

**Integration of Poe AI Chatbot into English Medical Vocabulary
Learning Classes for Students of Nursing**

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Abstract: This research aimed at integrating an AI chatbot (Poe-AI) into English medical vocabulary learning classes for nursing students and their interests in learning it. A quasi-experimental pre/post-test design was adopted, involving two groups: one was control (N=30) and the other was experimental (N=30), recruited voluntarily from 2nd year nursing students at Technological Nursing Institute (TNI), Beni-Suef governorate, Egypt. Instruments included a needs analysis questionnaire, an English medical vocabulary test, and an interest in learning scale. The intervention spanned 12 sessions over six weeks and was conducted during the 1st term of the 2024/2025 academic year. Findings indicated positive effects of the integration of the Poe AI into English medical vocabulary learning for nursing students who had high interests in learning it using Poe AI. AI chatbots should be incorporated into ESP programs as an effective means for enhancing medical vocabulary use. Furthermore, it was recommended using AI chatbot as a valuable assessment tool in ESP contexts.

Keywords: AI chatbot, English medical vocabulary, Interest, Nursing, Poe AI

1.1 Introduction

Medical vocabulary learning is a major aspect for nursing students in order to achieve the professional communication process. Either professionally or academically, they are required to retain and use vast amounts of these vocabularies. To address this challenge, AI chatbots can provide ESP classes with interactive resources based on their personal needs and attract curiosity in knowledge instead of only text-based materials. ESP programs should pay attention to the learner's curiosity which is the seed of their interest in learning.

Medical vocabulary, as a specialized language employed by nursing students to communicate with patients or peers or doctors (Ahmed, 2022: 50), is a main concern for them (Alahmed, 2024: 26) as it assists them to read reports, complete admission form, make diagnoses (Hsu; Chan&Yu,2023:1), write admission notes, as well as medication administration records (Hsieh, 2016:1). Therefore, the more they retain them, the easier they contact with patients and colleagues and do their roles and future job. They are in need to get its meaning, pronunciation and usage (Zaidi &Al Jadaan, 2022: 92). However, they complain that they forget most of those they have learned previously (Mahdi & Gubeily, 2018: 115).

Due to its nature and varied etymologies, medical vocabulary is a challenging task for many instructors and students (Alahmed, 2024: 26 & Hsu; Chan &Yu, 2023: 4185). For instructors, it is tough to express concepts disguised in terminology from languages other than English, including Greek and Latin. As a result, the students find difficulty in pronouncing, and retaining them (Askarova, 2023: 77) and become uninterested in pronouncing, spelling, remembering, and using them (Abdullah, 2013: 225 & Hassoun, 2019: 105). Thus, more than one third of these students fail in their medical terminology courses (Ahmed, 2022: 51).

To explore other difficulties of medical vocabulary learning among 76 trainees, Khan (2016) has found that they can't use morphological knowledge, e.g. suffixes and prefixes, or pronounce letters that don't have one-to-one relationships between sounds. Moreover, Najafi and Talebinezhad (2018: 27) state that "they can't

recognize collocations due to the differences between the word order in their native language and English". This problem is attributed by Ayadi and Beghoul (2024:11) due to: (1) lack of linguistic skills, (2) insufficient inclusion of medical content in textbooks, and (3) lack of interest. In this sense, Khan (2016: 79) has shed the light on the need to design a logically coherent material that can cater to their learning interests and needs.

Conducting a needs analysis among medical sciences students, Alizadeh; Ramazanzad and Sharifi (2021) have assured the scarcity of educational materials in accordance without students' interests. They need various teaching and learning aids aligned with their personalized learning. Most of educational institutions tend to use textbooks and wordlists heavily as a technique for teaching words through either overhead projectors or PowerPoint.

In align with this; EFL instructors still use some traditional techniques for teaching new medical vocabulary (Najafi & Talebinezhad, 2018: 239). Such passive techniques make nursing students less interested in retaining vocabulary in a long-term memory (Cerrato, 2022). This might be due to their heavy emphasis on textbook definitions which lack the visual context to facilitate lasting comprehension. In order to enhance these skills crucial for safe nursing practice, it is important to explore innovative tools (Kristanto, Glomjai, & Putri, 2024: 12) Thus, Akbari and Tahirian (2009: 514) have recommended that ESP textbooks should:

1. incorporate interactive materials related to specific medical fields.
2. have role-play activities based on scenarios for the specific medical field.
3. concentrate on specific skills based on what the students need and want.
4. have activities based on AI visual and auditory aids.

In relation with vocabulary learning, interest and learning are two faces for one coin. Learning as an act of getting experience, knowledge, skills and values by understanding what and how to do any task, brings about changes in the existing behavior of an individual. As a part of doing the behavior, the interest is an encouragement of learning by doing (Marpaung, 2022: 8). Interest is a tendency that the learners know things or

love some activities. If a learner focuses on a thing for a long time under a certain orientation, he/she is interested in it (Zhao, 2014: 308). As a powerful motivational process, it guides academic and career trajectories, and is essential to academic success. However, the students generally lack interest in learning a FL. They often reject to learn and have a certain barrier of understanding it. As a result, it is hard for them to improve their FL level so it is very important to arouse their interest (Zhao, 2014: 308). However, interest in learning is decreasing, because of lack of feelings, confidence, and teacher's method (Marpaung, 2022: 1).

