Some Enlightments of Level-of-Processing Theory on English Vocabulary Teaching

Yin-feng GUAN
College of International Studies, Southwest University, Chongqing, China
529447303@qq.com

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Abstract. level-of-processing theory proposes that whether the new information is stored in long-term memory is not determined by the length of time that it is held in short-term memory but rather by the shallowness or depth with which it is initially processed and that analysis proceeds through a series of sensory states to levels associated with pattern recognition to semantic-associative stages. On the basis of this theory, the writer presents the idea that vocabulary learning would be more efficient if the teachers put emphasis on the teaching of vocabulary and guide the students to have a deeper processing of the new words from different perspectives as pronunciation, morphology and semantics.

Vocabulary, Vocabulary Learning and Teaching

Vocabulary has been proved to be very important in the process of L2 learning. Wilkins observes “without grammar very little can be conveyed; without vocabulary nothing can be conveyed.”[1] McCarthy also highlights the great importance of vocabulary in second-language learning: “No matter how well the student learns grammar, no matter how successfully the sounds of L2 are mastered, without words to express a wider range of meanings, communication in an L2 just cannot happen in any meaningful way.”[2]

However, L2 vocabulary learning is not an easy job for most of Chinese learners, especially for those beginners. For one thing, L2 vocabulary learning itself is a kind of complex process. The learners need shift from simple word recognition to partial to completed lexical knowledge (including words’ pronunciation, spelling, meaning, affixations, synonyms and colligations). For another, L2 vocabulary learning generally lacks a natural learning environment and takes place against the backdrop of an already existing mental lexicon. Thus, “Vocabulary problems were the highest compared with other problems, such as, grammar problems, syntax and cultural problems.”[1] When reading a passage, many students find their vocabulary is too limited to understand the whole passage. Sometimes, even they seem to know the literal meaning of each word, they still find it hard to grasp the meaning. When in writing, they either cannot work out a proper word nor have wrong usage of certain lexical items. These problems similarly happen in listening, speaking. Many teachers owe these problems to the little time the students spend in memorizing new words. They hold that words can only be kept in the brains by rote. According to the level-of-processing theory, they are wrong.

Level-of-Processing Theory

The levels-of-processing framework was presented by Craik and Lockhart [3,4] as an alternative to theories of memory, e.g. the three-store model, a structural theory of memory, which postulated separate stages for sensory, working and long-term memory. This theory proposes that there are different ways to code material and that memory codes are qualitatively different. Preliminary processing is concerned with the analysis of physical features such as lines, angles, brightness, pitch, and loudness. Later stages of analysis are concerned with pattern recognition and identification of meaning. After the stimulus is recognized, it may be further elaborated—a word, sight, or smell may trigger associations, images, or stories on the basis of the individual’s past experience with that
particularly stimulus. The levels-of-processing theory claims that analysis proceeds through a series of sensory states to levels associated with pattern recognition to semantic-associative stages.

So Craik and Lockhart argued that the possibility of new information being stored in long-term memory is not determined by the length of time that it is held in short-term memory but rather by the shallowness or depth with which it is initially processed.

As to what way can result deep processing, and what way can result shallow processing, Craik and Lockhart further postulated several levels of processing. For example, processing the meaning of a new lexical item takes place of rather deep level whereas processing the phonological form takes place at rather shallow level. Repeating words as strings of sounds is low-level processing and badly remembered; working out how words fit in the grammatical structure of the sentence is deeper and leads to better memory; using the meanings of words together within the whole meaning of the sentence is the deepest level of processing and ensures the best memory [4]. That is why the semantic processing of lexical item results in higher retention than phonological processing. For example, rote repetition of a list of words for one minute probably leads to less retention than construction a meaningful organization of the words and holding it for ten seconds. In other words, maintenance of information in working memory for a period of time-how long is not certain-may be necessary but is not sufficient to establish a permanent memory trace. It appears that new information must be related to information already stored or organized in a semantic way to affect transfer to permanent memory.

So processing new lexical information more elaborately (such as, paying more attention to the word’s pronunciation, orthography, grammatical category, meaning, and semantic relations to other words) will lead to a higher level of retention than processing new lexical items less elaborately.

**Some Enlightments on Vocabulary Teaching**

**Vocabulary teaching cannot be neglected**

In traditional junior English classroom, vocabulary teaching is always neglected. Some teachers even skip this part, because they think that vocabulary has nothing to do with comprehension but much with memorization and teaching vocabulary is a waste of time. To those teachers, the main task in the classroom is to elaborate the grammar, so that the students can make up sentences and write passages. Thus, the students are supposed to do with the words by themselves. Gradually, the students form a bad habit of rote learning. They think they can memorize the words so long as they repeat it enough in their brains. So, they spend much time in learning the words by heart, yet they find they forget those words time and again.

According to the level-of-processing theory, if one wants to have a long-term memory of the word, one has to analyze the word and process it deeply. The more deeply the word is processed, the longer the memory of the word will be. So the process of vocabulary teaching should not be neglected. Ellis [5] claims that the perceptual aspects of new words, i.e. acquiring their phonetic and phonological features, are learned implicitly as a result of frequent exposure. Similarly, the motor aspects of the articulation of word forms develop implicitly as a result of practice. However, the meaning of words is learned explicitly, requiring the conscious processing at the semantic and conceptual levels and paying attention to the form-meaning connections. Whether implicitly or explicitly, the emphasis should be the exposure and the learning strategies. Only by much exposure and with efficient learning strategies, can the learners have access to deep processing of the words they are learning.

