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The Effect of Semantic Mapping on Students' Vocabulary

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Abstract

Nursing students at King Saud University (KSU) are considered to be low achieving readers. They face difficulties with understanding medical texts due to the fact that they lack some necessary medical vocabulary knowledge. Thus, the researcher used computer-assisted semantic mapping (CASM) with level-three (114 NAJM) nursing students to map medical terms for the purpose of helping such students in vocabulary acquisition. The present study, therefore, aimed at investigating the efficiency of CASM in improving ESP students' vocabulary knowledge.
Participating subjects were of two groups: Group A (n = 32) and Group B (n = 26). The control group (n = 26) received traditional in-class instruction that depends on the textbook only and the experimental group (n = 32) received a combination of traditional in-class instruction and SM instruction using a software (FreeMind 0.8.1). A pre- and post-test were utilized to assess student vocabulary skills before and after the intervention. The semantic-mapping treatment lasted 8 weeks. Results showed that SM expanded student vocabulary.

Keywords: ESP, nursing students, semantic mapping, vocabulary

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Introduction

The process of reading goes beyond simply decoding words on a page. It involves understanding the meaning of individual words and combining their meanings to reach an understanding of a reading text. Thus, knowledge of vocabulary items can aid in reading comprehension. Researchers such as Brown, Waring, Donkaewbua (2008), Waring and Takaki (2003) and Horst (2005) state that there is a strong relationship between students' word knowledge and reading comprehension. People with large vocabulary understand more of a text. As suggested by Davis (1942, 1944), reading, as a skill, is built on a number of sub-skills. He mentions that two of the components, word knowledge and reasoning in reading, account for 89% of students' achievement.

Nursing students at King Saud University (KSU) are considered to be struggling readers compared with medical students. Pre-medical and nursing students are required to take an English for Specific Purposes (ESP) course known as 134 NAJM for pre-medical students and 114 NAJM for nursing students that aims at improving students' English and medical knowledge at the same time. The objectives of the course are mainly increasing students' medical terms and improving their reading comprehension level. Nursing and pre-medical students need to understand the meanings of medical terms if they are to understand medical texts. After teaching the course to both groups, the researcher noticed that nursing students are facing difficulties with understanding and recalling medical texts due to the fact that they lack some necessary medical vocabulary knowledge.

One of the techniques that gained some popularity for its efficiency in improving students' reading comprehension level and their vocabulary is the technique of semantic mapping (SM). As defined by Pearson and Johnson (1978), SM is an organizational strategy that shows graphically and visually the relationships between ideas.

Al-Jarf (2009) highlights that a considerable body of research indicates the effectiveness of SM in science (Özmen, Demircioğlu & Coll, 2009), nursing (Jitlakoat, 2005), psychology (Berry & Chew, 2008), economics (Chiou, 2009), medicine (Gonzalez, Palencia, Umana, Galindo, & Villafrade, 2008) , research methods (Hay, 2007), and teacher education (Andrews, Tressler, & Mintzes, 2008). It can be used in every language skill to benefit native speakers of English at all grade levels. It has been implemented with success in writing (Ojima, 2006; Al-Jarf , 2009), reading (Siddiqi, 2007; Hall & Strangman, 2002), and vocabulary (*Little & Box, , 2011).*

Nowadays, computer-related technologies have been successfully introduced as instructional tools in classrooms and their impact cannot be ignored. Thus, the researcher will use a computer program known as *FreeMind 0.8.1* to generate semantic maps. Such a program uses lines, arrows, branches, pictures, and colors and thus it makes learning tasks more appealing and motivating. Anderson-Inman and Horney (1997) highlight that computer-assisted SM (CASM) is a rich tool that stimulates the visual thinking that underlies knowledge representation and makes it more accessible and attractive. Due to the wide use of SM in different areas, the researcher will use CASM to investigate its effectiveness with nursing students who need sufficient knowledge of medical terms to understand medical passages.

Semantic Mapping

Khoii and Sharififar (2012) describes SM as "a visual strategy for vocabulary expansion and extension of knowledge by displaying in categories words related to one another" (p. 202). Hence, semantic maps are of two aspects: visual and conceptual. Visually, a semantic map is an arrangement of shapes such as boxes, triangles, circles, or rectangles connected through lines and arrows. Conceptually, a semantic map contains verbal information within such shapes (Fisher, 1995, p. 68). Novak (1998, p. 3) noted that since semantic maps are "knowledge representation tools;" they should be read from top to bottom; from general concepts to more specific ones at the bottom.