In so far, ESP courses do not meet these needs and instructors should teach vocabulary in context rather than teaching it in separate lists. To meet the students' diverse needs, instructors need to be equipped with the latest methods of teaching vocabulary (Ahmed, 2022: 51; Zafirovska & Xhaferi, 2022: 505). Thus, there is a need for an effective approach to display various learning materials effectively (Putri et al. 2023: 111), receive dedicated teaching on the linguistic rules of medical vocabulary (N. McAllister et al. 2024: 1), be guided and have a defined learning material to memorize (Zaidi & Al Jadaan, 2022: 92), and produce appropriate educational materials in the form of teaching and learning aids to enhance vocabulary learning (Alizadeh; Ramazanzad & Sharifi, 2021: 61). To cope with ESP vocabulary, Elsanousi Hamad, and Ahmed (2021, 119: 120) have recommended that the instructors should incorporate AI into designing courses and selecting materials.

AI enables computers and machines to simulate learning, understanding, problem-solving, decision-making, creativity, and computer-based human intelligence. As one of the driving forces of the industry 4.0 revolutions to create an interesting learning environment (Anggraini & Faisal, 2024: 950), AI reinforces retaining information in the form of text, image and sound (Manimurasu, 2024: 26). However, the lecturer still give the medical vocabulary, pronounces it and asks students to do tasks (Alizadeh; Ramazanzad & Sharifi, 2021: 61).

With the enhancement of the fifth generation of computers, AI assists students to practice its applications (Ghoneim & Elghotmy, 2020: 4.) Greatly, it makes the

learning environment interesting for both the students and instructors (Ja'ashan; Alfadda & Mahdi, 2022: 2). Exploring the role of AI applications in English Language Teaching (ELT), Anggraini, and Faisal (2024) indicated that AI offers a conducive learning environment for ELT, creates a personalized environment where students use their senses to simultaneously practice English skills depending on their current English proficiency level, vocational needs, or interests. To make learning medical vocabulary more engaging and effective, Hsu; Chan and Yu (2023: 2) have presented a novel approach that uses JavaScript, jQuery, and HTML to develop a chatbot system with crossword puzzles, named Termbot.

Chatbots can assist EFL students and are not limited by human constraints such as forgetting and recall. They can simulate a conversation with a colleague when it comes to learning and training. A training event should appear and feel like a natural conversation between you and a co-worker, so it can be very personal, to the point and enjoyable. A chatbot is a conversational agent (an artificial intelligence [AI] program) that communicates with users using natural language and makes decisions based on predefined rules (Qasem et al. 2022: 77).

On the other side, traditional methods such as flashcards and memorization are less effective, to address this, Hsu, Chan and Yu (2023:1) designed an online chatbot-based learning model called Termbot to provide an engaging and convenient method for enhancing medical vocabulary learning. To enhance the first-year nursing students' long-term retention and engagement in medical terminology, Kristanto; Thanee Glomjai; and Putri (2024) used Mnemonic-Enhanced Multimedia Mobile Learning. Medical terminology poses a significant learning obstacle for numerous nursing students who rely heavily on textbook definitions. It aimed to evaluate the effectiveness of the Picmonic application, which utilizes audiovisual narratives, in improving retention and engagement compared to traditional studying methods. Another experimental study carried out by Mahmoud (2022) and De Vivo (2022) showed that Poe AI brought certain effects in enhancing students' engagement in learning activities, especially in an educational context.

Several researchers have also advocated the benefits of AI chatbots combining visual, audio aids and text. Using an AI chatbot to learn English has the following advantages: AI is capable of doing tasks that humans are unable to complete, such as analyzing English phoneme-by-phoneme and determining how quickly your language abilities have improved over time (Manimurasu, 2024: 25). Moreover, Pham et al. (2024, 129: 130) have integrated AI tools e.g. Poe AI into their teaching methodologies to enhance student's learning interest. As the technology continues to shape our society, students ought to be prepared for the digital world. With the advancement of (AI) technology, several AI tools and chatbots have been launched and employed by language teachers, including Chat GPT and Poe. Due to Shin and Lee (2024:6), Poe AI enables natural conversation on unlimited topics, compared to existing scenario-based chat bots.

In so far as the researcher knows, it has been noticed a gap in literature that medical education still evolved as an instructor-centered environment. Nursing students are uninformed in shaping their learning experiences, and traditional teaching approaches emphasized passive learning in the form of faculty lectures and lacked interactivity, as seen with the text-based materials. The integration of AI chatbot (Poe AI) into English medical vocabulary learning classes may enhance nursing students' interests by tailoring instruction to their specific needs and providing authentic language materials.

1.2 Context of the Problem

TNI is a higher nursing private institute of a four-year program in Beni-Suef governorate. A crucial component of its curriculum is " English for Nursing" course ", which aims to develop the 2nd year nursing students' medical vocabulary use and abbreviations related to the basics of nursing studied previously in level one e.g. the parts of the body & organs, functions, systems, diseases & symptoms, medical terminology & abbreviations, hospital departments, jobs, and nursing responsibilities.

