

Chinese Medical English Students' Beliefs on Vocabulary Learning and Memory Strategies Usage

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Abstract. Medical English is seen as an important bridge in international medical exchanges and cooperation, particularly against the backdrop of globalization. As such, medical English learners should master science and technology vocabulary to compete in the world, although medical English vocabulary has been found to hinder learners' medical English learning ability. As is known, memory strategies usage is of great importance to vocabulary learning, which significantly improves learners' English proficiency. However, many learners still lament that medical English vocabulary is too difficult to learn. Hence, to further improve medical English learners' language proficiency, this research investigates Chinese medical English students' beliefs on vocabulary learning, their strategies usage and knowledge of memory strategies. A qualitative research method was applied to 10 learners from Ningxia Medical School, China. Semi-structured interview results revealed that Chinese medical English students generally believe that medical vocabulary is challenging to learn because of the complicated characteristics of the medical lexis itself. Therefore, most students believe using memory strategies in medical English lexis learning is necessary. Unfortunately, students' understanding of memory strategies is still found to be non-ideal. It is therefore suggested that students cultivate consciousness of using memory strategies, use the fragmented time to learn medical English vocabulary as well as establish a cooperative learning environment to promote the learning effect.

Keywords: Medical English \cdot Vocabulary Learning \cdot Memory Strategies \cdot Beliefs \cdot Usage

1 Introduction

Against the backdrop of globalization, medical science has become increasingly active in international exchanges. Medical English as a branch and component of English for Specific Purposes (ESP) is seen to build a bridge in international medical exchanges and cooperation [1] and plays a pivotal role in the construction of English courses [2]. Furthermore, medical English knowledge is also an essential professional skill for medical learners to obtain the most cutting-edge medical science and technology information, master the latest international medical developments and participate in international medical research exchanges [3], thereby, medical personnel can learn advanced medical technology and improve their medical level with the help of medical English [1].

As for medical English, learners should master both science and technology vocabulary and cultivate medical English vocabulary learning ability. Because vocabulary is the basis for learning medical English and the foundation for academic exchanges [3], which is of paramount importance [4–8], learners need to lay the foundation of medical English by studying characteristics of vocabulary [1]. Only when learners improve their professional English comprehensive ability by mastering a large number of vocabulary can they become outstanding talents worldwide [9]. However, the medical English vocabulary has unique characteristics; hence, it is the focus and difficulty of medical English teaching and learning [10, 11].

As is known, memory strategies usage is of great importance to vocabulary learning, which significantly improves students' English proficiency [12]. Furthermore, medical English learners can efficiently master many professional vocabularies to accurately understand medical English literature using strategies [13]. Hence, in medical English learning, learners should not only pay attention to the importance of medical English vocabulary but also use strategies efficiently to improve their medical English proficiency. Therefore, to further improve medical English learners' language proficiency level, this article explores the students' views on medical English vocabulary learning, their strategies usage and knowledge of memory strategies. Furthermore, it is expected to help medical English learners master professional vocabulary more proficiently and provide references for improving the English learning effect; thus, this study is committed to solving the following research problems:

(1) What do Chinese medical English students think of vocabulary learning?

(2) What are students' beliefs on memory strategies usage in vocabulary learning?

2 Literature Review

Medical English is very professional, with complicated lexis and strong professionalism; medical English vocabulary has characteristics of standard vocabulary wording criteria, accurate concepts, complex composition, unintelligibility, and reasonable selfconsistence [14]. Consequently, medical English learners are generally inefficient in vocabulary learning with low learning enthusiasm [1]. Memory strategies play an important role in assisting learners to commit new words to memorization [15], so the theories related to vocabulary memorization must be considered. In the process of vocabulary learning, there is no acquisition without noticing; according to [16] noticing hypothesis, the participation of noticing is the prerequisite for the input, processing and extraction of information [16]. As such, noticing plays a vital role in the entire process of second language acquisition [17]; thereby, [16] believes noticing is necessary for understanding almost all aspects of second language acquisition. He further explains that second language acquisition is primarily affected by the degree of attention the learner pays to the target input information. Hence, [16] states to a greater extent that the information must be noticed before it is absorbed.