SM can be used, as noted by Buzan (2000), to take notes, improve memory, generate and develop ideas. Hague (1987) and Machalias (1991) note that classroom activities that foster the formation of associations between concepts may build up semantic networks necessary for long-term retention. Hence, it has been proven that SM enhances recall of information (Berkowitz, 1986), helps in problem solving and decision making (Shmaefsky, 2007), lowers student apprehension about a subject (Jegede, Alaiyemola, and Okebukola, 1990), aids in planning learning materials (MacArthur, 2009), helps pinpoint any misconceptions, and thus allows teachers to find any initial barriers to learning (Brown, 2002).

Using computer software to generate semantic maps is one way to foster student participation and increase their motivation to higher levels. Anderson-Inman and Horney (1997) state that CASM may activate the visual representation of any form of knowledge and make it more accessible. Also, Plotnick (1997) highlights that computer support for SM makes adaptation and manipulation easier, develops dynamic thinking, and enhances communication and storage. Due to the various uses of the technique, as noted by Ward (1988), SM has been widely used as a prereading or prewriting strategy, as a post-reading check of comprehension, or for general vocabulary development.

Selected Studies on Semantic Mapping and Vocabulary

A number of instructional studies examined the impact of SM on improving students' vocabulary (Pittelman, Levin, & Johnson, 1985; Toms-Bronowski, 1982; Dyer, 1985). Most of these studies conducted on the use of SM for vocabulary development advocate the use of SM as a pre- and post-reading strategy. Such studies were with elementary school students. For example, Johnson, Pittelman, Toms-Bronowski, & Levin (1984) examined the impact of three strategies (teacher-directed SM, semantic feature analysis, and a modified basal approach) on fourth graders' vocabulary. The aforementioned strategies were taught as examples of pre-reading vocabulary instruction. Results showed that the two groups receiving instruction in SM and semantic feature analysis outperformed the one of the modified basal approach.

Similarly, Nilforoushan (2012) worked with sixty intermediate female learners of English to examine the effect of SM (as a post-reading strategy) on students' awareness of two affective dimensions, evaluation and potency dimensions of deep vocabulary knowledge. Using a vocabulary achievement test, the researcher reported that SM was an effective strategy in improving students' awareness of the affective domains. However, Khoii and Sharififar (2012) chose thirty-eight intermediate female learners of English to compare the technique of SM to rote memorization. Posttest results showed that the difference between both groups using the above-

mentioned techniques is not significant concluding that SM is not superior to rote memorization. The researchers attributed this lack of statistical significance to poor students' involvement in map creation and the use of other cognitive strategies by the rote-memorization group such as that of mnemonic.

Thus, Al-Jarf (2010) recommended an instructional strategy for teaching vocabulary that can be followed by teachers interested in implementing a SM computer program in class. The procedure is of six stages: (a) *orientation,* (b) *presentation and modeling,* (c) *guided practice,* (d) *independent practice,* (e) *extension activities,* and (f) *assessment.* In the first stage, students are exposed to the SM software and its components. Then, the instructor can train their students in using the program by creating different kinds of maps: (a) *morphological maps* for words sharing the same root, prefix, or suffix, (b) *phonics or sound-symbol association maps* for words with silent letters, words with hidden sounds, homonyms, and homophones, (c) *syntactic maps* which focus on the plural and singular form of words, collocations, idioms, and phrasal verbs, (d) *semantic maps* for antonyms and synonyms, and (e) *phonological maps* that focus on pronunciations and stress patterns. In the *guided practice stage,* students connect words they already know with those studied in class through using the SM program. Students will be guided by their teacher to add any new word covered in class to the previously created maps according to specific categories. For the *independent practice stage,* students will continue using the program at home and will be asked to add new words to their maps and to create more maps. On tests, the instructor can give their students a semantic map of specific category and with blank nodes to be filled with appropriate items. In this way, student knowledge of vocabulary items is evaluated and hence SM can be used also for evaluation purposes.