As a part-time English language lecturer at TNI for two years (2023-2025), I observed that a significant number of 2nd year students struggled to use English medical vocabulary in their professional settings. There were many complaints of their weak

usage of vocabulary during their training at hospitals. This problem was well-documented in existing literature (Abdullah, 2013; Ahmed, 2022; Alahmed, 2024; Ayadi & Beghoul, 2024; Ja'ashan, Alfadda & Mahdi, 2022; Khan, 2016; Kristanto; Glomjai & Putri, 2024; Najafi & Talebinezhad, 2018; N. McAllister et al., 2024; Zhang & Wei, 2024), where challenges in using prefixes, roots, suffixes, collocations, definitions and letter-sound correspondence were common.

The researcher conducted a pilot study on the 1st week of Nov., 2024 to assess 2nd year TNI students' English medical vocabulary level (N=30). They were asked to: 1. Match the medical terms to their definitions, 2. Identify the form and meaning of suffix, prefix, and the root of medical terms, and 3. Use medical vocabulary to make meaningful sentences by combining the given words.

Table (1) Students' Scores on the Medical Vocabulary Test (N=30)

Percentage%	SD	Mean (x)	Max Mark	Test
English Medical Voc.	30	12	.4.9	40

Results in table (1) indicated that the students' vocabulary level tends to be weak since the mean score was (12) which wasn't a high mark and indicated that they had hardly passed the English medical vocabulary learning test. This signified that they had a weakness in their English medical vocabulary. The results of the pilot study were that the majority of 2nd year TNI students had problems in:

1. remembering the form of medical vocabulary previously taught to them
2. identifying the meaning or definitions of the vocabulary items
3. linking the form of such vocabulary and their meanings
4. producing or using such vocabulary in sentences
5. breaking down such vocabulary into its component parts (prefix, root, and suffix) and determine its meaning

Moreover, an interest scale (Adopted from Sharaf, 2024, 115:116) (**Appendix 1**) in learning vocabulary scale was administered to this group of students (N=20) to find out how much interest they had in learning it.

Table (2) Students' Scores on the Interest in Learning Scale (N=20)

Percentage%	SD	Mean (x)	Max Mark	Scale
Interest	18	8.5	4.5	47.22

Results in table 2 indicated that the students' interest level in learning vocabulary tends to be weak as the mean score was (8.5) which was not a high mark and indicated that they hardly had an interest in learning it. This signified that they had a weakness in their interest in learning. Therefore, there is a need to enhance their interest in English medical vocabulary learning.

The researcher also conducted a semi structured interview among the 2nd year students (N=100). They were asked to respond to the following:

1. What do you feel particularly when learning English medical vocabulary?
2. Are you interested in English medical vocabulary? Why?
3. What do you prefer to use when learning medical vocabulary? Results highlighted that nearly 75% felt uninterested in learning it especially when asked to recall, and use. They can't use prefixes and suffixes or rehearse the target vocabulary.

1.3 Statement of the Problem

The problem addressed by this study can be stated as follows: "TNI 2nd year students demonstrate a low level in English medical vocabulary use and their interest in learning it".

1.4 Questions of the Research

The research was an attempt to answer the following questions:

1. How far do TNI 2nd year students possess English medical vocabulary?
2. How far are TNI 2nd year students interested in learning it?

3. How can an AI chatbot (Poe AI) be integrated into English medical vocabulary learning classes for TNI 2nd year students?
4. What are the effects of integrating an AI chatbot (Poe) into English medical vocabulary learning classes for TNI 2nd year students and their interests in learning it?

1.5 Delimitations of the Research

The research was delimited to:

1. A group of (N=60) TNI 2nd year students, Beni-Suef, Egypt. 2nd year was chosen since they had previously learned basic medical vocabulary which they were supposed to use professionally in their training at hospitals. Learning vocabulary early within nursing students' program provides a critical foundational knowledge needed to do their future job effectively.
2. The research targeted a group of specific vocabulary which was collected from the "English for Nursing" course and suitable for TNI 2nd year students' level.
3. The study implemented an intervention based on an AI chatbot (Poe AI) to enhance TNI 2nd year students' medical vocabulary learning.
4. The study was conducted during the 1st term of the 2024-2025 academic year
5. Poe as an AI chatbot was implemented in this study to assist nursing students to learn a number of medical terms taught in the "English for Nursing" course.

1.6 Instruments of the Research

Instruments were designed and developed by the researcher as follows:

1. A Needs Analysis Questionnaire (NAQ).
2. An English medical vocabulary pre-posttest.
3. An Interest in learning pre-post scale.

1.7 Significance of the Research

This research may yield valuable contributions by:

1. Enhancing English medical vocabulary learning for TNI 2nd year students.
2. Paying curricula and program designers' attention to integrate AI chatbots to into ESP programs in order to enhance English medical vocabulary learning.
3. Directing researchers' attention to the relationship between AI chatbots and ELT, which may reveal insights into effective instructional practices for professional communication.

1.8 Definitions of Terms

1. AI Chatbots

Manimurasu (2024: 25) defined AI as a human intelligence simulation based on computers and designed to function as human beings. It is one of the drivers of the 4.0 industrial revolution to facilitate education in teaching and learning.

Qasem et al. (2022: 80) defined chatbot as a computer, available on mobiles as an application and the interaction can happen anywhere as they are accessible.

Kim (2018:1) defined chatbot as an artificial person which conducts a conversation with real humans. This could be a text-based conversation, a voice-based conversation, or a non-verbal conversation. They can speak almost every major language using natural language processing (NLP).

