 1998; Oxford, 1990)? What would be the differences in strategy use between learners of different proficiency levels? Since there is little published literature on these questions and these questions are important to look at before practical implications are to be drawn, this study is to fill in this gap in particular.

THE CURRENT STUDY

Research was conducted into vocabulary handling strategies among a cohort of Singapore secondary three students. The results reported here were to answer the following two research questions:
  (1). What vocabulary handling strategies do ESL students employ in reading?

(2). Are there any differences in the use of the strategies among high and low proficiency students?

Subjects. Ten high and ten low proficiency secondary three students were selected from the Express Stream, the good cohort and the Normal Stream, the poor cohort, respectively in a neighborhood school of Singapore through discussions with their teachers and were approached individually for their willingness to participate in this study. In the student selection, their final Secondary Two course grade of English and their teachers' evaluation of the students' verbal ability were major considerations.

Method for data collection. The major data collection method was verbal report. This process of individuals' observing and reflecting on their thoughts, feelings, motives, reasoning processes, and mental states is one of very few data collection methods available for going beyond observable behavior and attempting to access the underlying mental processes that determine the behavior (Nunan, 1992).
Although verbal report has received increased attention and use in reading research in recent years, it is not without criticism (Pressley & Afflerbach, 1995). Some challenges to this method as a data source have focussed on differences in task parameters, inferences researchers make about cognitive processes based on written transcriptions of oral language, and the guiding prompts researchers use to encourage talk and extend students' ideas (Pressley & Afflerbach, 1995). However, the validity and reliability of introspective data can be improved substantially through training of participants and the consistent use of procedures.

Material. The passage used in this study were selected from among a total of seven passages that are chosen for pre-testing with the target grade students taking consideration of proper density of unfamiliar words, primary word classes and the subject background knowledge. First, the selected passage must contain a number of words unknown to all informants. However, the new word density should not be too high. Laufer (1997) claims that readers need sight recognition of at least 95% percent of the words in a text for it to be comprehensible enough for the meaning of unknown words to be inferred. That means the new word density should be less than 5%, otherwise the students would have difficulty understanding it. Second, primary word classes should be represented. Of the likely unfamiliar lexical items, all the three first and foremost word classes, i.e. noun, verb and adjective, should be represented. Adverbs are not emphasized since they lacked variety in the text. Thirdly, the subject

discussed in the passage should not be beyond the knowledge scope of the participants. A conceptually difficult text would most likely conceal their vocabulary handling strategies employed by the students because their attention which should have been paid to unfamiliar word processing would be distracted by their lack of thematic knowledge. Besides, the topic of the passage had to be something close to the participants' interest.

To discover the unfamiliar words in the passages, all the seven passages were xeroxed sixteen copies and distributed to eight Express students and eight Normal students who were requested to underline all the new words to them. Besides, *Wordsmith Tools* (Version 2.0) was employed on each of the seven passages to list all the words used in them and then these word lists were presented to students of the target grade to assess their understanding. This measure was taken because of two concerns. First, it is believed that the contextual information sometimes may be so redundant that readers may ignore unfamiliar words in the passages (Coady, 1993; Hulstijn, 1993). Second, if a subject thinks s/he has succeeded in figuring out the meaning of an unfamiliar word, s/he won't identify it as unknown. Thus, another eight Express students and eight Normal students were requested to read through the seven word lists and tick the unfamiliar words. Then the averages of the unfamiliar words in the seven passages were calculated through addition and division. The fifth passage *Is the computer a threat to man?* (see Appendix) (Menon, 1998) was chosen because it was the best choice based on the aforementioned considerations. This passage reviews the implication of the chess match held in 1997 between then the world best-known chess master Kasparov and the supercomputer, Deep Blue. The subject was not unfamiliar to the students who were asked to identify unfamiliar words through reading. Thus, it was assured that the participants did not lack background knowledge on the subject. The passage had an average of thirteen unfamiliar words for the Express students and seventeen for the Normal students, thus, the new word densities for the Express and for the Normal students were 2.33% and 3.1% respectively. Both the subject background knowledge and new word densities suggested that the passage was within the scope of the students' usual reading, with little possibility that they would be frustrated. Texts too difficult for subjects might only force them to resort to survival strategies of wild guessing (Johnson & Yau, 1996), which was not the aim of this study.

Following established methodological recommendations for increasing the likelihood of obtaining reasonably complete and accurate self-reports (Pressley & Afflerbach, 1995), the target passage was broken up into meaningful segments, normally according to sentences or clauses.