Methodology

Population of the study

The participants of this study were ESP Saudi university female students studying at the Nursing College, KSU, Riyadh, Saudi Arabia. This study took place during the first semester of the academic year 1430/31 AH (2009/10). Students were in their third semester taking an ESP course (114 NAJM) offered by COLT. The subjects were all native speakers of Arabic and they were the researcher's students. Their median age was 19, and they all had no less than seven years of EFL instruction in grades 6-12 prior to their admission to the Nursing College. Students enrolled at the College of Nursing are provided with the essential knowledge and skills that help them become qualified nurses. They are encouraged to act promptly and to think critically in order to face career challenges in any setting. Thus, students are not only offered specialized courses in nursing, but they are given other courses in chemistry, physics, nutrition, pharmacology, anatomy, physiology, biostatistics, the English language (112 NAJM and 113 NAJM), the Arabic language, the Islamic culture, etc.

Participants were of two intact groups (76 participants), but the total number of subjects became 58 because of students' irregular attendance and withdrawal, which affected the process of obtaining data. The control group (n = 26) received traditional in-class instruction that depends on the textbook only (*The Language of Medicine in English* by Ethel and Martin Tiersky) and the experimental group (n = 32) received a combination of traditional in-class instruction and SM instruction using a software (FreeMind 0.8.1).

114 NAJM is the only ESP course offered by COLT to nursing students. The course is taught to students of level three for three hours per week. It aims at improving students' reading comprehension level and vocabulary. Hence, the textbook assigned for the course (*The Language of Medicine in English* by Ethel and Martin Tiersky) is primarily of medical passages followed by sections focusing on some medical terms and exercises. Exercises are reading comprehension exercises (T/F statements, WH-Questions, identifying causes and their effects, inferencing, etc.) and vocabulary exercises, including analyzing words and word parts, matching words with their meanings or synonyms, matching meronyms (parts such as organs) with holonyms (wholes exemplified by systems), etc. The researcher covered only five required chapters from the book, namely, "Highlights from the History of Medicine", "Human Anatomy", "Disease: Its Symptoms and Treatments", "Physicians and Medical Specialties", and "First Aid in Medical Emergencies".

Research Design

This study is of a *quasi-experimental design* known as the nonequivalent-control-group design (hereafter NEGD) represented as follows:

O_1	X	O_2	O_1 O_3	= pretests

O_3	C	O_4	O_2 O_4	= posttests

Figure 1. **The pretest-posttest nonequivalent-groups design (Best & Kahn, 1986, p. 129).**

Following the above illustrated design, Group A (n = 32) was the experimental group that received the intervention (SM instruction) whereas Group B (n = 26) was the one instructed traditionally using the textbook only. This study was of 11 weeks from the 14th of October to the 13th of January. SM treatment lasted 8 weeks. Both groups were pretested during Week 1 to ensure that they were comparable to each other and to attribute any resultant change in student behavior to the treatment itself and not to any other factor.

During the second week, students of the intervention group only received a training session on the procedure of SM. A week later, the experimental group started using SM to map medical terms in their textbook. The control group, on the other hand, was taught in a traditional way, as is usually the case in traditional teacher-fronted classrooms. The post-test was administered to students of both groups during Week 11 to measure the extent to which the treatment benefited students of the experimental group.

Vocabulary Test

The vocabulary test is of 30 items (matching questions). It was set to explore students' ability in identifying meanings of words using their knowledge of medical roots, matching words with their definitions, and matching meronyms with holonyms. Such vocabulary skills are emphasized in student textbook and textbook exercises. Student textbook, *The Language of Medicine in English,* is not merely of medical passages, but each passage is followed by a group of words and their definitions. Students were asked to medical terms and they had to find ways of dividing medical terms into categories to create maps of medical words and their definitions. Hence, the focus of Question III (see Appendix 1) is on matching words with their definitions.

Students were also required to generate maps of body systems (holonyms) and their organs (meronyms). Identifying the organs of each body system is the focus of Chapter 2 and thus Question II (see Appendix 1) is about matching body systems with their organs. Textbook exercises place a lot of importance on medical roots and hence students were urged to create maps of words sharing the same medical root. The focus of Question I (see Appendix 1) is on matching medical terms with their definitions and students had to depend on their knowledge of medical roots to answer this question.

The researcher chose to test student vocabulary through matching questions because such questions are used normally in testing meanings of words (Pavlů, 2009). In addition, educators argued that matching questions are the best when one wants to assess "content knowledge" (Jones, 1994). Further, Jones stated that matching questions are more efficient than multiple-choice questions since one can read one list of distracters to answer a group of items. To avoid any arbitrary answers by students, the researcher included more options than premises in the test and hence the probability of guessing is low.