Poe is an AI chatbot that creates texts, stories, and vocabulary quizzes. It is a free educational platform and application used to produce different levels of vocabulary quizzes based on teacher demands concerning students' levels and the required vocabulary. Obtaining well-produced texts and quizzes depends on the comprehensibility level of the inserted instructions. For example, without specifying students' level and required vocabulary, the produced text might be unsuitable for foreign language students (OpenAI, 2023a).

Poe generates texts and quizzes that are the nearest answer to the given instructions. Sometimes, it provides unclear answers when the inserted feedback does not contain adequate details (OpenAI, 2023b).

Operationally, Poe, "Platform for Open Exploration (<https://poe.com/>)," is an innovative platform designed to connect users with multiple AI chatbots. Developed to facilitate curiosity and exploration, Poe allows individuals to interact with different AI models, making it easy to find the right assistant for their needs.

2. English Medical Vocabulary

Abdullah (2013: 227) defined English medical vocabulary as a specialized language used by learners, specialists and experts of medicine and health sciences for quick and efficient communication between members of the same discipline.

AL-Jawadi and Safwat, (2018: 1) defined it as special vocabulary used by health care professionals for effective and accurate communication. It is consistent and uniform throughout the world since it is based on Greek and Latin words.

The operational definition of English medical vocabulary is a specialized language aspect that serves as the foundation for effective medical communication. It encompasses a vast and precise vocabulary list used to describe the human body, its functions, disease, treatments, and medical procedures etc.

3. Interest in Learning

Marpaung (2022: 4) defined it as "a mental encouragement or an activator to do learning tasks. By having interest, students will get more enthusiasm in doing action and a high attention to do and learn more". Sharaf, (2024: 12) defined it as " a feeling of wanting to learn more of the English vocabulary."

Learning interest can be defined operationally as "the high desire of TNI 2nd year year students' in learning English medical vocabulary and use it to communicate in various professional contexts".

2. Review of Literature & Related Studies

2.1 Medical Vocabulary as an ESP Branch & its Characteristics

As ESP aims at enhancing professional communication, it encompasses learning specific vocabulary, named English for Medical Purposes (EMP) (Zaidi & Al Jadaan, 2022: 91). EMP, as a demanding and thriving sub-system of ESP, could facilitate learning medical vocabulary (Sinadinović, D. 2013: 289) and works within a broader category of ESP as shown in fig. (1) (Zaidi & Al Jadaan, 2022: 91).

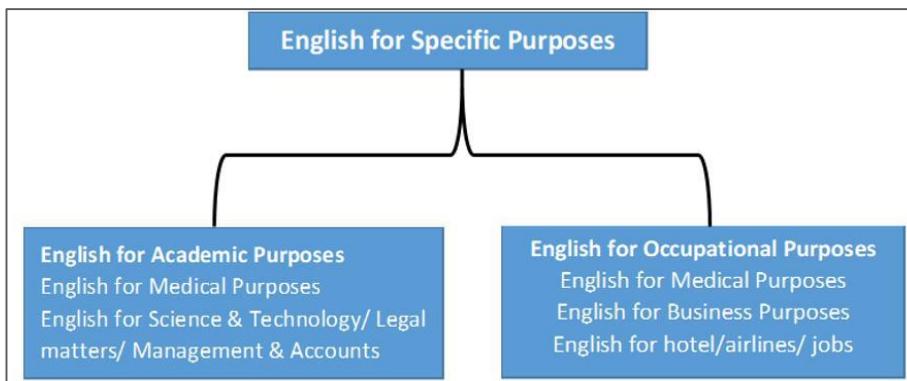


Figure (1): English for Specific Purposes (Zaidi & Al Jadaan, 2022: 91)

Nursing students need to learn what terms the specialists mean, how they are pronounced and used. The better the Medical English they learn, the easier the contact with patients, colleagues and doctors. However, they struggle with medical vocabulary, which hinders not only their comprehension and communication but also their academic achievement (Zaidi & Al Jadaan, 2022: 92).

EMP is also characterized by abundant use of synonyms (e.g. *myopia* = *short-sightedness*), abbreviations (e.g. *AIDS*) and eponyms (e.g. *Parkins* – *Parkinsonism*). The words of Greek and Latin origin have irregular plural as they keep Greek and Latin formants (e.g. *bacterium*–*bacteria*) learn by heart, which is not popular among nursing students (Sinadinović, D., 2013: 275).

Medical vocabulary is one of the most difficult specialized languages, including very long complicated terms, seemed difficult to pronounce, spell, remember and even

understand. For example, some words contain triple (o) together, as in **hysterosaplingooophorectomy** and others start in double (o), as in **oophorectomy**. Furthermore, the grammatical patterns in medical context are different, for instance the plural is formed by another way different from that one in an ordinary English, many nouns do not add "-s" or "-es" in the plural, but change in vowels or the last part of the words e.g. **amoeba/amoebae, protozoon/protozoa, fungus/fungi**,.etc (Abdullah, 2013: 227).

A combining form is produced when a vowel (usually "o," or sometimes "i.") and a word root are combined. The combining form is often created by adding a suffix or using one or more roots. The combining vowel allows two or more word parts to be linked together. For example, the term “gastroenterology: study of the stomach and small intestine” has two combining vowels to link two word roots and a suffix) as shown in fig. (2).