Theses segments were separated with intermittent red strokes, which acted as constant reminders for the participants to stop reading and verbalize their thinking processes.

Word knowledge scale. As a specific measure to more accurately determine the unfamiliar words in the experimental passage to the subjects, a list of presumably unfamiliar words was drawn up from the selected passage. The word list comprised the words identified as unfamiliar by the students in the course of choosing the passage for the experimental purpose and other potentially unknown words selected from *Wordsmith Tools* entry list according to Hindmarsh's (1980) *Cambridge English Lexicon*.

Then a table of word knowledge scale was made with the word list. After the word list column, there were another three columns, labeled as "I don't know it", " I sort of know it," and I know it well". This word knowledge scale table was administrated to the subjects a week before the think-aloud and the subjects were asked to rate how well they knew the words. The words the subjects indicated as "I sort of know' and "I don't know' would be more closely followed in think-aloud. The merit of this practice was to reduce the number of words to be closely followed to manageable proportions without eliminating a reasonable number of potentially unknown words.

Procedures. Prior to the verbal report procedure, I made an interview schedule, according to which I got acquainted with a participant and administered the word knowledge scale about one week ahead and made an appointment with him for the thinking-aloud in the following week. During the think-aloud session, I made another appointment with him for the general interview and my feedback.

The interviewer reiterated the purpose of the research project before the think-aloud session and asked the participants to imagine that they were doing reading on themselves after class, such as in a study or their school library where the actual interviews took place. The students were requested to do what they usually did with a reading assignment and report aloud everything that came into their mind while reading through the passage regardless of how trivial the thinking processes might seem. They were not supposed to describe or edit their thinking processes. The language they used for reporting could be either their mother tongue, or English or a mixture of them so far as they felt at ease. Then came the think-aloud training. The first task was to describe what they were thinking about while looking at a colored picture. Further practice

involved think-aloud reporting while reading a passage similar to the experimental one

Following the training exercises, concurrent think-aloud protocols were collected for all the subjects as they carried out the reading and think-aloud task. During this session, the subjects had access to the dictionary *Cambridge International Dictionary of English* (1995) available in the school library. Besides, a blank sheet of paper was provided for the subject to take notes if he wanted. While the subjects were carrying out the reading and think-aloud task, the interviewer took down notes, asked for clarifications, prompted the students during quiet periods with guiding prompts to encourage talk and to extend students ideas with the focus on the content of their thought. Examples of these dialogic prompts were "Tell me more", "Go on, please", "How do you say that?" and "What makes you say that?"

In the immediate retrospective interview, based on the field notes, questions on uncertainties and particular responses were asked. For example, "You looked puzzled on this sentence, why?" "Why did you put your finger on that word?" "I could see you were shaking your head when you went through this sentence, but you did not report on this, can you tell me why you shook your head then?" The last step in the immediate retrospective interview was to go through the passage again with the participant to check whether he or she had ignored or neglected some unfamiliar words while reading and thinking aloud. In the final general interview session asked were questions prompting the participants to reflect on how they generally encountered unfamiliar words in reading and how to expand their vocabulary stock in general. I audiotaped each think-aloud session and the immediate retrospective interview.

Coding data. After the participants' verbal reports of thinking-aloud and immediate retrospective interviews had been transcribed verbatim, the transcripts were coded for vocabulary handling strategies. In this study subscribed to was the definition of strategies as specific actions, steps, techniques, physical behaviors or mental operations consciously or subconsciously employed by learners to improve their learning (Cohen, 1998; Oxford, 1990). To be free from preconceptions emerging from other studies in the literature, all the printed transcripts were treated in the following steps: (1) They were read carefully several times to obtain an intuitive picture of possible patterns in the students' strategic moves. At this stage I did not label these as strategies. (2) These initial impressionistic patterns were noted instead of being labeled offhand. (3) Similarities and differences in such patterns were identified, and (4) I

reflected on similarities and differences between the patterns, and the extracts in the transcripts were labeled for strategies.

Specific measures were taken to improve the reliability of the coding. One measure was to put the results of the coding aside for three months and then I coded the data again. The code-recode agreement was 86%. The reliability of the codes was further confirmed by an independent coder.

RESULTS AND DISCUSSION

The students' verbal reports of thinking-aloud and immediate interviews yielded a great deal of data because all of these took place when their mental processes of tackling new words were still in their STM. The process of coding identified a total of 21 strategies invoked by the subjects when they handled unknown words encountered in the experimental reading. Some strategy types may overlap to some extent, but such overlapping may project a more realistic picture of the students' vocabulary handling process. Table 1 presents an overview of the repertoire of the vocabulary handling strategies.