Three types of validity have been obtained for the pre- and post-test: content validity, face validity, and concurrent validity. According to Hughes (1989), a test is said to have content validity if its content truly reflects the purpose of the test. It can be safely said that the test (See Appendix 1) sufficiently covers the entire body of the content that was intended to be measured. The vocabulary test, for example, contains items that were set to explore students' ability to identify meanings of words by using their knowledge of medical roots, matching words with their definitions, and matching meronyms with holonyms. Heaton (1975) stated that one should develop a table of test specifications to achieve content validity. Thus, the following test blueprint was developed by the researcher to specify the content of the test.
Face validity was also obtained for the same pre- and post-test. A test having face validity, as described by Heaton (1975), is a test that "looks right" when shown to other testers and testees (p. 159). It has been shown to three experienced teachers at COLT (two MA holders in English Literature and one MA holder in TESL) who taught the course more than once. All the reviewers confirmed the suitability of the test to student level and suggested some modifications that have been considered.

Test reliability was calculated for the pre- and post-test. According to Heaton (1975), for a test to be valid, it should be reliable in the first place. As defined by Hughes (1989), a test is reliable if it gives the same results when scored by different people or administered on different occasions. To achieve test\re-test reliability, the pre- and post-test was piloted with a sample (n = 24) of 114 NAJM students who were not part of the present study. It was administered to the same group on two different occasions (two-week interval). Scores obtained from these two administrations were correlated using the Pearson product-moment correlation coefficient. Results revealed that the test showed a moderate to high degree of correlation which suggested that students performed similarly on both occasions. Hence, the vocabulary test (r = 0.675) is considered to be reliable.

Description of the Treatment

FreeMind 0.8.1 is the software used in the study and it is a free mind mapping program written in Java licensed under a free software license called the GNU General Public License. The

program is used for creating mind maps. A mind map, as mentioned above, is a diagram of nodes representing ideas or words and arranged around a central concept (Tanaka, 2007, p 4). The program is notable for its ability in helping users in generating, classifying, and organizing ideas. It can also aid in problem solving and decision making (Tanaka, 2007, p 5).

Week 3 was marked as the first week of the experiment, which lasted eight weeks. The control group (Group B) was taught in a traditional way, whereas the intervention group (Group A) was exposed to the technique of SM and was required to map medical terms using FreeMind 0.8.1. With the control group, the instructor would start explaining the meanings of the key terms listed after each medical passage in each chapter. Then, the teacher would go back to the passage to explain each paragraph. After that, students of the control group were asked to do the exercises and their answers were shared and discussed among the group.

On the other hand, for the experimental group, keywords (pertinent to the chapter) were introduced by the teacher to be mapped. When the teacher introduced important keywords, she asked students to think of other words related to it to activate their prior knowledge. Using the SM software, the projector, and a laptop, students' responses were documented and the teacher prompted students to find ways of categorizing such words and connecting them to each other. Hence, students worked with the teacher and individually to map some medical terms of the passage by identifying their synonyms, antonyms, definitions (see Figure 2), derivatives, etc., or by finding other medical terms that share with the key one its prefix, suffix, or its root (see Figure 3), or identifying meronyms and holonyms (see Figure 4). As students reached the end of the intervention, they were able to map more medical terms. Maps created by students ranged from re-focused semantic maps (teacher-directed emphasis) to general semantic maps (student-generated) made towards the end of the treatment.