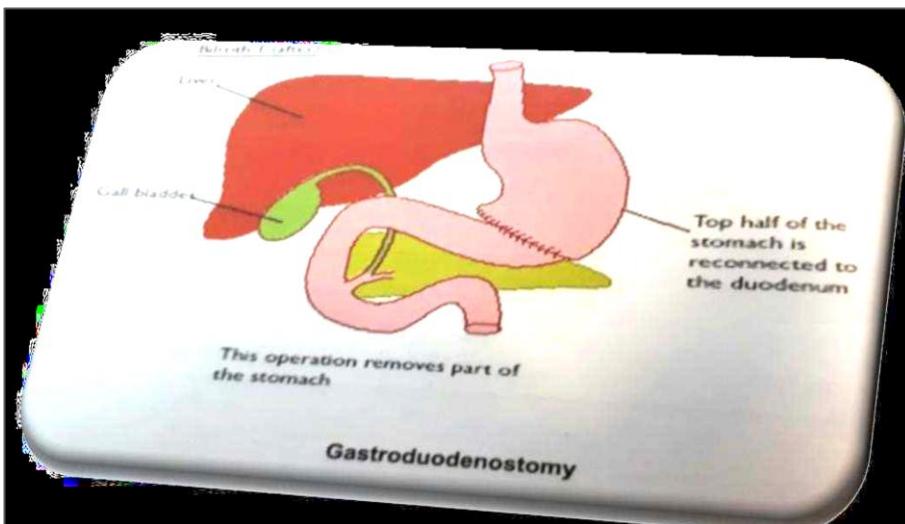


Figure (2): Gastroduodenostomy (AL-Jawadi, & Safwat, 2018: 1)

The goal of teaching medical vocabulary is to equip students with a foundational understanding of the language commonly used in the field, e.g. “word roots, prefixes, suffixes, and linking vowels”, and teaching them how to spell, pronounce, and abbreviate terms (Chabner, 2022: 3).

2.2 Components of Medical Vocabulary

Medical vocabulary has a combination of “prefix, suffix, combining vowel, and word root” (Chabner, 2022: 3). For example, the Greek word “*dermatoes*” and the Latin word “*cutane*” both refer to the skin, but they have different use. Greek roots typically represent an illness, condition, remedy, or diagnostic. Anatomical structures are described by Latin roots. The Greek root “*dermar*” describes a disease, of the skin “e.g., *dermatitis*= *inflammation of the skin*”, and the Latin root “*cutane*” identifies an anatomical structure “e.g., *cutaneous*”.

Most medical terms can be divided into component parts: (Roots, Prefixes, and Suffixes) that maintain the same meaning whenever they appear as shown below:

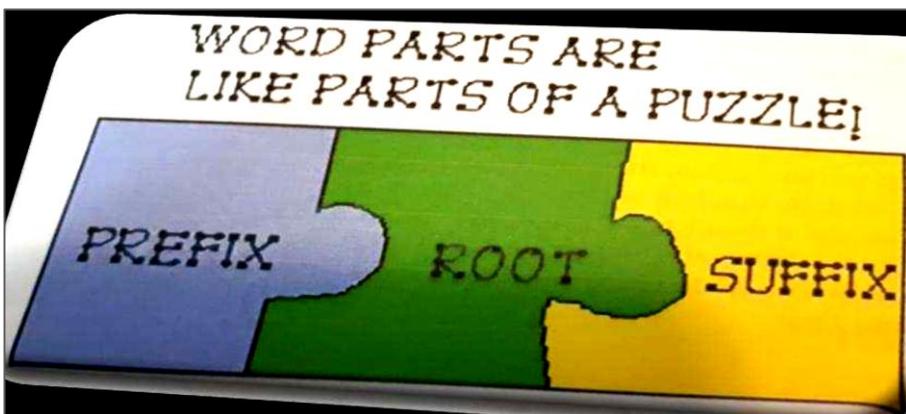


Figure (3): Components of Medical Vocabulary (AL-Jawadi & Safwat, 2018: 1).

According to Khan (2016), each medical term has at least two of the following:

1. Root: is the fundamental unit of each medical word which establishes the basic meaning of the word. It is the part to which modifying **prefixes and suffixes** are added.
e.g. **learn**

2. Prefix: is a short word part added before a root to modify its meaning such as **re-**, **pre-**, **pro-** and **per-**. e.g. **re learn**

3. Suffix: is a short word part added at the end of a root to modify its meaning such as **-itis**, **-er**, **-ous**, **-denatil**, **-ist** e.g. **Learner (n.)**

Both prefixes and suffixes can change the meaning of the word. Sometimes both the prefixes and suffixes can change the pronunciation of the medical term e.g. **gnath/o** = **prognathous**. Also, they can change the grammatical function of the word e.g. Learn (v.) = Learner (n.). There are two types of words:

a. Simple Words: are words which contain only one root. e.g (learn+ **er**: learner), or (**re-** : relearn). It's important to note that not all the roots are complete words, in that most medical roots are derived from other languages and used in combinations such as: **Greek word (kardia)** is a root = **cardi**= heart. **Latin word (pulmo)** is a root = **lung**. **Both Greek + Latin roots = nepher (Greek), ren (Latin) = kidney.**

b. Compound Words: are the words which contain more than one root. E.g.: **Cardiovascular**= (heart+blood vessels).