Table 1: Vocabulary handling strategies employed by the students

Strategy	Description	Sample responses
Assessing word (Assessing)	The subject evaluates the importance, difficulty or ease of an unfamiliar word.	S6: "…equipped with technical prowess …Prowess is a very nice word…I have to look it up."
Using general knowledge (General knowledge)	The subject makes use of his or her general world knowledge trying to decipher a new word.	S19: "In science fictions, people often become slaves of computers, so I think obsolete means slave …"
Using main idea (Main idea)	The subject uses the main points of the paragraph or passage to guess at an unfamiliar word.	S1: "The whole paragraph talks about that computer can not do without man. So I guess obsolete here means useless."
Using wider context (Wider context)	The subject tries to infer the meaning of a new word using the context outside the sentence in which the word occurs.	S2: "Last paragraph mentioned that Deep Blue is a supercomputer. Here Deep Blue may be equipped with technical prowess, technical prowess must mean technical advantage."

Using sentence meaning (Sentence meaning)	This strategy refers to the fact that all the information that the subject makes use of to decode a new word occurs in the same sentence in which the new word appears.	S9: "*According to the meaning of this sentence, revamp should mean change.*"
Attending to part of speech (Part of speech)	The subject makes use of the grammatical class (e.g. verb, noun, adjective etc.) of an unfamiliar word to as an aid to make sense of it.	S5: "*Propel in this sentence is a verb, indicate an action, I guess, it means enter.*"
Clue word association (Clue word)	The subject uses collocation knowledge or association to guess at a new word.	S17: "*Last sentence said that the chess match caused 'a stir'. So it attracted many people's attention. …so speculating means being attracted.*"
Attending to word structural analysis (Structural analysis)	The subject uses etymological and/or morphological knowledge understanding to guess at unknown words.	S1:"*I know computer. Supercomputer should mean a very powerful computer. Like in superman, supermarket, super means very strong, very good, etc.*"
Using audio-familiarity (Audio-familiarity)	The subject tries to guess at an unfamiliar word through pronunciation or sound similarity.	S15:"*Perishable items, perishable, …people say perishable goods. The two* (words) *should be the same word.*"
Rereading	This strategy refers to the subjects' act of repeating the target word out loud or rereading it several times, perhaps in order to buy time, in an attempt to retrieve it from phonetic or graphic clues.	S19:"Vulnerable to unpredictable human behavior. *Vulnerable to, vulnerable, hmm, I think is something like sensitive to.*"
Delayed reprocessing	The subject approaches a handled word later again.	S4:"*Contemplate means think about. In the previous paragraph, the word, speculate, I said it means 'talk without knowing.' Now, I think the two words*

		have the same meaning. Both of them mean think about.”
Checking against context (Checking)	This is the process of checking and confirming how well one's inferred or consulted meaning.	S2:“*Let me look at the sentence again.*”
Self-evaluation	This strategy refers to the attempt of the subject to determine the outcomes of his word handling.	S8:“*I think that is right.*” S6:“*It makes sense.*” S15:“*I still don't understand.*”
Consulting	The subject consults a dictionary either to look up the meaning of a new word or to confirm the meaning of an unfamiliar word guessed.	S4:“*I can't guess it. I have to look it up in the dictionary. …*”
Negotiating	The subject tries to find the most appropriate meaning of an unfamiliar word in the particular context through trying to fit different meanings into the context when consulting a dictionary.	S5:“*…speculate…* (Consulting the dictionary) <u>to form opinions about something …to make guesses; …to buy and sell in the hope …to make a profit…</u> I think in this sentence the first meaning makes sense.
Shortening definition	The subject picks out part of the definition of an unfamiliar word looked up in the dictionary to reduce the information to be handled.	S14: “”Literally, (Consulting the dictionary) it means exactly”.
Reinforcing	The subject either tries to use a newly handled word actively or makes use of example sentences from the dictionary in order to reinforce his vocabulary learning.	S9:“<u>Reap, to cut and collect by hand…to obtain or receive …</u>**To reap what you have you sown.**”
Note taking	The subject takes down notes about a new word, usually after guessing or dictionary use.	S9:“*Let me take down this. …*”
Ignoring	The subject purposely pays no attention to an	S19:“*I understand the meaning of the sentence,*

	unfamiliar word.	*so I just skip this word* (obsolete)."
Recognizing the sentence structure (Sentence structure)	The subject recognizes the sentence structure or the author's organization of ideas.	S6:"*Amateur here, I think, is something like ordinary. But here* (indicating) *suggests a contrast. Deep Blue, you know, is a supercomputer, very powerful, but Kasparov also is no ordinary chess player.*"
Imagery	The subject says that an unfamiliar word leads him forming a mental picture about its meaning.	S13:"*The image of the word* (speculating) *leads me to the meaning of going around and around.*"