Many studies have shown that memory strategies benefit English vocabulary learning and significantly improve learners' English proficiency [12, 18, 19]. Regarding memory strategies, most learners think association strategy makes it easier to remember words, a study by [20] exploring students' medical English vocabulary learning habits and memory methods adopted in the professional English learning stage [20]. The chunking strategy can also effectively improve learners' memorization of medical English lexis, a study by [21] using a questionnaire to investigate the memory effect of nursing students who learn medical English knowledge of organ systems [21]. Additionally, [22] studied meta-memory prediction-related theories for clinical medical students and English majors regarding predictive judgment accuracy [22]. They found that the relative accuracy of prediction and judgment of clinical medical students was better, while the absolute accuracy of prediction and judgment of English majors was better. Tan et al. also proposed a medical English curriculum teaching method combining an online teaching platform with classroom teaching, significantly improving the medical English vocabulary teaching effect [23]. Therefore, medical English vocabulary is highly professionalized and generally complex and abstract because of the professionalism and complexity. As a result, learners always encounter difficulties in understanding, memorizing and applying medical English vocabulary in the learning process. However, using some strategies, learners can improve their comprehensive medical English ability and English proficiency.

3 Methodology

This study aims to examine Chinese medical English students' beliefs on vocabulary learning and memory strategies usage. Thus, this research aims to conduct the study using a qualitative approach.

3.1 The Participants

Reference [24] proposes that the sample size for an experiment is 10 to 20 [24]. Hence, in this study, ten second-year medical undergraduates at Ningxia Medical University, China, were conveniently selected as the participants according to the actual situation, covering high language proficiency learners, average language proficiency learners and low language proficiency learners. The participants' language proficiency was determined according to their activity engagement and participation, assignment completion and academic achievement. Students with good levels of class activity engagement, participation, and assignment completion were selected. Among them, the students with academic achievement above 90 (100 mark system) were determined as high language proficiency learners and below 60 (100 mark system) were determined as low language proficiency learners and below 60 (100 mark system) were determined as low language proficiency learners.

3.2 Instrument

In this study, the qualitative approach of the interview was applied. Interviews support researchers with rich and detailed qualitative data to understand participants' experiences, how they describe the experiences and the meaning they make of the experiences

Participants	Gender	Language proficiency level	
Participant A	Female	High language proficiency	
Participant B	Male	High language proficiency	
Participant C	Female	Average language proficiency	
Participant D	Male	Average language proficiency	
Participant E	Male	Low language proficiency	
Participant F	Female	Low language proficiency	
Participant G	Female	High language proficiency	
Participant H	Female	Average language proficiency	
Participant I	Male	Average language proficiency	
Participant J	Female	Low language proficiency	

Table 1. The participants' information (N = 10).

[25]. Reference [26] asserts that while there are several kinds of data, all data falls into four basic categories, "observations, interviews, documents, and audiovisual materials" [26]. Researchers may use many different techniques, but at the heart of qualitative research is the desire to expose the human part of a story. Therefore, this study used an interview of three items 1) What do you think of medical English vocabulary learning? 2) Do you think using memory strategies to learn medical English vocabulary is necessary? Why? 3) What is your knowledge of memory strategies?

3.3 Research Procedure

The researchers first made an interview protocol to guide the interview process, which was more than a list of interview questions and also extended to the procedural level of interviewing, including scripts the interviewers would say before the interview and also at the end of the interview, prompting the interviewers to collect informed consent and also reminding them of the information being collected. Next, the researchers worked on receiving feedback on the interview protocol to obtain feedback on the interview protocol, further enhancing its reliability and trustworthiness. Feedback can provide researchers with information about how well participants understand the interview

questions and whether their understanding is close to what the researcher intends or expects [27]. The interview protocol was then improved accordingly, and the researchers examined each question for clarity, simplicity, and answerability.

Then a pilot interview was conducted to get a realistic sense of how long the interview took and whether participants could answer questions. Four students were chosen to participate in the pilot interview. Finally, a consent form was signed by each participant to ensure the researchers would hold their confidence and that they may withdraw from the study at any time. The researchers conducted about 10 min of interviews with each student, recording interviews simultaneously and transcribing them into interview texts later.

3.4 Data Collection and Analysis

The qualitative analysis software NVivo 12 was used to encode the respective materials. The interviewees' audiotapes were first transcribed to text materials and then coded according to Corbin and Strauss's coding protocol. The student's opinions on vocabulary learning and beliefs on memory strategies usage were encoded freely [28]. The frequency of words was checked first, and then the three-level codes were determined by carefully reading each participant's interview text. Finally, a total of three nodes which were opinion, perception and cognition, were established. The researchers analyzed and categorized text information in the coding process, combining the participants' learning experiences to sort out the logical relationship between each node and its sub-nodes.

