

METAPHOR IN LEARNING SPECIALIZED LANGUAGE: TERMINOLOGY ACQUISITION BY STUDENTS IN HEALTHCARE SPECIALTIES

Ivaylo Dagnev

Medical College at Medical University - Plovdiv, Bulgaria, ivaylo.dagnev@mu-plovdiv.bg

Abstract: The influence of awareness of conceptual metaphors on the acquisition of medical terminology among non-native students is a complex issue that underscores the significance of metaphorical understanding in language learning. Research has shown that metaphors play a crucial role in making intricate medical concepts more accessible, as they connect new information to the learners' pre-existing knowledge. This cognitive linkage not only aids in comprehension but also fosters deeper engagement with the material, ultimately enhancing the learning experience for students. Studies show that these metaphors facilitate engagement with complex subjects, making them more approachable by framing concepts such as learning as a journey or understanding as a puzzle. This cognitive mapping fosters connections between new vocabulary and learners' pre-existing knowledge, thereby enhancing their metaphorical competence significantly. Reports suggest that focused instruction can improve the ability to produce metaphors, a skill particularly beneficial for bilingual learners dealing with the intricacies of medical terminology. This emphasized the idea that metaphors function not merely as linguistic tools but also as cognitive connectors, promoting a more profound comprehension across different languages. For non-native students, grasping these metaphorical frameworks is vital, as they often face the challenge of interpreting dense and abstract language found in medical literature. The current paper presents an experiment held over three consecutive academic years, which aims at proving the value of introducing new innovative methods of specialized vocabulary acquisition via the application of conceptual metaphor tools. The study is centered around teaching dental terminology to students of dental technology at the Medical College at the Medical University – Plovdiv. Two groups are formed in each academic year, one serving as the control group and the other as the experimental one. The experiment itself consists of several stages aiming at identifying and classifying terms related to dental anatomy and dental processes via conceptual metaphor. The experiment is validated through the use of a gapped test and a questionnaire that is filled in by the members of the experimental groups. The results suggest a strong affinity on the side of the students of the experimental groups for using new cognitive approaches to term acquisition. Therefore, it can be concluded that using cognitive methods in teaching EAP and especially conceptual metaphor plays a crucial role in the cognitive processes of understanding EAP vocabulary in the target language. The current study corroborates findings by scholars from many countries. As a follow-up, it will be informative to gauge the effectiveness of the eventual expansion and extension of the scope and scale of the use of such cognitive methodology by its application to other areas of medicine. Thus, it can be proven that metaphorical conceptualization plays a crucial role in shaping how various phenomena are framed, particularly aiding learners in navigating the complex foundations of medical terminology, even beyond the medical context.

Keywords: EAP, metaphor, dental technicians, specialized vocabulary

1. INTRODUCTION

Teaching specialized vocabulary to students of dental technology requires an understanding of effective pedagogical strategies tailored to the nuances of dental terminology, clinical practices, and professional communication within the field (Kalendarian et al., 2018). The development of specialized vocabulary instruction must also account for the integration of relevant educational practices that promote active learning and comprehension (Condon, 2012). To effectively stimulate learning specialized medical vocabulary in dental technology for non-native English speakers, a combination of various exercises and learning strategies can be employed. Utilizing mnemonic strategies has been shown to enhance the retention of specialized vocabulary in dental contexts. Brahler and Walker note that employing mnemonic techniques can significantly improve recall of critical dental terminology, facilitating easier and more effective learning (Brahler & Walker, 2008). Additionally, these techniques can help students navigate the complexity of Latin and Greek roots that permeate medical and dental language, thereby strengthening their overall comprehension and confidence in using specialized vocabulary. Furthermore, supporting vocabulary development through methods such as word association games encourages deeper cognitive processing of terms essential to the field of dental technology (Li, 2011).

The impact of conceptual metaphor awareness on learning medical terminology among non-native students is a multifaceted topic highlighting the importance of metaphoric competence in language acquisition and understanding. Numerous studies indicate that metaphors facilitate the comprehension of complex medical terms and enhance cognitive engagement by linking unfamiliar concepts to students' existing knowledge bases. By

elucidating complex and abstract dental concepts through metaphorical language, learners can create mental frameworks that enhance comprehension and retention. Firstly, conceptual metaphors allow for the transformation of abstract dental terminology into more tangible and relatable concepts. Research indicates that metaphors enable learners to engage with difficult subjects, making them more accessible by illustrating that "learning is a journey" or "understanding is a puzzle" (Naghavian, 2024). This cognitive mapping helps learners build connections between new terms and their existing knowledge base, significantly improving their metaphorical competence (Hashemian, 2018; Zhang & Dhamotharan, 2021). Furthermore, findings from Gaskins and Rundblad indicate that targeted instruction can enhance metaphor production, which is important for bilingual learners navigating the complexities of medical language (Gaskins & Rundblad, 2023). This reinforces the notion that metaphor serves not only as a linguistic device but also as a cognitive bridge, fostering deeper understanding across languages (Lahlou & Rahim, 2022). Studies show that raising awareness of these metaphors can improve comprehension and retention of complex terminology (Cubillo & Esbrí-Blasco, 2022). Learners begin to see patterns and relationships between terms, rather than memorizing isolated facts. Some effective teaching strategies for using metaphors in medical terminology incorporate:

- Intentional use of metaphors, analogies, and similes - Educators can deliberately introduce metaphors to explain difficult topics. For example, describing inflammation as a "fire alarm system" helps students visualize the body's response to injury. This method was shown to enhance understanding and recall in pathology courses.
- Visual metaphors and illustrations - Pairing metaphors with visuals—like depicting the immune system as a castle under siege—can reinforce learning. Visual metaphors help students form mental models that are easier to remember and apply.
- Student-generated metaphors - Encouraging students to create their own metaphors fosters deeper engagement. It challenges them to internalize the concept and express it in a way that makes sense to them, which strengthens retention and communication skills.
- Discussion and negotiation of meaning - Facilitating group discussions around metaphorical interpretations allows students to refine their understanding and appreciate multiple perspectives. This collaborative approach also builds communication skills vital for future clinical interactions.
- Contextual integration - Metaphors should be embedded in real-world clinical scenarios. For instance, using military metaphors like "attacking the infection" in case studies helps students grasp both the terminology and its practical application.

Additionally, cultural factors significantly affect metaphor use and understanding. Metaphors are often deeply rooted in specific cultural contexts, and recognition of these differences in educational settings is crucial. Acknowledging that metaphorical expressions vary across cultures can lead to more mindful and context-sensitive teaching strategies in dentistry that resonate with diverse learner backgrounds (Cubillo & Esbrí-Blasco, 2022). Such strategies will not only facilitate vocabulary acquisition but also enable students to navigate cross-cultural interactions in their professional practice.

This paper aims to gauge the effectiveness of conceptual metaphor awareness in the acquisition of specialized vocabulary by students in the healthcare field.

2. MATERIAL AND METHODS

The study was conducted over three academic years – 2022/2023, 2023/2024 and 2024/2025 with first-year students of dental technology at the Medical College at the Medical University of Plovdiv. As a preliminary note, it has to be mentioned that English for Academic Purposes is taught only in the first year of a three-year course of a healthcare bachelor's degree at the college in the frame of 60 school hours per year. The sample of the study included doing exercises, testing and surveying two groups in each year in the specialty of dental technology, each one consisting of twelve-thirteen students (74 in all) of similar levels of English, ascertained via a diagnostic test as being intermediate/B1 and upper-intermediate/B2 according to CEFR. One of the groups in the study in each academic year served as the *control group* and the other as the *experimental group*. The premise of the study involved the comprehension of the specialized vocabulary of a reading text in a specialized unit from a textbook (Dagnev, 2021). The experiment was carried out in a single seminar with a duration of 90 minutes. The unit is entitled "Teeth and dental technology" and the text – "Teeth" (p. 107-108). The text is mainly about the anatomy of teeth and their development in people. The only means of term disambiguation for the control group was conducted through explanation in L2, involving category definitions and various types of exercises and excluding translation of any kind.

The experiment itself, carried out in the experimental group, consisted of several phases: Phase 1: Students read the text and ask questions about the new vocabulary. Phase 2: The teacher hands out flashcard with images related to 16

terms. The images do not refer to the specific domain of dentistry, but are broader and include general reference meanings. For example, when introducing the term “milk teeth”, the flashcard has an illustration of a bottle of milk, with the adjective “deciduous”, the flashcard presented a deciduous tree. The targeted vocabulary included the following terms: baby or milk teeth; erupt (v); deciduous dentition; exfoliate; arches; crown; root; translucent; anchor (v); junction; cementum; sockets; pulp; incisors; canines; wisdom teeth. The students are encouraged to associate the objects in the flashcards with the targeted specialized vocabulary. Phase 3: The students are divided into groups of 3 or 4 and are invited to group the vocabulary items into 4 or 5 domains. Five minutes are allotted to this activity. Phase 4 comes after some grammar is explained to put some buffer time between the explanatory Phases 1, 2 and 3 and the test that is the essence of Phase 4. This test represents a gapped text including all the targeted vocabulary and does not give any incentives to the students. Figure 1 illustrates the gapped text.

Fig. 1. Gapped text as part of Phase 4 of the experiment.

Teeth are small, calcified structures that are typically white and located in the jaws of humans and various animals. In humans, teeth play essential roles in chewing food, aiding in speech, and providing support for the jaws, cheeks, and lips. Throughout life, individuals have two main sets of teeth: the first set, known as deciduous or (1)..... teeth, (2)..... when a child is a few months old and is (3)..... by permanent teeth around the age of 12 to 13. The permanent dentition begins to replace the baby teeth around six years of age. Teeth are organized into two (4)..... in the upper (maxilla) and lower (mandible) jaws, with the (5)..... set containing ten teeth per arch and the permanent set containing sixteen. Functionally, teeth can be categorized into (6)....., (7)....., premolars, molars, and (8)..... Each tooth consists of several parts, including the (9)....., which is covered by enamel; the dentine, which forms the bulk of the tooth; the (10)....., which contains living tissue; and the (11)....., which (12)..... the tooth in the jawbone. The enamel, a (13)..... protective layer, is primarily made of inorganic materials like calcium and phosphorus. The cemento-enamel (14)..... marks the meeting point of the enamel and the (15)..... that covers the root. Additionally, important supporting structures include the alveolar process, which surrounds and supports the teeth, and the alveolar bone, which lines the (16)..... where the roots are embedded.

