

CHAPTER 2

REVIEW OF LITERATURE AND RELATED RESEARCH

To exemplify the promotion of vocabulary acquisition and retention while reading in a CALL context with which this study was concerned, review of literature and related empirical research were divided into three main areas. First, cognitive psychological views on second and foreign language vocabulary acquisition will be presented. Next, two types of vocabulary learning, intentional and incidental, will be reviewed, and finally CALL and vocabulary acquisition and related research will be examined.

2.1 Cognitive Views on Second and Foreign Language Vocabulary Acquisition

Language acquisition scholars have studied cognitive psychological frameworks such as noticing and attention, implicit and explicit learning, and levels of processing theory to explain how a word is acquired and learned (Ellis, 1995; Fotos, 1993; Schmidt, 1990; Craik & Lockhart, 1972).

2.1.1 Noticing and Attention

The question of whether there is learning without noticing and attending has arisen and researchers have been interested in the role of noticing of and attending to input in language learning. Schmidt (1990) proposes the hypothesis related to conscious learning. Three aspects of consciousness involved in language learning are (1) awareness at the level of 'noticing', (2) 'attending' in order to learn, and (3) conscious understanding. According to Schmidt's *Noticing Hypothesis* (1990), 'noticing' is a necessary condition for learners to transform input into intake. 'Paying attention', to what is to be learned is possible and effective in incidental learning. In addition, noticing and attending to a linguistic feature in the input have facilitative effects for conscious understanding.

Empirical research has shown that conscious attention and noticing is a necessary condition for learning. With regard to the noticing and attention aspects, Fotos (1993) was interested in raising learners' consciousness of grammatical structures and noticing the target structure in subsequent communicative input. In this study, learners' attention was drawn to formal knowledge of problematical grammar structures. After learners' consciousness of grammatical structure had been raised, they then noticed those structures in communicative input.

As for vocabulary acquisition based on noticing hypothesis, in order to draw the attention of learners to the input, some researchers have investigated the effects of noticing through input enhancement by means of highlighting target words in texts presented in CALL learning materials. De Ridder (2000) investigated the effects of highlights displaying a link towards dictionary definitions on the incidental vocabulary learning and reading comprehension. The findings of the experiment indicated that highlighted words attracted the readers' attention, and the amount of vocabulary incidentally learned by the readers was positively affected by highlighted words.

Reviewing the second language acquisition (SLA) and psychological literature on noticing, Cross (2002) has drawn attention to the fact that although there is a wide range of empirical studies in noticing in SLA, level of noticing in learning a language is varied. The assumption that noticing enhances language acquisition is challenging to researchers involved in intensive empirical research. Some researchers consider noticing as an important primary process in language development.

It should be noted that noticing and attention are considered indicators for successful learning in SLA both in non-CALL and CALL context. Therefore, based on Schmidt's *Noticing Hypothesis* (1990) a possible way of drawing the learners' attention to the input and the role of noticing and paying attention to a word form and meaning needed to be investigated.

2.1.2 Implicit and Explicit Learning

Not only the issue of noticing and attention but also the issues of implicit versus explicit learning have been discussed with relation to the question if vocabulary is acquired naturally or must be taught and learned. According to Ellis (1995), the processes of vocabulary acquisition are based on two alternative hypotheses: implicit and explicit learning.

Implicit vocabulary learning hypothesis holds that a new word form is acquired by experience as a result of frequency of exposure and is developed unconsciously. Therefore, implicit vocabulary learning occurs naturally, simply and without conscious performance. Explicit vocabulary learning hypothesis holds that the meaning of a new word is acquired with conscious performances of learners by noticing unfamiliar words, inferring the word from context, acquiring the definition from dictionary consultation, and repeating and associating learning strategies such as semantic or imagery mediation techniques.