4 Results and Discussion

4.1 Presentation of Interview

The students' opinions on medical English vocabulary learning and perceptions of strategies usage were encoded and visually shown in Fig. 1, which presented each distributed node and also scientifically improved the qualitative data in this study. Three main codes, opinion, perception and cognition, were formed, five sub-codes (two of opinion, two of perception and three of cognition) and 30 references were established. Lastly, the optional code, beliefs on vocabulary learning and memory strategies usage was determined to connect the codes.

To further reveal students' thoughts intuitively on vocabulary learning and strategies usage, word frequency which indicates the times words appear during the interview, was checked. As the word cloud can visually display the word frequency, Fig. 2 shows the word cloud of participants' opinions and perceptions. The 100 lexeis most frequently appearing in the interview were selected. The bigger the lexical item, the higher frequency of the word occurs.

Words such as strategies, vocabulary, difficult and necessary are significant, but we cannot directly decide which word is more significant. Hence, although the word cloud intuitively presents the encoded text, it cannot accurately reflect the exact value of word frequency. Then the top 20 primarily used lexis were listed to present the participants' views on medical English vocabulary learning and memory strategies usage (see Table 1) (Table 2).

🔨 Name	Sources	References
	0	0
It's difficult to learn medical English vocabulary	1	8
It's not difficult to learn medical English vocabulary	1	2
Perception	0	0
It's necessary to use memory strategies	1	7
It's unnecessary to use memory strategies	1	3
Cognition	0	0
The learner knows much about memory strategies	1	3
The learner knows less about memory strategies	1	5
The learner dose not know memory strategies at all	1	2

Fig. 1. Frequency of coding.



Fig. 2. Word cloud of the interview.

The words related to opinions on medical English vocabulary learning include difficult, vocabulary, long, remember, boring, and complex; lexical items about students' perception are composed of strategies, necessary, memory, time, energy, save, and method; the vocabulary of cognition on memory strategies are repetition, spelling, suffix, association, prefix, structure and like. To more clearly show the structure of the interview content, Fig. 3 was drawn, showing the relationship between each node and the interaction with each other.

4.2 Chinese Medical English Students' Opinion on Vocabulary Learning

The most encoded references about medical English vocabulary learning are 'It is difficult to learn medical English vocabulary'. At the same time, fewer are encoded as 'It is not difficult to learn medical English vocabulary', as seen in Table 3.

Most participants (80%) believed it was difficult to learn medical English lexis. For example, a high language proficiency learner, participant A said, "I think it is complicated

Words	Length	Count	
strategies	10	30	
difficult	9	23	
vocabulary	10	23	
necessary	9	19	
memory	6	11	
long	4	8	
remember	8	4	
repetition	10	4	
spelling	8	4	
time	4	4	
energy	6	3	
save	4	3	
suffix	6	3	
association	11	2	
boring	6	2	
complex	7	2	
method	6	2	
prefix	6	2	
structure	9	2	
like	4	2	

Table 2. High-frequency word list.

to learn medical English vocabulary because most of the vocabulary is relatively jerky. The words are very long and complicated, and I have never seen them". Similarly, Participant B, a high language proficiency learner too, stated:

"It is challenging to learn medical English vocabulary. As a result, I use these words sparingly. I usually use medical English vocabulary only in English class. However, I may use them in the future if I continue to study for a master's degree."

Participant H (an average language proficiency learner) said, "It is not easy to learn medical English vocabulary. The words are boring to memorize, so I am not interested in learning them." Similarly, Participant J, a low language proficiency learner, noted, "Personally, it is too difficult for me to learn medical English vocabulary because the words are different with daily used words, the alphabetical order is also random, which makes them more difficult to be remembered."

Therefore, it is clear that most participants think the medical English lexis is challenging to learn. Liu also discovered that English language learners generally believed that vocabulary was too difficult to learn [29]. Due to the complexity of medical English

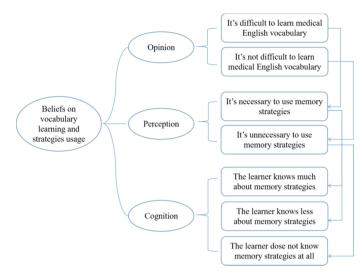


Fig. 3. The structure of the interview.