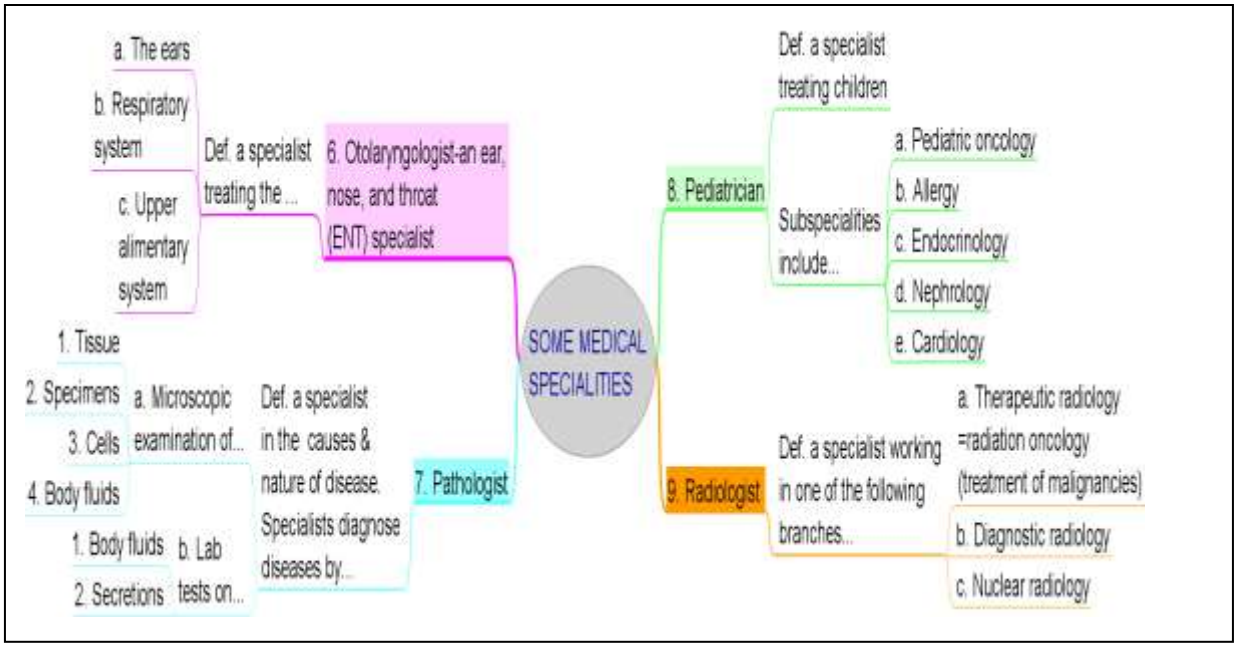

Figure 2. **A semantic map showing some words and their definitions (Tiersky & Tiersky, 1992).**

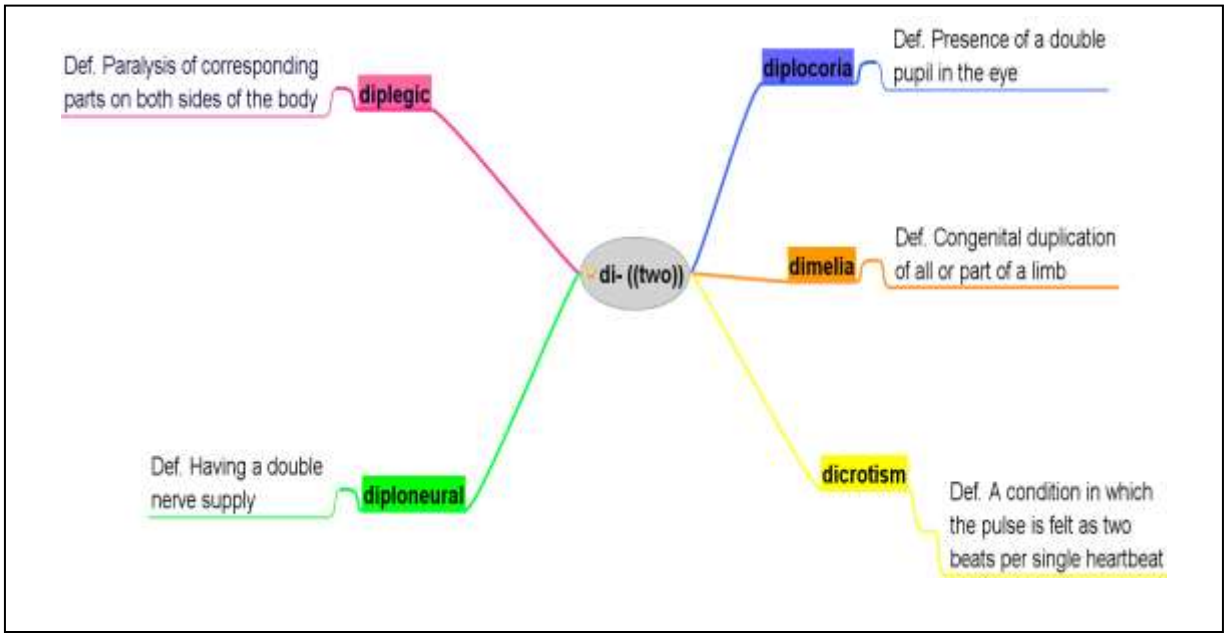

Figure 3. **A student-created semantic map showing words that share the same prefix.**