Ellis (1995) claims that implicit learning and explicit learning take place in vocabulary acquisition. Learners are required to be frequently exposed to new word forms. Consequently, word features are learned implicitly and automatically. By contrast, the meaning of a new word is acquired explicitly with consciousness of processing at the semantic level.

It could be concluded that noticing with attention has an important role in both implicit and explicit language learning. Recognition of word forms is involved in implicit learning and acquiring and processing word meanings are involved in explicit learning. Thus, to succeed in learning vocabulary, learners should be encouraged to acquire a new word form implicitly and a new word meaning explicitly.

2.1.3 Levels of Processing Theory

One consideration in learning vocabulary is the association between information and memory. Atkinson and Shiffrin (1968) propose the memory system, which is based on the assumption that information is received, processed and stored differently for each type of memory: sensory, short-term, and long-term. Sensory

memory refers to a brief storage of sensory information (e.g. audio and visual materials). When information such as letters or numbers presented is noticed, it is held in the short-term memory. Information, which is attended to up to a certain extent, is stored in long-term memory.

In cognitive psychological studies, there has been a belief that the way in which information is processed determines the retention of information. Craik and Lockhart (1972) propose the *Levels of Processing Theory*. According to this theory, information can be processed at different levels called shallow and deep processing. Shallow processing refers to processing information only in terms of its surface structure such as, sound, letters, and shape. Deep processing refers to the process of fully analyzing information in terms of its semantic appropriateness in a sentence or the meaning category to which it belongs and its significance. *Levels of Processing Theory* holds that the deep processing of semantic analysis will lead to better memory than shallow level processing of a word form because when learners analyze for meaning, they may think of other related associations such as images and past experience related to the stimulus.

Craik and Lockhart (1986) believe that a deep level of processing encourages recall because of elaboration, which involves rich processing in terms of meaning. The representation of a word that is related to a greater number of things or other words helps recover the memory. In vocabulary acquisition, Schmitt and McCarthy (1997) suggest that one way to engage learners in deeper processing is through a task in which learners are engaged with the particular input until its meaning is clearly understood.

However, Laufer and Hulstijn (2001) indicate that there are two problems concerning levels of processing theory: (1) what exactly establishes a level of processing, and (2) how do we know that one level is deeper than another? For example, it is not clear whether oriented tasks involving thinking about pronunciation or spelling of a word can be meaningful activities or whether oriented tasks, which do not involve thinking about word meanings are meaningful activities. Moreover, theoretical explanations of phenomena of human learning and memory in terms of type, duration, and frequency of information processing are inadequate, and need further study (Laufer & Hulstijn, 2001).

It is important to note that the significance of information processing and memory has been related to vocabulary learning. Researchers have attempted to discover more effective ways of promoting a deep level of processing in vocabulary learning. Hence, elaboration of the information may determine the effectiveness of deep levels of processing. It could be said that effective vocabulary acquisition and retention should include tasks directing the learners' attention to a new word and elaboration of word meaning in order to promote depth of processing.

In conclusion, within the framework of cognitive psychology, methods used by teachers and researchers is an important consideration in the area of vocabulary learning in order to produce a more effective way to increase vocabulary knowledge.

2.2 Intentional and Incidental Learning

In the case of second and foreign language learning, there are two types of vocabulary learning: intentional learning and incidental learning. Hutch and Brown (1995) defined intentional learning as the type of learning that is designed or planned for learning of one thing with intent. To illustrate, learners are instructed to do activities focusing on vocabulary to develop vocabulary knowledge. On the other hand, they defined incidental learning as the type of learning that is a by-product of doing or learning something else. For example, learners are instructed to read or listen to authentic language and they learn vocabulary indirectly through working on comprehension tasks.

2.2.1 Intentional Vocabulary Learning

All activities that are prepared for vocabulary learning are categorized as intentional learning. In order to learn new words, learners make a conscious effort to memorize the words and their meanings.