3. Word Combining Forms are as follows:

1. Root + O + Suffix = Combining Forms. e.g.: **Neur+O+logy**: **Neurology**

2. Root + Suffix =Combining Forms. e.g.: **Neur+itis**: **Neuritis**

4. Word Derivations: Greek (G) and Latin (L) are the main two languages that most medical word parts come from. E.g. the word **Muscle** has come from the Latin word which means **mouse**= **muscle movement under the skin**. Another example, the word **Coccyx** which has come from Greek and it means **the end of the spine**=cuckoo= **resembles the cuckoo's bill**.

5. Words Endings in X: As for the words ending in x, the x will be omitted when adding the suffix to the end of the root of the word as in the following examples:

X in **pharynx** (throat) + Suffix **g**: **Pharynx/pharyngeal**

6. Suffixes Beginning with rh : In this case the (r) will be doubled and it will separate between the root and the suffix that begins with rh as in the following examples: **r□rr** as in : **rhea** : **dia** –(through)+ **rhea** (flow)□ **diarrhea**

Moreover, collocation competence of medical students is one of a great importance, so, instructors should pay it a lot of attention and should not neglect them (Najafi, &

Talebinezhad, 2018: 25). The following list, proposed by Nation (1990:31), includes the various kinds of knowledge that a learner must master for learning a vocabulary:

- the meaning(s) of the word.
- the written form of the word
- the spoken form of the word includes the ability to recognize a word when it is heard, and to pronounce it correctly
- the grammatical behavior of the word
- the collocations of the word
- the register of the word
- the associations of the word
- the frequency of the word

Table (3): Aspects of Knowing a Word (Nation, 1990:31)

	Spoken	R	What does the word sound like?
		P	How is the word pronounced?
Form	Written	R	What does the word look like? How is the word written and spelled?
	Word form	R	What parts are recognizable in this word? What word parts are needed to express the meaning?
	Form and meaning	R	What meaning does this word form signal? What word form can be used to express this meaning?
Meaning	Concept and referents	R	What is included in the concept? What items can the concept refer to?
	Associations	R	What other words does this make us think of? What other words could we use instead of this one?

	Grammatical functions	R	In what patterns does the word occur? In what patterns must we use this word?
Use	Collocations	R	What words or types of words occur with this one? What words or types of words must we use with this one?
	Constraints on use (register, frequency ...)	R	Where, when, and how often would we expect to meet this word? Where, when, and how often can we use this word?

The collocation competence, e.g. medical aid, premature fetus, blood test, upset stomach, admitted to hospital, prescribe treatment, refers to any kind of typical word combination, for example verb + noun (have an operation), adverb + adjective (absolutely vital), noun + noun (lack of energy), adjective + noun (streaming cold) etc. Collocations help medical students to: 1. use the words they know more accurately; 2. sound more natural when they speak and write. By saying, for ex. “respond well to treatment”, rather than “react to treatment”, and 3. vary your speech, helping avoid repetitions. Nursing students can be asked to use, for ex., the verb “prescribe” with other nouns: prescribe drugs, prescribe antibiotics, etc (Najafi, & Talebinezhad, 2018: 25).

2.3 Strategies for Learning English Medical Vocabulary

Achieving mastery in English vocabulary not only depends on learning and retaining the meaning of words but also on using them in different language contexts (Shahin, 2023: 6). Conversely, the memory, cognitive and metacognitive strategies are used to assist in retaining the meaning of word. Memory strategies are used to connect new words to previously learned information. Cognitive are mechanical strategies used for memorization, and metacognitive strategies are mental processes that include planning, monitoring, and assessing one's own learning (Alahmed, 2024: 28).

Abdullah (2013, 228: 229) identified the most effective strategies in learning/teaching medical vocabulary:

1. Breaking down it into small meaningful units, pronouncing, spelling and memorizing these complicated terms and their meanings e.g. The medical term,

electrocardiogram, can be broken down into: electr/o-, which means electricity and - cardi/o, which means heart and a suffix, -gram, which means record.

2. Word – parts: any word can be divided into two main parts: a) Root and b) Affixation.

3. Removing Affixation: By removing the prefixes and suffixes, the students can assume the general idea or what the lexeme rounds about i.e. the closed meaning of the term. For ex. if we take the following word: "supernaturalization", we can do it in this way:

- a) Removing a prefix "super-" remaining, naturalization.
- b) Removing the noun suffix "-tion" remaining, verb naturalise .
- c) Removing the verb suffix "-ise" remaining, adjective natural.
- d) Removing the adjective suffix "-al" "remaining, the base or the root "nature".

Then, the student can guess or conclude that, the lexeme "supernaturalisation" is something about or related to " nature".

4. Eponyms: There are two major categories of medical terms:

- a) Descriptive lexeme to describe shape, colour, size, functions, etc.
- b) Eponyms: Literally means "putting a name upon ". The latter has been to honour those who first discovered or described an anatomical structure or diagnosed a disease or first developed a medical instrument or procedure. Also, some term of this kind are named to indicate the source of a drug (i.e. named after the plant in which this drug is extracted) or the source of a disease e.g. animal.

2.4 Problems Faced by Nursing Students

Learning medical vocabulary pose a lot of problems explored by Zaidi and Al Jadaan (2022: 95) as shown in the figure below.