Based on the tallied occurrences of the twenty-one strategies identified, the two research questions proposed in this study were examined.

VOCABULARY HANDLING STRATEGY USE IN GENERAL

Table 2 shows the overall strategy use by the students after the total number of occurrences of each strategy was tallied.

Table 2: Overall strategy use by the students

Strategy	High proficient (N=10)	Low proficient (N=10)	Total (HP+LP:N =20)	Percentage (%)
Sentence meaning	58	64	122	23.19
Rereading	56	33	89	16.92
Clue word	23	42	65	12.36
Consulting	24	19	43	8.18
Note taking	14	8	22	4.18
Structural analysis	13	8	21	3.99
Audio-familiarity	6	13	19	3.61
Self-evaluation	13	5	18	3.42
Checking	14	3	17	3.23
Negotiating	13	2	15	2.85
Ignoring	2	12	14	2.66
General knowledge	9	5	14	2.66
Assessing	9	4	13	2.47
Shortening definition	5	7	12	2.28
Wider context	9	2	11	2.09

Reinforcing	10	0	10	1.90
Part of speech	8	0	8	1.52
Sentence structure	4	1	5	0.95
Main idea	3	0	3	0.57
Delayed reprocessing	3	0	3	0.57
Imagery	0	2	2	0.38

In Table 2, strategies in the left column are arranged in a descending order of total frequencies, so it is patent what strategies were more frequently used while what strategies were not.

Four strategies, the percentages of which were over 5% out of the total strategy use, could be arbitrarily regarded as most frequently used in this study. Among the four most frequently used strategies, *using sentence meaning* received the lion's share of attention. This strategy accounted for almost one quarter of the total strategy use and was 6.27% more than the second most frequently used strategy of *rereading*, whose percentage was 16.92. The next two frequently used strategies were *clue word* and *consulting,* the percentages of which were 12.36% and 8.18%. With the four frequently used strategies added, they accounted for 60.65% of the total strategy use, suggesting that the students relied heavily on only a small number of strategies, though their strategy repertoire consisted of twenty-one types.

Of the twenty-one strategies, there were six strategies, whose percentages in the total use were less than 2% and they could be arbitrarily regarded as the least frequently used group. These strategies were *reinforcing, attending to part of speech, recognizing sentence structure, using main idea, delayed reprocessing* and *imagery*. Their use percentages in the total strategy use ranged from 1.90% to 0.38%, and the total sum with all these five strategies added together was only 5.89%.

Between the two extremes fell a third group, comprising eleven strategies. They were *note taking, structural analysis, attending to audio-familiarity, self-evaluation, checking, negotiating, ignoring, world knowledge, assessing, shortening definition, wider context, reinforcing* and *attending to part of speech*. The frequencies of these strategies ranged from 4.18% to 2.09%.

The frequent use of *sentence meaning* supports the finding in the literature that students tend to decode unfamiliar words based on local context (Harmon, 1999; Huckin & Bloch, 1993; Roskams, 1998). Meanwhile, the high frequency of *rereading* confirms the finding that language learners use repetition frequently (Ahmed, 1989; Kletzien, 1991; Lason & Hogben, 1996). One remarkable finding that emerged from the frequency distribution was the use of *clue word association*. It was the

third most frequently used strategy in this study. This unequivocally suggested that these second language learners often used clue words in decoding unfamiliar words, as Kletzien (1991) and Roskams (1998) has observed. The frequent use of this strategy by the subjects in particular is most likely due to the wide use of English in their daily life.

The finding of *consulting* as the fourth most frequent strategy confirms the importance of dictionary attached to second language acquisition by many teachers and researchers (Krashen, 1989; Scholfield, 1997). This finding also indirectly confirms Schmitt's (1997) finding with Japanese learners of English. The fairly frequent use of dictionaries to some extent disproves the incredulity towards them shown by some authors (Bensoussan, Sim & Weiss, 1984; Fox, 1983; Honeyfield, 1977).