Hunt and Beglar (1998) propose that one principle in developing vocabulary knowledge is providing opportunities for intentional learning. Reviewing the literature on intentional vocabulary learning, Hunt and Beglar (1998) conclude that for direct teaching of vocabulary, the word list method is appropriate for learners who need to learn the first 3,000 most common words.

However, most of research investigating the *Levels of Processing Theory* has not used intentional learning because, in intentional learning tasks, learners know ahead of time that their memories will be tested for what they are being presented with. Learners would try to deeply process the tasks so that they would perform well on the test. Therefore, research on levels of processing has employed a technique called incidental learning in which learners are presented with items without being told they are going to be tested on them later (Atkinson & Shiffrin, 1968).

In addition, in terms of retention of vocabulary knowledge, it is difficult for teachers or researchers to specify which factors or strategies promote vocabulary retention because when learners decide to commit words to memory, they may choose other strategies they feel more comfortable with instead of strategies such as key word method, and word-pair translations (Laufer and Hulstijn, 2001).

Although language teachers are aware of the importance of vocabulary in learning a language, it is impossible to spend most of the class time exclusively on direct vocabulary instruction. Hulstijn et al. (1996) point out that means of intentional word learning activities are restricted when learners have to learn new words in large quantities.

2.2.2 Incidental Vocabulary Learning

It is obvious that in incidental vocabulary learning, vocabulary knowledge increases partly from reading and listening activities. In second and foreign language learning, several researchers have paid particular attention to incidental vocabulary learning through reading (De Ridder, 2002; Kost et al., 1999; Hulstijn et al., 1996; Shu et al., 1995; Knight, 1994). In these studies, learners were typically instructed to perform reading tasks that involve processing vocabulary. Learners were not informed in advance that they would be tested afterwards on the recall of that vocabulary. The findings showed that learners learn a number of new words while reading for meaning.

Vocabulary can be learned incidentally through reading by means of guessing and inferring word meaning from context. However, learning of vocabulary through context is not always effective because of several factors such as, readers' false

beliefs that they know the words, readers' decision to ignore the words, readers' ignorance of the connection between a new word form and its meaning, and non-reoccurrence of new words (Hulstijn et al., 1996).

Several factors can promote incidental vocabulary learning: (1) the deep elaboration on the word meaning, (2) frequency of word appearance, (3) readers' attention to words, (4) readers' high verbal ability, (5) use of a dictionary, (6) provision of marginal vocabulary glosses (Hulstijn et al., 1996). In a non-CALL context, Luppescu and Day (1993) found that dictionary use while doing reading tasks assisted vocabulary learning. Students who used a dictionary while reading scored significantly higher on a vocabulary test than those who did not. In a CALL context, the study by Knight (1994) also showed that students who read a text and looked up unknown words in the dictionary remembered them better than students who read the text without the dictionary. However, looking up words in a dictionary requires the effort of searching and then choosing an appropriate meaning out of several possible ones.

Another way a learner can learn words is by using available glosses such as textual and pictorial glosses that provide the meanings of unknown words as they appear in context. To illustrate this, a study by Kost et al. (1999) indicates that a combination of text (English translation) and pictures in the gloss has positive effects on incidental vocabulary growth when reading a foreign language. They discovered that learners utilizing a combination of text and pictures in the gloss did better in remembering target words in both short-term memory and retention than those in two other gloss conditions: textual gloss only (English translation) and pictorial gloss only.

Hence, it could be confirmed that vocabulary learning is a by-product of reading. It should be noted that incidental vocabulary learning occurs extensively through reading in a first language. Therefore, incidental learning of words from reading, in particular, is quite a powerful means in second and foreign language vocabulary learning.

Above all, Laufer and Hulstijn (2001) suggest that intentional and incidental learning should not be confused with implicit and explicit learning in memory. Implicit learning only takes place incidentally, but explicit learning can take place

both intentionally and incidentally. Again, connection of a word form to its meaning, which is explicit learning, requires attention on the part of the learners, so vocabulary can be learned intentionally and incidentally when it is attended to.