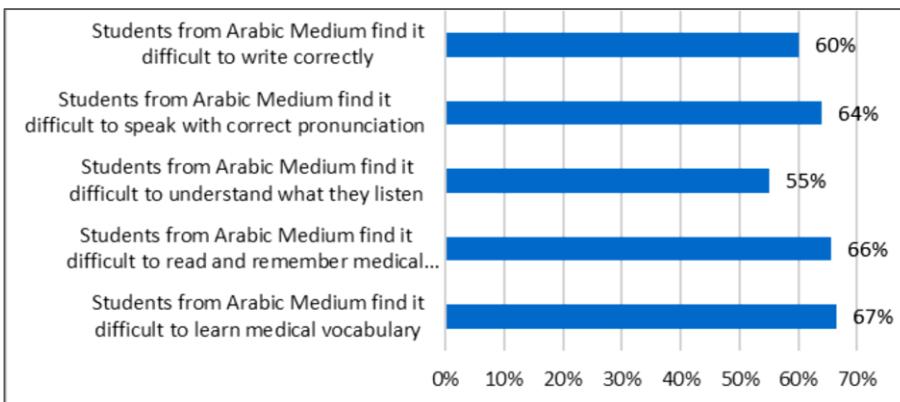


Figure (4): Problems Faced by Medical & Health Sciences University Students (Zaidi & Al Jadaan, 2022: 95)

The figure above indicated that 67% of students found it was difficult to learn medical vocabulary. Najafi and Talebinezhad (2018: 239) added that ESP learners of medicine faced difficulties in understanding unfamiliar, long and complicated terminology. Furthermore, Zaidi and Al Jadaan (2022: 91) stated that it was difficult for to understand and learn medical vocabulary and more than 50% use an English-Arabic dictionary due to weak linguistic skills. Interactive activities can be used in the class for better retention.

Moreover, EFL learners can't recognize the meanings, pronounce, use and spell words correctly (Afzal, 2019: 81). In addition, they lack using synonyms, and prefixes and suffixes (Khan, 2011: 1255). Furthermore, a study done by Khalid (2024) revealed some problems in English vocabulary retention, and low interest in learning it.

2.5 Vocabulary Assessment

According to Dujardin, et al. (2021), vocabulary assessment tasks are: matching words with multiple choice pictures, defining target words and connection between words, indicating words related by semantic features, selecting the pictures that represent the meaning of words or sentences and choosing the word of the sentence closest to the meaning of a target word.

The difficulty of learning a word in a foreign language is the amount of effort required to learn and remember it through a number of sources: the learners' prior experience of English and their mother tongue, the way through which the word is taught or learned (Nation, 1990: 33). Some factors that make some words more difficult are proposed by Thornbury (2002, 27:28) as follows:

- **Pronunciation:** Words, difficult to pronounce, are considered more difficult to learn.
- **Spelling:** Mismatches in sound-spelling are likely to be the cause of errors, either of pronunciation or spelling and may add to the difficulty of a word.
- **Length and complexity:** Long words are no harder to understand than short ones.
- **Grammar:** The grammar associated with the word is also problematic, particularly if this differs from that of its L1 equivalent.
- **Meaning:** When two words overlap in meaning, learners may confuse them.
- **Range, connotation and idomaticity:** Words that can be used in various contexts will generally be perceived as easier than their narrower-ranging synonyms. In addition, uncertainty about the connotations of certain words may also cause problems. Finally, idiomatic words or phrases (e.g., make up your mind, keep an eye on....) will generally be more difficult than words whose meaning is clear (decide, watch).

One important variable affecting EFL vocabulary learning is students' interest. If they are not interested, they will not achieve their learning goal. On the other side, if they are extremely interested, they will be highly achieved.

2.2 Interest in Learning

2.2.1 Definition of Interest & its Theory

One barrier to fostering interest is the one-size-fits-all approach to educational materials. Since each student arrives with different prior knowledge and interests, some students have trouble connecting with the materials and consequently lose interest in learning (Krapp, 2002). In relation to personalized learning (PL), the interest is the priority. Department of Educational Technology in USA (2016) brought a focus to

(PL), defining it as "...instruction including learning objectives, instructional approaches, activities and content are optimized for the needs of each learner and driven by their interests, and often self-initiated."

Interest is a desire shaped and developed over time. Interest Theory refers to a four-phase model proposed by Hidi and Renninger (2006) in which interest develops through the interaction between a person and a specific content. It suggests that interest is influenced by both the content and the context of the situation, and interventions can trigger and maintain interest. Hidi and Renninger (2006) proposed a four-phased model of interest, with the first two phases encapsulating the triggering and maintenance of **situational interest** and the last two phases covering the emergence of and maturation of **individual interest**. According to their model, it is necessary to first generate situational interest before students can develop a more stable individual interest in a topic. Most interventions traditionally tackle the first two stages of interest.

Reber et al. (2018:3) indicated the four-phase model of interest development that guides teaching practices. First, the model contends that interest develops gradually and that external support (e.g., engaging lectures, school field trips) can foster it. Second, the students may benefit from different types of external support. When students are unfamiliar with a topic, teachers may be able to create environments that catch their attention (e.g., by beginning a chemistry class with a demonstration of a chemical reaction). Thus, teachers can stimulate students' interests in the first two phases (triggered and maintained situational interest), and maintain or strengthen interests for students in the second two phases (emerging and well-developed individual interest).