Note taking was also fairly employed by the students, though the students took notes in quite different manners, with some taking down only the word itself, part of the dictionary definition while others taking down the whole definition. The employment of this strategy implied a fairly high degree of metacognition concerning *note taking* on the part of the students, who realized the need to consolidate their learning through note taking. Besides, the strategy use frequencies also demonstrated that students often used strategies for analyzing linguistic features of the words. The students attended to *word structural analysis* 21 times, excluding quite a few cases in which the students mistook unfamiliar words for known ones just because of their formal similarity.

The infrequent use of some strategies in this study contrasts with the observations in the existent literature. For example, the little use of *imagery* diverged with the observations in Cohen and Aphek (1980). It is speculated here that this contrast was probably due to the materials used in our studies. It seems that studies based on isolated sentences with new words tended to identify strategies of creating mental pictures and imagery while few studies based on passages mentioned such strategies as in Gu (1994), Roskams (1998) and Harmon (1999). In this vein, some vocabulary handling strategies seem to be more spontaneously employed by the students while others like mental picture and imagery are used in more lab-like learning settings. This finding substantiated the warning sounded by McDonough (cited in Schmitt & McCarthy, 1997, p. 235) that though various tricks under the general denomination of mnemonics seem to help to learn words, "we should not get too carried away in our enthusiasm" for these strategies experimented with "until we see if they are used and useful in practice."

Taking into account the general strategy use pattern, the students mobilized multiple strategies per word handling cases. Table 3 shows the average number of strategies used on individual words.

Table 3: Number of strategies used per unfamiliar word

Group	No.	No. of strategies used	No. of words handled	Mean no. of strategies per word
High proficient	10	296	108*	2.74
Low proficient	10	230	130*	1.77
Total	20	526	238*	2.21

Excluding words abandoned and neglected for mistaken identity.

The twenty subjects invoked a total of 526 strategies to handle the 238 unfamiliar words they encountered in the experimental reading. This means that they used an average of 2.21 strategies per word. As for the effect of language proficiency on strategy use, the high proficiency students employed an average of 2.74 strategies per handled word while the low proficiency counterparts used 1.77 strategies.

The observation that the students concurrently employed multiple strategies on individual words is congruent with the finding of Lawson and Hogben (1996) and Harmon (1999) that language learners do not subscribe to a single strategy to handle and learn words. Rather, they tend to employ several strategies. Lawson and Hogben attributed the use of several strategies to the language learning experience of their subjects, as they all were adult learners of Italians. Based on the doctrine of constructivism that the external world exerts a strong influence on knowledge construction (Schunk, 1996), the explanation taking experience as a fundamental reason is plausible as well in the current study.

Firstly, the students' use of several strategies can be explained by the amount of input they received. Though these participants were secondary students, they had been educated mainly in English instructions for at least eight years. Besides the input in their classroom, they were exposed to a lot of input from daily communication and mass media, especially TV programs. Since English TV programs are as prevalent as, if not more prevalent than, programs in other languages, the subjects were exposed to English TV programs from very young. Thus, their experience of learning and entertainment formed a rich stock of prior knowledge and experience to draw on.

Secondly, the words themselves may contain morphological and etymological features that may have helped to evoke more strategies when the students were tackling them, which was reflected by the fact that quite a few students capitalized on their knowledge of word structural analysis.

In addition, from a constructivist point of view, the word may have different affective values interacting with the students' personal interests and past learning and life experiences (Vanniarajan, 1997), which may influence the number and types of strategies used.

The finding of multiple strategy use of diverse strategy types also confirms the assertion and description of interactive processing proposed in interactive models (Carrell & Eskey, 1988). The students processed unfamiliar words both through graphic recognition bottom-up analysis and through a high-level schemata top-down, knowledge-driven hypothesis-testing process. Furthermore, the finding is also in keeping with Elsout-Mohr and van Daalen-Kapteijn's (1987) description of mental functioning phases when coping with new vocabulary. According to their description, students tend to initially understand the word meaning, which requires the use of certain strategies, and then they move on to other strategies to reinforce their word learning.

STRATEGIC DIFFERENCES BETWEEN TWO STUDENT GROUPS

This study suggested that strategy use varied with proficiency levels, with the high-proficiency students mobilizing more strategies on individual words as aforementioned. This evidence confirmed the finding in quite a few studies that high proficiency students flexibly employed more strategies than low proficiency counterparts (Ahmed, 1989; Goh, 1998; Lawson & Hogben, 1996).