2.3 Computer-Assisted Language Learning and Vocabulary Acquisition

At present, it is undeniable that a computer is a significant tool for learning in every discipline. In the area of language learning, several researchers have taken an interest in presenting language learning activities on a computer screen.

Exploration of effective pedagogical methods for vocabulary acquisition is continuing. One method that interests researchers and has been applied to second and foreign language learning is computer-assisted language learning (CALL). Researchers have attempted to improve the effectiveness of CALL activities in accordance with SLA theory (Hegelheimer and Chapelle, 2000; Chapelle, 1998).

Research by Chapelle (1998) suggests criteria for the development of multimedia CALL lessons as follows: (1) making key linguistic features salient by highlighting them in a different color, (2) offering modifications of linguistic input by repeating, simplifying, and restating, or offering opportunities for learners to request those modifications, (3) providing opportunities for 'comprehensible input' by posing questions, (4) providing opportunities for learners to notice and correct their errors, (5) supporting interaction between the learners and the computer through mouse clicks and hypertext links, and (6) providing L2 tasks for interaction.

It is apparent that salient input, output, and interaction are significant aspects in making CALL activities more efficient. Therefore, it should perhaps be pointed out that effective CALL material needs noticeable input and communicative tasks offering opportunities for interaction and production of output.

With regard to vocabulary acquisition, Ellis (1995) states that dictionary use is a direct way to learn the meanings rather than guessing from context. However, it is disadvantageous in that learners must stop their reading to access the printed dictionary to find the meaning of unfamiliar words, and select the appropriate definitions. This may cause loss of attention and is time consuming. CALL materials can solve these problems. When accessing a CALL program, learners can click on a

word in the text to obtain definitions in on-line dictionaries. This is faster than paper dictionary use. Furthermore, both the text and definitions are available side by side on the screen. As a result, the task of dictionary access does not interrupt the reading.

Accordingly, vocabulary development in CALL reading materials with a variety of lexical resources has been discussed. The focus is on investigation of the salience of 'noticing hypothesis'. Activities in CALL reading materials with a variety of lexical resources can be designed to permit learners to acquire vocabulary in written input through noticing unknown words, requesting modified input from lexical resources by clicking on them, and receiving modified input (Hegelheimer and Chapelle, 2000). Therefore, various types of conditions providing lexical information utilized in CALL reading materials should be investigated for their effects on incidental vocabulary learning and the role of noticing on vocabulary learning and retention.

As for conditions providing lexical information, researchers used a computerized dictionary and dictionaries provided online in their studies (Laufer & Hill, 2000, and Knight, 1994). Laufer & Hill (2000) used a computerized dictionary in a study on incidental vocabulary learning to investigate the relationship between computerized dictionary look up behavior and word retention by providing five lookup options: hear a word pronunciation, English meaning, L1 meaning (in Chinese and Hebrew), other forms of the word, and root. The subjects looked up unknown words by clicking on a word and chose the type of look up option. The computer was programmed to record the number of words each student looked up. There were 12 target words in the text. The study shows that students who used L1 together with L2 dictionary information had better retention, and that the use of a computerized dictionary has a positive effect on incidental vocabulary learning.

Knight (1994) instructed Spanish subjects to read the text under two conditions: with online dictionary access and without online dictionary access. Results of vocabulary tests and recall tests showed that students who used an online dictionary learned more vocabulary than those who did not.