Table 3.	The nodes and references of opinion.	
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The first-level node	The second-level node	References	Examples
Opinion	It is difficult to learn medical English vocabulary	8	Individually, it is tough for me to remember medical English vocabulary because the words are always very long and complex, so it takes much time to learn vocabulary.
	It is not difficult to learn medical English vocabulary	2	I think if the learners master the correct methods of learning medical English vocabulary, it is not difficult to learn them.

vocabulary, it is challenging to be understood and mastered by English language learners [9]. Likewise, students from medical colleges often have better knowledge of medicine, but they need to improve in understanding medical English terms [30]. Given this fact, students encounter many difficulties remembering lexis because of medical English vocabulary's strong professionalism and complexity [1, 3].

On the other hand, two participants stated it was not difficult to learn medical English vocabulary. For example, participant C, an average language proficiency learner, said:

"I think it is not difficult to learn medical English vocabulary if I spend more time and energy studying them. Many medical English words have the same or similar prefixes and suffixes; after mastering these affixes, I can guess the meaning of the same type of words."

Participant G (a high language proficiency learner) held that so long as the learners mastered the rules of affixes, they would find learning vocabulary was not so difficult. Kang also found that language learners could guess the meaning of most lexis with the same affixes, which helped them to expand their vocabulary [31]. Although it is difficult to learn English words, and the number of English words is enormous, it has inherent rules because the number of morphemes that constitute the word (roots, prefixes and suffixes) is limited. According to statistics, about half of English words consist of roots and affixes, and there are many common roots in English and more than 100 common prefixes and suffixes [32]. Hence, the root of a word is the core of the word, so if learners master the roots, they can use the analogy to memorize more words. Therefore, the use of word structure strategy is consistent with the cognitive principle and has always been considered the best, fastest and most provincial method of expanding vocabulary.

4.3 Chinese Medical English Students' Belief on Memory Strategies Usage

In this study, the participant's perception of whether it is necessary to use memory strategies in medical English vocabulary learning and their cognition on knowledge of memory strategies are summarized as their beliefs on memory strategies usage in vocabulary learning. The references of perception mostly encoded are 'It is necessary to use memory strategies', and that of cognition is 'The learner knows less about memory strategies' (see Table 4).

Regarding memory strategies usage, the participants (70%) believed that using memory strategies to learn medical English vocabulary was necessary. For example, participant A said, "I usually use spelling strategy to learn vocabulary, and I find it is beneficial, so I think it is necessary to use memory strategies in medical English vocabulary learning." Participant H (an average language proficiency learner) stated:

"Medical English vocabulary is commonly very long, and I need to spend much time and energy to learn them, while if I use some strategy (for example, use of word structure strategy) in learning vocabulary, it becomes easier. Therefore, I think using some vocabulary learning skills is necessary."

Likewise, participants B, E, G, and D expressed a similar opinion on memory strategies usage, that using strategies in lexical items learning was necessary. Participant I especially emphasized that:

"Individually, it is essential to use some strategies to learn medical English vocabulary because I find it impossible to memorize medical terms without memory strategies. As a result, I usually apply contextual and spelling strategies to remember lexis to make vocabulary learning easier."

However, Participant C had a slightly different view on using strategies "I know it is necessary to use some strategies, but I do not use memory strategies frequently." Similarly, participant J (a low language proficiency learner) indicated that she usually did

The first-level node	The second-level node	References	Examples
Perception	It is necessary to use memory strategies	7	It is essential to use some memory strategies in medical English vocabulary learning due to the complicated characteristics of vocabulary; otherwise, we cannot remember the words efficiently.
	It is unnecessary to use memory strategies	3	I do not think using memory strategies plays a role in medical English vocabulary learning. It always takes time to think over which strategy should be used, so I would directly remember the words instead.
Cognition	The learner knows much about memory strategies	3	I know how to use memory strategies such as spelling, contextual, and association strategies, so I apply strategies in medical English vocabulary learning, which really affects my lexis learning.
	The learner knows less about memory strategies	5	I only know spelling strategy and always use this strategy in medical English vocabulary learning.
	The learner dose not know memory strategies at all	2	Frankly, I do not know much about memory strategies. In my opinion, memory strategies do not matter much in vocabulary learning.