The high proficiency students seemed to have a bigger strategy repertoire at their disposal as well. Of the twenty-one strategies identified, the high proficiency subjects used twenty while the low proficiency students used seventeen. If six or more subjects out othe ten in each group reported a strategy and this strategy is counted as being a majority usage, the general tendency is a bit more revealing. Table 4 compares the handling strategies employed by the majority of the students in each group.

Table 4: Vocabulary handling strategies used by
the majority of high and low proficiency students

Strategies	High proficient	Low proficient
Sentence meaning	√	√
Rereading	√	√
Consulting	√	–
Clue word association	√	√

Self-evaluation	√	√
Structural analysis	√	√
Note taking	–	–
Checking	√	–
Ignoring	–	√
Negotiating	√	–
Assessing	√	–
Audio-familiarity	√	√
Shortening definition	–	–
General knowledge	√	√
Reinforcing	√	–
Wider context	√	–
Part of speech	–	–
Main idea	–	–
Sentence structure	–	–
Delayed reprocessing	–	–
Imagery	–	–
Total	13	8

The majority of high proficiency students invoked thirteen strategies while the majority of the low proficiency students employed eight strategies, with seven majority usage strategies shared across the two groups. In terms of the different majority usage strategies employed by the two groups, the majority of the high proficiency students mobilized *consulting, negotiating, checking, assessing, wider context* and *reinforcing* while the majority of the low proficiency students used *ignoring*.

The comparison of the majority usage strategies employed by the different groups of the students projects some manifest differences in vocabulary handling strategy use between the two groups. First, the high and low proficiency students differ in the employment and deployment of metacognitive strategies. While the high proficiency students were more prepared to attack new words head-on and more actively monitoring their vocabulary handling processes, the low proficiency students were more likely to steer clear of unknown words. Based on the established taxonomies of learner strategies (O'Malley & Chamot, 1990; Oxford, 1990), *checking, assessing* and *ignoring* are metacognitive strategies, which involve the fundamental processes of planning, monitoring and evaluating. Whereas *assessing* is a metacognitive strategy by which the students decide in advance which word to pay attention to, *checking* suggests the awareness of whether an unfamiliar word has been successfully handled and whether any more remedial or corrective actions should be taken. The more employment of *checking* and *assessing* by the

high proficiency students substantiates the finding in the current literature that good L2 learners have more metacognitive control over their reading and learning process (Gu & Johnson, 1996; Goh, 1998).

One intriguing finding in this study rests with the metacognitive strategy of *ignoring*. Whereas the high proficiency students did not often ignore unfamiliar words in reading, the low proficiency students manifested a much clearer tendency. It is speculated that that the low proficiency students were more ambiguity-tolerant than the high proficiency ones. This conjecture is in keeping with the observation reported in Goodman (1996) that many readers, even in graduate classes, still believed that it was cheating to skip words and that good readers knew every word and remembered everything they read. From the perspective of information processing theory that learning can not take place without attention (Schmidt, 1990), ignoring definitely is of no help to vocabulary building. In this vein, this deduction does not support the view of Ely (1995, p. 94) that language learning students should be empowered with a fairly high ambiguity tolerance and "that uncertainty is really an opportunity to discover something new about the L2", though she is of the opinion that a high tolerance of ambiguity would be a troubling symptom.

The second difference in the majority strategy use between the two groups is that the high proficiency students appreciated the value of dictionaries more than did the low proficiency counterparts. It seems a bit thought-provoking that though the high proficiency students came across fewer unfamiliar words in the experimental reading than the low proficiency, the majority of the high proficiency students made use of the dictionary provided while the low proficiency ones did not. The majority use of consulting on the part of the high proficiency students confirms the importance of dictionaries attached to L2 learning by researchers (e.g. Huckin & Bloch, 1993; Krashen, 1989; Scholfield, 1997) and by experienced expert learners (e.g. Wiltshire, 1999). The difference in dictionary use between the two groups did not stop at the frequencies the students resorted to the dictionary provided. The high proficiency students were more actively engaged in integrating dictionary meanings back into the context of unfamiliar words looked up through negotiating and more actively made use of dictionary examples to reinforce their new word learning. This observation is compatible with that of some other authors (e.g. Goh, 1998; Gu, 1994) that students with different abilities differ in the quality of their strategy use.

