Medical English Vocabulary Teaching Research Based on Mind Mapping

Ying Nie*

Foreign Language Department, Qiqihar Medical University, Qiqihar, 161006, China

*Corresponding author e-mail: Yingnie163.com

Abstract. In the mind mapping, the thinking process is presented through a tree structure. Based on the understanding of the concepts and characteristics of mind mapping, the advantages of mind mapping in English vocabulary learning are analyzed. Combined with the characteristics of word-formation and the interrelationship between words of medical English vocabulary, the mind mapping is used to help students build a vocabulary network and improve the teaching effect of medical English vocabulary.

Keywords: Teaching Research, Medical English, Mind Mapping, Vocabulary Memory

1. Introduction

Vocabulary is not only the basic elements of language learning but also the essential foundation of language learning. The amount of vocabulary directly affects the ability and level of language learners in listening, speaking, reading, writing, and translation. However, for vocabulary learning, most students are usually mechanically dull, memorizing hard work, and making huge effort, but they have not obtained much fruit. Enthusiasm for learning [1]. Vocabulary learning has become a significant obstacle in students' English learning. As is known to all, medicine involves many disciplines, such as human anatomy, physiology, psychology, pathology, biology, and chemistry, with a large number of professional vocabularies and various categories. Therefore, for medical students, the study of professional English vocabulary is even more difficult.

The mind mapping presents the thinking process through a tree structure. Learners rely on this visual graphical tool to promote the structuring and integration of knowledge, establish links between English vocabularies, and form vocabulary networks. At the same time, the emergence of brainstorms through the divergence of thoughts has a very definite meaning in helping learners understand and memorize vocabulary and improve the effectiveness of medical English vocabulary learning [2]. Mind
mapping, also known as mind mapping, is a useful graphical thinking tool invented by the famous British educator Tony Bozan based on the characteristics of brain radioactivity. The mind mapping uses the technique of focusing on both graphics and text to show the relationship between the topics at all levels with mutual affiliation and related hierarchical diagrams and establish the memory link of the topic keywords with images and colors. The mind mapping uses the method of illustration to express the concepts, ideas, theories, etc. in people's minds, and to make the invisible knowledge in the human brain explicit and visual. The process of mind mapping is similar to the pattern of the neuron network in the brain, and it is a method to materialize radioactive thinking \[3-4\]. It uses charts to organize and articulate knowledge, which is a graphical representation of knowledge and thinking processes. Mind mapping allow learners to draw their own brain maps vividly through the use of lines, colors, pictures, arrows, and multi-dimensional graphics, which enhances the memory effect so that the focus of people's attention is clearly placed on the central graphics \[5\]. Meanwhile, the advantages of the left and right brains are fully leveraged in terms of logical and image thinking, and a memory network of different images and colors is established through lines and topic keywords, which allows learners to have unlimited associations and make the thinking process more creative \[6\]. Based on an understanding of the concept and characteristics of mind mapping, this paper analyzes the advantages of mind mapping in English vocabulary learning, combines the word-forming characteristics of medical English vocabulary and the interrelationship between vocabularies, and uses mind mapping to help students construct Vocabulary network to improve the teaching effect of medical English vocabulary.

2. Advantages of mind mapping in vocabulary learning
First, mind mapping can help reveal the relationship between words. Vocabulary is not stored in the human brain in isolation. Words, especially real words, are usually stored in the human brain in the form of a schema or a network of meanings. Words are connected to form a semantic network. In vocabulary teaching, by constructing a vocabulary mind mapping, the relationships between vocabularies are clearly presented graphically to form a systematic and interconnected vocabulary network, which helps learners to remember and extract information. Secondly, the external presentation form of knowledge has a significant influence on the understanding and memory of the internal content, and the mind mapping makes the internal knowledge and thinking process explicit through the visual expression. According to the dual coding theory of American psychologist Pavio, the brain's memory effect and memory speed for image materials are better than the effects and rate of semantic memory. By presenting information in the form of vision and language at the same time, it is beneficial to enhance information recall and Identify. Therefore, learners learn vocabulary with a mind mapping, so that the memory method and thinking process can be followed, which not only deepens the traces of memory but also enhances the memory effect. Moreover, the use of mind mapping for vocabulary teaching provides great support for learners to actively construct knowledge and learning processes, helping learners to recognize what they have learned and a part of the cognitive structure in their own minds. Substantive connection, replacing traditional indoctrination and passive learning with mechanical memory with meaningful language learning. It has fully reflected the subjective status and role of students, which is conducive to the their subjective initiative, stimulates their creativity, and facilitating meaningful learning.
3. Application of mind mapping in English vocabulary teaching for medical professionals

3.1. Vocabulary learning based on mind mapping and derived word formation

The composition of English words can be followed regularly. Mastering the rules of word-formation helps to learn and memorize words quickly and accurately. Learning English words with roots and affixes is the most effective vocabulary learning method. Although medical vocabulary is long and complicated, the vast majority of words are formed by derivation. According to research and classification, for medical students, if they can master 500 morphemes, morpheme analysis, and morpheme synthesis of medical terms, they can recognize and master a large number of medical English vocabulary through different permutations and combinations. The stem is like the center of a mind mapping, emitting all kinds of wonderful branches, connections, and branches. Based on memorizing the frequently occurring roots, affixes, and their meanings in the medical specialty, learners decompose the roots and affixes of words through the function opened in the mind guide layer, and then use the roots and affixes to correlate related words through expansion. Hence, they can quickly understand and memorize vocabulary, learn by analogy, and bypass the category, which can dramatically improve their ability to guess the meaning of words and expand the vocabulary. If teachers can often analyze these medical terms structurally in teaching, guide students to identify their suffixes and roots, and use morpheme analysis methods to deepen students' rational understanding of professional vocabulary from the structure, not only can help students strengthen their memory of words, but also increase their enthusiasm for vocabulary learning. Take the word osteoporosis (osteoporosis) as an example.