 Table 4.
 The Nodes and References of Perception.

not have enough time and energy to think over using which memory strategy, although she firmly believed that using strategies was practical. Conversely, Participant F showed a completely different opinion:

"I do not think using strategies to learn medical English vocabulary is necessary. I find it is too complicated to construct the strategies, so I would rather learn the words directly. Therefore, I rarely use memory strategies, so strategies are meaningless for me."

As a result, most participants believed that using some strategies to learn medical English lexis is necessary, which is consistent with the result of Yang's research that using strategies is essential in vocabulary learning and greatly helps learners master many lexical items [33]. Zhang also found that in medical English learning, the complicated and rich medical English vocabulary was not only the cornerstone of language but also an important factor in medical translation [1]. As such, learners can do medical English translation better only by understanding the characteristics of medical English vocabulary and remembering the words using different methods.

With respect to students' cognition of memory strategies knowledge, high language proficiency learners generally knew more memory strategies (spelling strategy, repetition strategy, association strategy and use of word-structure strategy) and frequently used these strategies in vocabulary learning. Participant A said:

"I usually apply the use of word-structure strategy to learn medical English vocabulary because I find most medical English lexis have prefixes or suffixes, so once I master the affixes, I can learn vocabulary easier. Moreover, repetition and spelling strategies are also my commonly used strategies."

Participant B was familiar with repetition strategy, spelling strategy and association strategy and frequently used these strategies in vocabulary learning. Participant G stated:

"I am accustomed to using repetition strategy in medical English vocabulary learning, but if the words have obvious affixes, I will apply the use of word-structure strategy. Sometimes, when I meet with very long words, I usually choose to use a spelling strategy."

In comparison, average language proficiency learners knew less about memory strategies and usually used fewer strategies in vocabulary learning. Participants C and H expressed that they commonly used repetition and spelling strategies in learning lexical items. Participant D preferred to use the spelling strategy and use of word-structure strategy. Participant I expressed:

"I am only familiar with spelling strategy and often use this strategy in vocabulary learning. Sometimes I would like to use more strategies, but I do not know how to use them, and I find if I cannot use the strategy correctly, it not only costs time but also discourages me much."

However, some learners of low language proficiency had little knowledge of memory strategies and rarely used any strategies in vocabulary learning. For example, Participant F said:

"Frankly, I do not know much about memory strategies because I do not think memory strategy is helpful in vocabulary learning. I think using or not using memory strategies is the same, so I never learn how to use some method in vocabulary learning." Therefore, as for students' beliefs on memory strategies usage, most learners have a favourable opinion on strategies usage and believe it is indispensable to use memory strategies in vocabulary learning. However, in terms of memory strategies Chinese medical English students used, only four strategies were mentioned. This indicated that students' understanding of memory strategies was relatively lacking, and memory strategies they flexibly applied were limited. Furthermore, their memory strategies usage was also single, and many difficulties were encountered in remembering vocabulary, which is consistent with the findings of Guan that students have less knowledge of strategies [34]. Therefore, they do not know which strategy to tap into in vocabulary learning. Guan also found that students' interest in learning English was not high [34]. Many teachers have also reported a lack of interest in learning English among students, especially vocabulary learning, let alone learning with effective strategies [33].

5 Conclusions and Recommendations

The findings show that most Chinese medical English students deem vocabulary challenging to learn due to its complex, jerky, lengthy, and incomprehensible characteristics. As a result, most students believe using memory strategies in medical English lexis learning is necessary. However, others rarely apply strategies in vocabulary learning as they think it is non-beneficial. It was found that students of high language proficiency know more memory strategies than those of average and low language proficiency, although their knowledge of memory strategies is also limited.

Therefore, the following recommendations are put forward based on the main results found in the present study. The first is to use the fragmented time to learn medical English vocabulary because medical English learners usually have to spend much time on medical professional courses learning but less time on vocabulary learning. Hence, using the fragmented time to learn medical English vocabulary is one of the ways to solve the contradiction of learning time, which can increase the memorization reappearing rate and ultimately increase the memorization rate. The second is establishing a cooperative learning environment to promote learning. Mutual supervision and cooperation between learners can help complete learning tasks, so most students hope teachers or classmates supervise them to learn vocabulary. The last is to cultivate the learner's consciousness of using memory strategies. In vocabulary learning, learners can efficiently complete the task using some learning strategies. However, in practical learning, learners usually use fewer strategies which are boring and easy to make them feel fatigued with a common memorization effect. Given this problem, it is crucial to cultivate students' awareness of using memory strategies in actual teaching and learning.

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