The third difference in relation to strategy use between the high and low groups is that the high proficiency students employed more strategies from the perspective of global understanding than did their low

proficiency counterparts. Though both groups most frequently fell back on strategies dealing with immediate context around targeted unfamiliar words, such as local sentence meaning or clue word, the high proficiency students employed more strategies coping with wider context. This disparity is also likely due to their diverse degrees of metacognitive control of the two groups. The better metacognitive control of the high proficiency students helps render their reading processing more interactive. As Grabe (1988) has stated that whereas the high proficiency students frequently shifted their modes of processing, accommodating to the demands of a particular situation, the less skilled readers tended to over-rely on processes in one direction. Besides supporting the finding of Garner (1981) that poor learners tend to process text in piecemeal manner, this variation in strategy use corroborates the position assumed in interactive models in relation to successful reading (Carrell *et al*., 1988).

As a whole, the high proficiency subjects show better metacognitive awareness than the low proficiency subjects. The high proficiency subjects made more use of *assessing* and *checking against context*, which are generally regarded as typical metacognitive strategies. Besides, they also more frequently invoked *wider context, negotiating, consulting, reinforcing* etc., the employment of which uncontrovertibly heavily depended on the governing and guidance of their metacognitive knowledge. This conclusion is in line with the findings of some other studies (e.g. Goh, 1998; Gu, 1994; Gu & Johnson, 1996) that good language learners used more metacognitive strategies than poor learners and metacognition is a crucial factor involved in language acquisition process in general.

CONCLUSION

This study revealed that the students reported a relatively wide range of vocabulary handling strategies in reading. Nevertheless, the students, especially the low proficient, tended to fall back on a small number of them, which is congruent with the observation of Kletzien (1991) that learners strategy knowledge differs from their strategy use. This means that learner strategy training is necessary. Learners should not only be exposed to empirically proven effective strategies, but also be trained to improve and actively mobilize their existent strategies by raising their strategic awareness. We can do this by creating opportunities for learners to examine their vocabulary handling processes and share their observations with others in class or by asking them to keep a learning diary (Goh, 1998). Thus, the curriculum for reading should therefore incorporate strategy training and awareness raising by introducing special

activities for learner training (Cohen, 1998; Goh, 1998). Following the philosophy of learner-centered constructivism, it seems that the technique of teacher modeling followed by learner practicing would be well suited to improve students' contextual vocabulary handling strategies.

This study also came up with a key difference in the metacognition of the two groups of the participants. The fact that the high proficiency students have better metaciognitive control over their vocabulary handling was not only reflected by their higher employment frequencies of specific metacognitive strategies but also by the skilled manipulation of strategic approaches in the learning process as a whole. The majority of the high proficiency students utilized *checking* and *assessing* more frequently than the low proficiency ones. Besides, the strategy implementation of the more interactive nature on the part of the high proficiency students and their more frequent dictionary use all suggest that metacognition is crucial in the effective learning. As Williams and Burden (1997) have rightly pointed out:

Why are some people more effective at learning than others? Effective learning is not merely a matter of an individual having a high IQ. What appears to be important is the learners' ability to respond to the particular learning situation and to manage their learning in an appropriate way. Studies of successful and unsuccessful learners show that people who succeed in learning have developed a range of strategies from which they are able to select those that are most appropriate for a particular problem, to adapt them flexibly for the needs of the specific situation, and to monitor their level of success. (p. 146)

In this light, metacognitive knowledge affects strategy employment and deployment, thus problem solving — unfamiliar word handling in this case — and general learning efficacy as a whole. Thus, the need to raise metacognitive awareness wins more ground for incorporating strategy training in learner's curriculum.

Another concern this study raised is that students should be encouraged to use dictionaries. The current literature (Gu & Johnson, 1996; Huckin & Bloch, 1993) suggests that vocabulary size positively correlates with learners' English proficiency. Nevertheless, general meaning extraction from reading a text does not effectively help vocabulary building in accordance with information processing theories. In this vein, ignoring unfamiliar words in reading might do more harm than good to the students at initial and intermediate stages so far as vocabulary learning is concerned. Thus we have to reconsider the position that language learners should be fairly ambiguity-tolerant (Ely, 1995). Besides, the ability to exploit contextual clues is not enough in itself, as shown in

Wang (2000), since there were no contextual clues to be exploited for many words. Thus, there seems to be no escape from dictionary use.