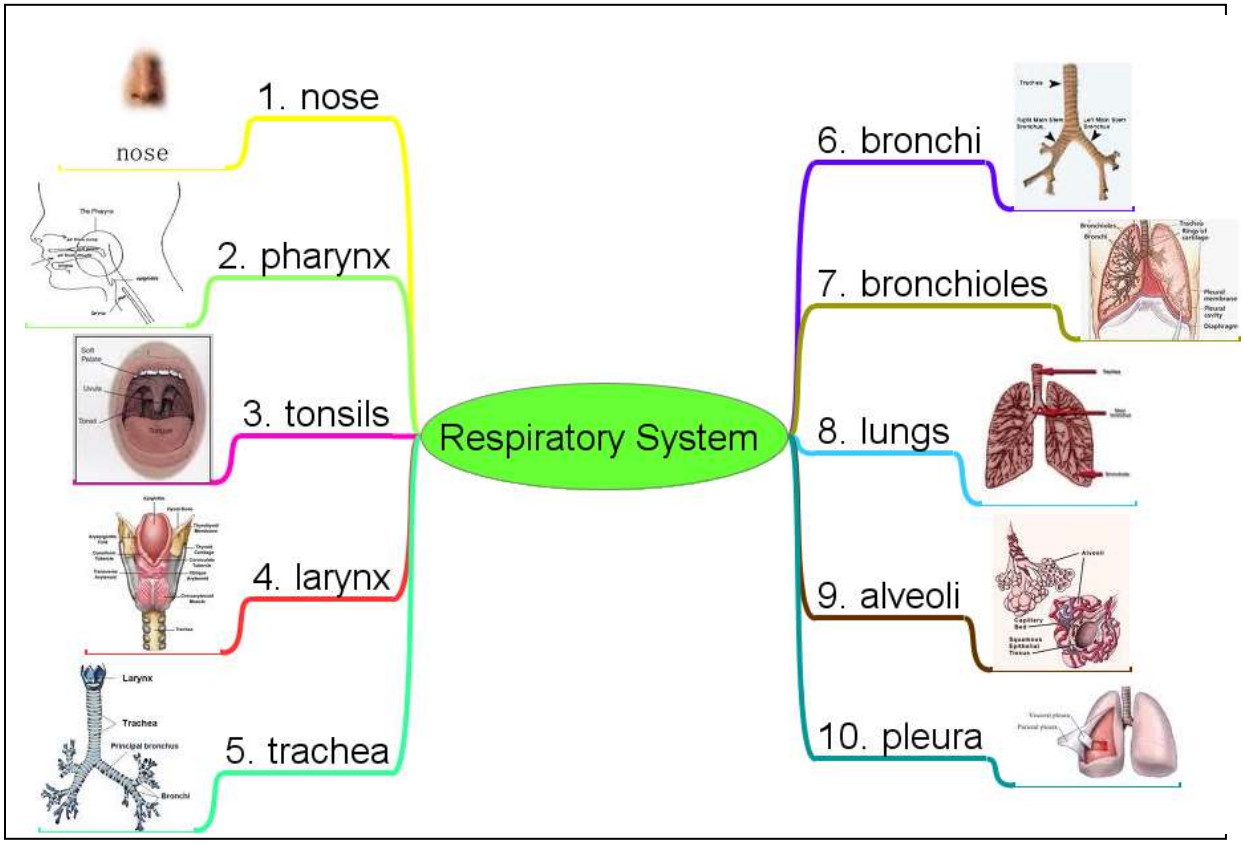

Figure 4. **A map of the respiratory system (as a holoynm) and its organs (meronyms) (Tiersky & Tiersky, 1992).**

Data Analysis

To analyze the obtained date, the researcher used descriptive statistics to describe the basic features of the collected data. Descriptive statistics are necessary to show the distribution, the central tendency (mean, median, and mode), and the dispersion (standard deviation) of data. Inferential statistics such as the independent samples *t* tests, the paired samples *t* tests, and the Pearson product-moment correlation coefficient were used to compare the mean scores of both groups, to measure student progress in each group, and to compare student performance on one post-test with that of another.