Source: The Author

Both the control and the experimental groups did the test. The results of the test are presented in Table 1, given the Bulgarian scoring system which posits 6 as the highest score and 2 as the lowest one (failed).

After the test, the students from the experimental group filled in a questionnaire asking for their opinions on the applied cognitive method of teaching specialized vocabulary. Part of the questionnaire was prepared in the Likert Scale from the most to the least significant value (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree). The questions are as follows:

Q1. Do you think you can memorize the targeted specialized vocabulary easier by performing the activities you did?

Q2. Do you think that simply providing definitions of these terms is clear enough?

Q3. Which activity was more challenging?

A. The activity with flashcards. B. Grouping the words into several areas.

Q4. Do you think more specialized vocabulary can be learned using these new activities?

Q5. Do you think grammar can also be learned using alternative activities like the ones you did?

3. RESULTS

Table 1 presents the results from the test on the targeted vocabulary items.

Academic Year	Control group score	No of students	Experimental group score	No of students
2022/2023	4.68	12	5.12	13
2023/2024	4.42	12	5.08	12
2024/2025	4.56	13	5.18	12

Source: The Author

Table 1 clearly indicates that the students in the *experimental groups* in each academic year fared better than the ones in the *control group*. The difference is approximately half a grade but is consistent over the period. The results from the test are statistically significant ($p \leq 0.05$).

As far as the questionnaire is concerned, it was aimed at the students of the experimental group as its purpose was to ascertain their attitude toward using cognitive methods and especially conceptual metaphor as a viable method of teaching. The third question was a simple choice one, while the other ones were in the Likert Scale type as described in the Materials and Methods section of the current paper.

Table 2. Answers of students to the Likert type questions in the questionnaire.

QUESTIONS/ OPINIONS	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly disagree
Q 1.	22	10	2	2	1
Q 2.	2	2	-	25	8
Q 4	17	12	5	3	-
Q 5	2	12	20	3	-

Source: The Author

Table 3. Answers of students to the third question in the questionnaire.

QUESTION/ ACTIVITY	Activity 1	Activity 2
Q 3.	8	29

Source: The Author

As can be seen from the Likert type questions, the students were very optimistic about the new approaches to teaching vocabulary. The third question shows that classification is still a very gruesome and complicated task for the students.

4. DISCUSSION

Despite the small scale of the conducted experiment, it has consistently shown that students highly approve of innovative methods of teaching, especially when acquiring new vocabulary. These new methods, as shown by the results from the performed test, yield better understanding and improve mental retention. It is inconsequential that students were not formally acquainted with the theoretical underpinnings of Conceptual Metaphor Theory, as they applied approaches involving conceptual metaphors (especially in Phase 3 of the experiment).

Although, the experiment was also limited in scope and by no means conclusive, it is supported by research carried out by many other analysts in the field. For example, Zhang and Dhamotharan demonstrate that integrating a metaphor-enriched curriculum into medical English for first-year students can facilitate the transition from English for General Purposes to English for Specific Purposes (ESP), particularly in fields like medicine that rely on specialized vocabulary and conceptual frameworks (Zhang & Dhamotharan, 2021). The relationship between metaphor awareness and vocabulary acquisition is also supported by Miao, who stresses that developing metaphoric awareness is vital for effective foreign language instruction (Miao, 2023). In another study, Shao examines metaphor's influence on cognitive processes in second language learning and finds out that metaphors significantly affect reasoning and knowledge organization (Shao, 2024).

However, Howe provides a critical perspective on the dual nature of metaphor in second language vocabulary acquisition, indicating that while metaphors can aid understanding, they may also introduce challenges, particularly when first language interference arises (Howe, 2024). This complexity suggests that an acute awareness of metaphoric language is crucial, as it can either hinder or facilitate the learning process depending on the learners' background and existing vocabulary knowledge. This finding suggests that students should be made aware of any cultural differences that may arise when conceptualising complex ideas.

5. CONCLUSION

Although fairly limited in scope, the study has a high value of statistical significance and thus may be considered a firm assertion of the importance of introducing cognitive methods in acquiring specialized vocabulary. The

conducted experiment can be regarded as a viable mode of teaching English for Special Purposes and in particular English for Academic Purposes. Students do find it easier to remember and learn specialized vocabulary items making use of conceptual metaphors, which in turn facilitates classroom activities. Given the short period of learning EAP, any means of study that make it easier and clearer deserves attention. As a follow-up, it may be considered useful to extend and expand the type and scope of innovative methods, especially such that utilize cognitive tools in specialized vocabulary acquisition.

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