When teaching new words, the teachers may make the students exposed to many words by choosing from the vocabulary some typical words to elaborate them. In the meanwhile, the teachers may help the learners to gain the appropriate ways to process the words deeply, so that they can have an active long-term memory of the words. Classroom activities which demand deeper processing, ‘rich instruction’, can be time-consuming and hard work for students, but, as Ellis [5] maintains, really acquiring a word is facilitated by cognitive effort in an explicit learning process.
Pronunciation and morphology should be related

As is known to all, pronunciation is very important in vocabulary learning, without which communication cannot go smoothly. Yet, owing to the examination-oriented education, many teachers would not spend time teaching pronunciation, let alone correcting the students’ wrong pronunciation. In this way, the students do not have a deep processing in terms of pronunciation, which directly leads to the separation between pronunciation and morphology. Thus, it is commonly seen that a student can not spell a word correctly when he hears it, and vice versa. Guided by this theory, when teaching a word, if the teacher relates the pronunciation with its morphology of the word, the student might have a better memory of this word on its spelling as well as its pronunciation since this involves a deeper processing in the students’ brains. E.g., when presenting the word “picture”, if the teacher encourages the students to discover there are two parts in the pronunciation, i.e. [pik] and [tfə], it is easy for students to form an awareness that letters T-U-R-E is a lexicon item and should be memorized as a whole. Then, when seeing letters T-U-R-E next time, the students may automatically know its pronunciation. Gradually, the group of the four letters and its pronunciation can be stored and used as a whole in their brains, rather than being stored separately. Take the word “foot” as another example. When presenting this word, the teacher may give some other words which looks similarly yet has the same rules in pronunciation as the words “book”, “look”, etc. In this way, the students may grasp that letters “OO” have the pronunciation of [u], and will naturally step by step relate the spelling of the word with the its particular pronunciation. If they have developed this awareness between the spelling and the pronunciation, over time, they can spell the word promptly according to its pronunciation and pronounce the word according to its spelling.

Semantics promotes deep processing

Besides the pronunciation and morphology, the meaning of the word is also important, without which the word is of no use. When teaching new words, the teacher should no longer fill the blackboards with masses of new lexical items, letting the students compile page upon page of word list that they rarely have any chance to practice, or just explain in Chinese the use of the word with its fixed meaning happened to appear in that text. This traditional forced-feeding method in the case of vocabulary teaching will finally lead students to acquire a bad habit of rote learning. That is to say, they just automatically match each word with its fixed Chinese meaning, regardless of real situation. Furthermore, this mechanical absorbing of words can lead to students’ inability to recall certain words when they are in need of them in real contexts. Thus, it is not an unusual complaint of the students that sometimes when confronted a sentence, they cannot work out the meaning of it even though they seem to know the meaning of each word in that sentence, and that they cannot use the words they have learned to express their feelings effectively.

Rather, in the process of vocabulary teaching, the teachers should explain the meaning of the word more so as to activate the learners’ imagination and association to have a deeper processing. As far as meaning is concerned, the availability of a mental image emerges as a possible aid in the fixing of words in memory [6]. Likewise Craik and Lockhart [3] also argued better learning would take place when a deeper level of semantic processing is required because the words are encoded with elaboration. This doesn’t mean that simply repeating items, ‘maintenance rehearsal’, will not lead to retention. It means, however, according to Baddeley’s ‘elaborative rehearsal’ [7] that richer levels of encoding, will result in better learning. When students are asked to manipulate words, relating them to other words and to their own experiences, and then justifying their choices, these word associations are reinforced. Students need to be encouraged to think aloud, to give reasons for their word choices, and to extend their learning of the world outside of the classroom, e.g. report when they encounter the target word in the real world.

Moreover, the known knowledge of semantics can be used to interpret new words. For instance, if we have learned the word “encode”, we know that the meaning of this word comes from its two parts: the prefix “en” and the core “code”. When we encounter the word “decode” next time, it is
quite likely that the word “encode” is automatically activated. Accordingly, the word “decode” is easily divided into two parts: “de” and “code”, from which the meaning of this word can be drawn.

**Summary**

Vocabulary learning is a starting point and fundamental to language learning. The process of learning English as a foreign language is generally characterized by the following three stages, namely: input, memory, and output (see Figure), and generally speaking, vocabulary learning also involves these stages.

![Figure 1. English language-learning process.](image)

As the level-of-processing theory puts, humans are limited-capacity processors. Thus, in the stage of vocabulary input, the teacher should try to make the learners have an awareness of the input so that they can consciously apprehend it and effectively process it. When input is received, it is memory that works. Memory is the prerequisite to any cognitive or intelligent behavior. Learning, which involves change in behavior and in ways of thinking, could not occur without memory. It can be argued that memorization occupies a central place in language learning [8]. Then how can the person with limited-capacity store the information in long-term memory? According to the level-of-processing theory, memory is not determined by the time but by the shallowness and depth of the processing. Therefore, in vocabulary teaching, especially when teaching the beginners, if the teachers guide them to have a deeper processing on the new words from pronunciation and morphology and semantics, there would be a better result of the vocabulary teaching. Gradually, this vocabulary learning method will be fixed in the students’ brains. Whenever they confront a new word, they would automatically look for its links with other words in pronunciation and morphology and semantics so as to form in their brains a complete lexical net. In this way, in the final output stage of vocabulary learning, which is realized mainly through speaking and writing, the students would no longer feel frustrated, and both the teachers and the students, will find it easier and easier to teach as well as to learn vocabulary.

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**References**