However, the evidence gleaned in this study substantiates the claim of Wiltshire (1999) that students cannot be counted on automatically to consult a dictionary if they do not understand a particular word. Indeed, the majority of the low proficiency students seldom consulted their dictionaries and a low proficiency student even articulated that his dictionary had "become rusted" at home. They seemed to prefer ignoring or wild guessing unfamiliar words to looking them up in dictionaries. However, this was just vise versa with the high proficiency students in this study and some others (e.g. Goodman, 1996). What we cannot but worry is the skeptic attitude towards dictionaries of quite a few English teachers informally interviewed during this study and described in some others (e.g. Harmon, 1999). These teachers, instead of encouraging dictionary use, actually discourage their students to use it as "the last resort" for fear that consulting dictionaries will disturb their flow of thought and comprehension. Nevertheless, the study of Wang (2000) indicated that without understanding unfamiliar words, students did come up with their own contextual interpretations about sentences, but these interpretations frequently were insensible or irrational. The misunderstandings of local contexts inevitably would affect the students' overall comprehension. Thus, by overlooking dictionaries, language learners are in danger of neglecting an invaluable study aid.

In brief, though we have not known enough about the causative relationships between strategy use and language proficiency, "there is strong evidence to show that what learners know about their learning can directly influence their learning process and the outcome of it" (Goh, 1998, p. 144). Our latest hope to help our students lies in strategic training by helping them develop greater metacognitive knowledge about their learning process in various learning aspects. In doing so, learners can improve and apply their strategies accordingly and effectively approach complex learning tasks, such as unfamiliar word handling in reading. This means helping learners to have a better understanding of how their learning is affected by their cognitive styles, strategies, motivation and other personal factors. It also means helping learners make informed choices about how they can autonomously develop their learning competence on their own, for instance, by making use of own reference books. As Goh (1998) has convincingly argued, learners who are aware of the learning processes that can contribute to success in learning will be in a better position to develop flexibility in the use of effective strategies and find personally suitable ways for systematic practice outside the classroom.

Notations used for transcribing the data

Normal   original text
<u>Normal</u>.   reading dictionary entries
<u>Bold</u>   dictionary examples
Italic   subjects' talk
 …   omission
(   )   observation

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APPENDIX

Is the computer a threat to man?

Computers have always provided great convenience to man and as we are propelled into the new millennium, this form of convenience is likely to reach new heights. Personal computers are becoming more affordable every day and as every household goes on-line, many facilities can and will be literally brought to our doorstep. Shopping, even for perishable items like groceries, will be just a click away as people can order and pay for their goods through their personal computers at home. Children will also be able to study using the abundant pool of information that is stored in the computer while more and more adults will hook up their home terminals to the office and work from home.

With the great convenience computer has brought, however, many fear what is the threat that computer poses to humanity. In order to fully exploit the age of Information Technology, mankind will inevitably need to revamp his lifestyle. This is not something that everyone is willing to do, and in effect, many also fear the day when computers will replace man. This concern has become all the more valid and understandable now, due to the triumph of the supercomputer, Deep Blue, over Garry Kasparov, who is regarded as the best human chess player in the world.

Deep Blue may be equipped with technical prowess but Kasparov is no amateur chess player either. He too has his own methods of calculation, pattern-recognition and strategy that are essential to chess. He also has two things that Deep Blue does not and that is experience and intuition. Thus, it appears that the only thing standing in the way of Kasparov's victory is his humanity. As a human being, Kasparov is completely vulnerable to unpredictable human behavior at any one moment. All the reports reviewing the match pointed out that the man cracked under pressure and surrendered too easily, especially in his final game. Deep Blue, on the other hand, is a cold, hard machine, completely devoid of emotions. As such, it has the competitive advantage over any human player and can be totally relied upon. The results of the match, which caused quite a stir all over the worlds, has led to many speculating on the implications of Deep Blue's victory over humanity. And amidst all this worry that the computer is a threat to humanity, many have forgotten that Deep Blue's programmers are after all human.

While we contemplate the implications of the Deep Blue-Kasparov match and the strong reactions that it has evoked, we should remember one thing. The match was put forward in good spirit and serves to demonstrate the fact that computers have progressed far beyond man's imagination. Instead of worrying about how computer will take over the world, we should concentrate on how we can use its power to further

improve our lives. Computers by themselves are not much use and as long as man is needed to program these computers, there is no real danger of man becoming obsolete.

To fully reap the benefits that computers are capable of producing, computers need to be used alongside man and not against him. Society must also learn to stop regarding machines as a threat to humanity. Only then can we maximize the benefits of the computer and use it as a means to improve our standard of living and our lives.