The research question asks: Is CASM an effective technique for increasing nursing students' knowledge of medical terms? To answer this question, one needs to compare student performance in both groups before and after the treatment. The pre-test was used to ensure that both groups were equivalent before carrying out the experiment. To ensure the equality of both groups, the researcher used the independent samples *t* test. Results of the vocabulary pre-test (see Table 1) showed that there was no significant difference between the two groups. The mean score of the experimental group (n = 32) was (16.31) with a standard deviation (SD) of (4.496), whereas the control group (n = 26) scored (16.34) with a SD of (4.947). As shown in Table 1, the Sig. (2-tailed) was (0.978) and it is greater than (0.05) and hence one can conclude that there was no significant difference in the mean scores between the two groups before the commencement of the treatment.

Table 1 ***Vocabulary Pre-test Results Using the Independent Samples t Test***

Group	N	Mean	SD	*t*-Value	Sig. (2-tailed)
Case group	32	16.31	4.496	-.027	.978
Control group	26	16.34	4.947		

Note. The probability of error (*P*-value) is significant if it is equal or less than .05.

To find out if CASM has increased the vocabulary range of students in the experimental group, the independent samples *t* test was used to analyze vocabulary post-test results. Table 4-6 showed that the mean score of the experimental group was (28.21) with a SD of (1.929) and that the control group scored (25.15) with a SD of (3.966). Table 2 showed that the Sig. (2-tailed) was (.000) and it is less than (0.05) indicating a significant difference between both groups favoring the case group.

Table 2 ***Vocabulary Post-test Results Using the Independent Samples t Test***

Group	N	Mean	SD	*t*-Value	Sig. (2-tailed)

Case group	32	28.21	1.929	3.608	.000
Control group	26	25.15	3.966		

Note. The probability of error (*P*-value) is significant if it is equal or less than .05.

Besides the analyses presented above, the researcher used the paired samples *t* test to measure any increase in student vocabulary by comparing student mean scores (of the same group) in the pre-test with those of the post-test. As shown in Table 3, the pre-test mean score of the experimental group was (16.31) while their post-test mean score was (28.21). The Sig (2-tailed) was (.000) and it is less than (0.05) indicating a significant difference between student performance on both tests in favor of the post-test.

Table 3 ***Paired Samples t Test for the Difference in Student Vocabulary Between the Pre- and Post-test of the Case Group***

Test	Mean	N	SD	*t*-Value	Sig. (2-tailed)
Pre-test	16.31	32	4.496	-18.923	.000
Post-test	28.21	32	1.929		

Note. The probability of error (*P*-value) is significant if it is equal or less than .05.

On the other hand, the pre-test mean score of the control group was (16.34) while their post-test mean score was (25.15). As shown in Table 4, the Sig (2-tailed) was (.000) and it is less than (0.05) indicating a significant difference between student performance on both tests favoring the post-test.

Table 4 ***Paired Samples t Test for the Difference in Student Vocabulary Between the Pre- and Post-test of the Control Group***

Test	Mean	N	SD	*t*-Value	Sig. (2-tailed)
Pre-test	16.34	26	4.947	-10.357	.000
Post-test	25.15	26	3.966		

Note. The probability of error (*P*-value) is significant if it is equal or less than .05.

From the results advanced above, student vocabulary of both groups has increased significantly, but students of the treatment group outperformed those of the control group. One can conclude that this significant increase in the vocabulary of the experimental group was due to the use of CASM. As a result, the researcher would reject the null hypothesis and would state that CASM is an effective technique for increasing students' knowledge of medical terms.

Discussion of Results

Students' vocabulary of both groups has increased significantly but students of the experimental group outperformed those in the control group in the vocabulary post-test. Similar findings have been emphasized by Toms-Bronowski (1982), Pittelman and Johnson (1985), Nilforoushan (2012) and Moore and Readence (1984). It is important to note that such an improvement in performance can be attributed to a number of factors. First, students were given a chance to be responsible of their learning and create their own maps as they explore the intricacies of the program (Khoii & Sharififar, 2012). Further, the instructor's guidance at the beginning of the course helped students overcome most of the technical problems. It also paved the way for students to focus on the process of mapping medical terms. In addition, the taught vocabulary was contextualized and this gave students more than one way to map terms (holonyms and meronyms, words sharing the same root or prefix, hypernyms and hyponyms, etc.). Using SM as a memorization tool, students' retention of word meaning has been improved. SM was also useful as an evaluation method to check on student learning.