Conversely, some studies in CALL reading with online glosses to assess noticing and retention of vocabulary yielded ineffectiveness of glosses (De Ridder, 2002; Koren, 1999). De Ridder (2002) conducted research to explore how the

highlighted hyperlink for glosses affected incidental vocabulary learning, text comprehension and the reading process. Sixty students (L1=Dutch; L2=French) participated in this experiment and were instructed to read an on-line text with glosses. Thirty students were assigned to read the text and take a text comprehension test after the reading treatment while the other thirty students were assigned to give an oral overview of what they read in the text and take the comprehension test after the treatment. The subjects in both groups could access the glosses by clicking on the defined word. Unlike her previous study in 2000 which yielded a positive result, the results showed that although the highlighted hyperlinks encouraged the readers to access glosses, it did not increase the amount of incidental vocabulary in immediate and delayed vocabulary tests. As for reading comprehension, there was no effect of highlighted or visible links on comprehension. For the reading process, the use of visible links did not slow down the reading.

Another example that shows ineffective vocabulary instruction through glosses is done by Koren (1999). She compared incidental vocabulary learning from inferred word meanings to that from glossed words. The subjects were required to read a text with 16 target words; seven blue words were linked to clues and were expected to be inferred from context, while nine red words were glossed at the end of the text. Subjects were given two vocabulary tests: three days and three months after the treatment. Koren (1999) concludes that retention of words learned through inference from context is higher than retention of glossed words.

Although researchers are interested in the use of CALL dictionary and glossed words in incidental vocabulary learning through reading comprehension tasks, the results are inconclusive. The findings vary according to several factors such as types of dictionary information and subjects' background vocabulary knowledge. Hence, it seems that more comparative and evaluative studies are required in incidental vocabulary learning.

Apart from online dictionary and glosses in CALL vocabulary learning, multimedia annotation modes have been another area of interest in vocabulary acquisition. Although the multimedia annotation studies put great emphasis on a visual element on the improvement of vocabulary learning, findings of the most effective annotation modes are not conclusive. Chun and Plass (1996) compared the

effectiveness of three types of annotations: (1) text annotation (text definitions only), (2) picture coupled with text annotations and (3) video coupled with text annotations. Results showed that students who accessed the picture coupled with text annotations performed better in word recall than the other two groups.

Another study assessing noticing and retention in the same way produced contrary findings. Al-Seghayer (2001) who also assessed the efficacy of each multimedia annotation in aiding vocabulary acquisition reported inconsistent results. In his study, thirty participants were measured under three conditions: (1) text definition only, (2) text definition coupled with still pictures, and (3) text definitions with video clips. The findings demonstrated that text definition with video clips produced the best results of the three on both recognition and production vocabulary tests. Al-Seghayer (2001) concludes that video builds a better mental image and greater curiosity leading to increased concentration.

Nikolova (2002) also used multimedia annotations in a study on incidental vocabulary learning. Sixty-two learners were randomly assigned to one of two reading conditions. One group read with text definitions, sound and picture annotations while the other group read with a French-English dictionary (without annotation). The learners who read without annotation were required to link the target words with sound and pictures files and to write text definitions annotations after looking up the meaning of the target words in a dictionary. The findings indicated that annotations containing text definitions, sound and picture were more useful for vocabulary acquisition when the learners participated in creating a link between form and meaning of the word, but little vocabulary was retained in delayed vocabulary test one month after reading.

The review of literature makes a strong case for learning vocabulary while reading. Based on cognitive views on foreign language acquisition and related empirical research, vocabulary acquisition during reading tasks took place in CALL and non-CALL context as a result of dictionary uses, glosses, CALL dictionary information and multimedia annotations. Only a previous study showed that multiple lexical information provided in a CALL reading enhances vocabulary knowledge in short-term memory (Laufer & Hill, 2000). However, no study has assessed long term retention of vocabulary when multiple lexical information options are provided in a

CALL reading. Moreover, only few studies have explored the relationship between look up behavior and vocabulary acquisition and retention. In order to investigate the extent of students' vocabulary knowledge in short-term and long-term retention of vocabulary and students' look up behavior, the present study provided students with not only various types of lexical information to elaborate on a word meaning but also activities that required them to access lexical information for text comprehension in CALL reading materials.