3.2. Vocabulary learning based on mind mapping and associative memory

Associate words and build a memory network using mind mapping. Association is the basis of memory. Pavlov, a famous Soviet physiologist, pointed out: “Memory depends on association, and association is the product of the connection between old and new knowledge.” The working mechanism of the brain is imagination and association, and the mind mapping in the brain. The natural and image-based thinking process and reflection of thinking ability. Mind mapping make full use of all aspects of the brain's ability to take a certain point as the center to extend and expand knowledge and cover associative branches to form a network thinking, which is conducive to memory and creative thinking. In vocabulary teaching, if the teacher is good at grasping the connection between vocabulary, after the central word is determined, guide the students to freely associate, give full play to their imagination, use the existing knowledge, and from one point to the other, activate and Expand other subtopics related to the headword. Subsequent, more specific vocabulary is set out after each sub-topic node, continue to expand and expand the next level of nodes, and gradually build a vocabulary network based on the connections between vocabulary. Students learn new vocabulary while also reviewing a large number of known vocabulary. For example, taking the central word hospital as an example, the following vocabulary network can be constructed by guiding students to make the most of associations (as shown in Figure 1).
3.3. Learn vocabulary using mind mapping and semantic fields

The semantic field refers to the clustering of semantics. The semantic field combines the individuals of the language in an aggregate relationship according to their different semantics. English vocabulary is not a series of independent individuals. Each vocabulary has its domain and scope. Because the vocabulary has some common characteristics, it forms a set to form a certain semantic field. For example, the syntactic relationship between words, that is, the relationship between general words and specific words between words. Specific words often exist in general words. Medical history has a long history, there are many categories, and the vocabulary is vibrant. Classify these professional vocabularies in vocabulary teaching, and use mind mapping to reflect this synonymous relationship between vocabulary, so that learners form a comprehensive understanding of the relationship between vocabulary, easily grasp the essence of the word, and generate a three-dimensional structure can not only effectively improve the memory efficiency of words, but also train the abilities of students to comb and summarize knowledge (as shown in Figure 2).

The teaching of English courses is evaluated based on mind mapping as follows:

A multi-index evaluation system consisting of $n$ evaluated objects $u_1, u_2, \cdots, u_n$. $m$ indicators
\( x_1, x_2, \ldots, x_m, \quad x_j = x_j(x_i) (i = 1, 2, \ldots, n; j = 1, 2, \ldots, m) \) is the observation data evaluation data matrix (decision matrix) of the evaluated object \( u_i \) and the index \( x_j \) can be expressed as shown in formula (1):

\[
A = \begin{bmatrix}
    x_{11} & x_{12} & \cdots & x_{1m} \\
    x_{21} & x_{22} & \cdots & x_{2m} \\
    \vdots & \vdots & & \vdots \\
    x_{n1} & x_{n2} & \cdots & x_{nm}
\end{bmatrix}
\]

The data in \( m, n \geq 3 \) and \( A \) are normalized data after preprocessing.

It can be transformed into equation (2) as follows:

\[
y_i = f(x_{i1}, x_{i2}, \ldots, x_{in}), i \in N
\]

Where \( f \) represents a positive transformation function; \( y_i \) represents the comprehensive evaluation value of the evaluated object \( u_i \). \( u_1, u_2, \ldots, u_n \) are sorted according to the value of \( y_1, y_2, \ldots, y_n \) in descending order, and the comparison of \( u_1, u_2, \ldots, u_n \) can be completed.

If there are two evaluation objects \( u'_i, u'_j, (i', j' \in N, i' \neq j') \), let \( w_j(x_{i'}, x_{j'}) \) be a random variable that obeys a distribution on the interval \( \left[ \min(w_j, w_{j'}), \max(w_j, w_{j'}) \right] \), and call \( s(u'_i > u'_j) \) the superiority of \( u'_i \) to \( u'_j \), as shown in formula (3):

\[
s(u'_i > u'_j) = p(f(u'_i) > f(u'_j)) + 0.5p(f(u'_i) = f(u'_j))
\]

Where the aggregate function indicates the event probability as shown in formulas (4) and (5) as follows:

\[
f(u'_i) = \sum_{j=1}^{m} \lambda_j w_j(i', j')
\]

\[
f(u'_j) = \sum_{j=1}^{m} \lambda_j w_j(i', j')
\]

4. Conclusions

In this paper, the advantages of mind mapping in English vocabulary learning are analyzed based on the understanding of the concepts and characteristics of mind mapping. Combined with the characteristics of word-formation and the interrelationship between words of medical English vocabulary, the mind mapping is used to help students build a vocabulary network and improve the teaching effect of medical English vocabulary.

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