The present study suggests some theoretical and pedagogical implications that need to be highlighted. Theoretically, this study reinforces the role of prior knowledge in helping students acquire new information. As suggested by previous research, background knowledge and word knowledge are equally essential for reading comprehension (Little & Box, 2011). Certainly, the technique of SM aided learners in vocabulary acquisition and helped them relate new information to old information. Pedagogically, the study emphasizes the role of computer in classrooms. Computer programs can add easiness to task accomplishment and enjoyment to learning activities. Further, computers can make students' assignments more organized and reduce dependence on teachers as the only source of knowledge. They make students more motivated and more engaged in the learning process. Obviously, CASM helped students learn independently and think more deeply. It was extremely useful in summarizing and organizing medical passages and hence can be used as an effective revision tool. It would be also suggested from this study that metacognitive strategies can work very efficiently if used with small classes, so it would be easier for instructors to provide intensive training for students and detailed explanation of each student-created map. It has been expected that map creation during class hours would take up more time than scheduled, but CASM facilitated student comprehension of medical passages and saved class time.

Conclusion

Nursing students at KSU struggle a lot in reading courses because their repertoire of medical vocabulary is so limited. . Thus, the researcher used CASM with level-three nursing students to map medical terms for the purpose of vocabulary retention. The present study, therefore, aimed at investigating the efficiency of CASM in improving ESP students' vocabulary knowledge. The SM intervention lasted 8 weeks and students of both groups (traditional and

experimental) were pre-tested and post-tested. An analysis of students' scores on the post-tests indicated that the experimental group achieved significantly greater gains than the control group. Based on the study findings, some suggestions are offered. First, FreeMind 0.8.1 could not exhibit the relationship between nodes of the same level and of different levels. Therefore, other mind-mapping programs should be tried if one wants to create more complex maps to emphasize more relationships between words. Additionally, to map terms related to the same passage, one map can be linked to another using a different program. Also, examining words from more than one aspect helps in vocabulary retention.

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Appendix1. Vocabulary test

Name:……. Group:…….. Score:……./30

I. Instructions: Use your knowledge of word parts to match words in Column B with their definitions in Column A. Answers in Column B will be used only once. (1 point each)

Column A	Column B
…….1. Inflammation of the skin	A. Cardiectasis
…….2. The condition of having an abnormally low body temperature	B. Dermatitis C. Diplopia
…….3. The surgical removal of the whole or a part of the stomach	D. Gastrectomy E. Histokinesis
…….4. The study of the origin and development of the mind	F. Hypothermia G. Leukodystrophy
…….5. The study of the anatomy and diseases of the ear	H. Oncotomy I. Otology
……..6. The free discharge of a thin nasal mucus	J. Psychogenesis
……..7. Double vision, in which a single object is seen as	K. Rhinorrhea

two objects L. Synergist
……..8. Conjoined twins united at the chest M. Thoracopagus
.....9. The incision of a tumor or swelling N. Vasculitis
……..10. Disturbance of the white substance of the brain
……..11. An agent that increases the effectiveness of another agent when combined with it
……..12. Movement in the tissue of the body
……..13. Dilation of the heart

II. Instructions: Match words in Column A to the systems where they can be found in Column B. Answers in Column B will be used only once. (1 point each)

Column A	Column B
…….1. Rib cage	A. Cardio-vascular
…….2. Thyroid	B. Digestive
…….3. Larynx	C. Endocrine
…….4. Alimentary canal	D. Integumentary
…….5. Urethra	E. Nervous
…….6. Medulla oblongata	F. Respiratory
…….7. Vena cava	G. Skeletal-muscular
	H. Urinary

III. Instructions: Match the terms in Column B to their definitions in column A. Answers in Column B will be used only once. (1 point each)

Column A	Column B
…….1. Infectious agents given to patients to establish resistance to particular diseases	A. Antidote
	B. Atria
…….2. A dead body	C. Cadaver
…….3. A substance that neutralizes poisons or their effects	D. Hemorrhaging
…….4. The upper champers of the heart	E. Hysterectomy
…….5. A combination of symptoms usually found in a particular disease	F. Immunity
	G. Plasma
…….6. The body's ability to resist microorganisms	H. Stapedectomies
…….7. Middle-ear surgery for hearing loss	I. Syndrome
…….8. Surgical removal of the uterus	J. Vaccines
…….9. Severe bleeding	K. Antiseptic
…….10. The yellow-colored liquid component of blood, in which blood cells are suspended	