Interest in vocabulary learning refers to the students' feelings to know more about the meaning and use it to communicate" (Marpaung, 2022: 33). As a psychological state of attention, interest affects toward a particular object or topic, and an enduring predisposition to reengage over time. Since students come from diverse backgrounds, personalized materials have a higher probability of increasing situational interest than a standardized, one-size-fits-all approach(Reber, et al. 2018:1).

Interest is a mentally condition signifying the students' attitude toward learning, and feeling which will determine activities or perform on behavior and motivate to do something. Feeling interest is stimulating and motivating students in learning, especially EFL vocabulary. Interest is related to the students' positive feeling encouraging them to do the activities assigned (Marpaung, 2022: 1). According to Asrianti (2020), "Interest is a tendency to have a sense of pleasure without coercion that it can cause changing knowledge, skills and behavior". Yuwanita et al. (2020) stated that learning interest is the ability to study something with enthusiasm, without coercion, resulting in knowledge, skills, and behavioral changes.

According to Marpaung (2022: 10), the purpose of interest is helping the students to obtain a new overall behavior change due to their attention, pleasure and experience. The existence of interest in learning encourages students to be more active and strive to carry out learning activities.

2.2.2 Types of Interest

Zhao (2014:309) divided interest in EFL into three types: direct interest, indirect interest and stable interest

1. **Direct Interest:** is most likely to stimulate the students' attention, to enhance FL effect, but it is hard to be kept for a long time, and only can play a certain role of guide and motivation in the students' FL. Therefore, direct interest will gradually disappear with the weakening of students' curiosity and the deepening of teaching content.
2. **Indirect Interest:** is generated among the students. Compared with the direct interest, it has a strong stability and is more helpful to the student's learning in an active way. In FL teaching, it is required to emphasize the cultivation of indirect interest.
3. **Stable Interest:** is sourced from indirect interest. It is an internal motivation for students' autonomic learning, and makes the learning interest become an integral part of the students' personality development.

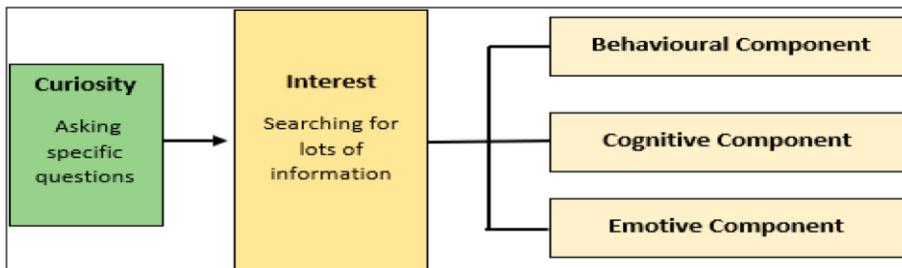
Therefore, in EFL, the instructors shall pay attention to the cultivation of students' indirect interest and arouse the students to have keen interest in EFL learning. When an indirect interest is formed, it shall be consolidated timely, and the teachers shall make efforts to transfer the indirect interest into a stable interest.

To stimulate the students' learning initiative and arouse their interest in EFL, instructors should consider the following:

1. Paying attention to teaching design and adding the interestingness in it
2. Simplifying the teaching methods to reduce the students' learning disabilities.
3. Based on the students' age characteristics, they really need to talk about the topics they are interested in.
4. Showing a demonstration of reading with emotion, to stimulate the students' visual sense (Zhao, 2014: 310).

2.2.3 Components of Interest in Learning

Ellie Christoffina van Aswegen and Donna Pendergast (2023:1336) illustrated the various components of interest and their derivation from curiosity. Curiosity is the initial spark that ignites interest in a particular topic. When learners are curious, they naturally ask questions related to the topic. As their interest grows, they engage more deeply, and begin to uncover new knowledge which further fuels their interest. The three components of interest are: behavioral, cognitive, and emotive, are all key components of interest connect to each other as shown in fig.5



Figure(5): The Various Components of Interest and their Derivation from Curiosity(Ellie Christoffina van Aswegen & Donna Pendergast, 2023:1336)

As learners gain more knowledge and skills related to a topic, they often experience a sense of competence which reinforces their interest and their desire to continue learning and exploring. When the students make an emotional connection with the topic, it can ignite their enthusiasm to learn more and actively engage with the topic.

2.2.4 Characteristics & Functions of Interest

Slameto (2010) highlighted several characteristics of students with learning interest: 1. They focus on and repeatedly review lessons, 2. They show positive responses to subjects interested in, 3. They take pride in achievements related to their interests, 4. They express enthusiasm for tasks they engage in, and 5. They enjoy being involved and participating in activities.

Hurlock (1993) identified four functions of interest: 1. It influences students' aspirations, meaning to achieve their goals, they must have a strong desire, 2. It provides motivation for students to engage in activities, even when faced with challenges, 3. It affects performance, as students motivated from within tend to excel, and 4. It impacts future success, as internally motivates individuals are more likely to succeed in the long term.

2.2.5 Factors Affecting the Interest

Previous studies exploring various factors that influence interest; e.g. Junianto and Mahmudi (2016) highlighted the negative effects of conventional teaching methods, such as lecturing on students' interest. The study concluded that teacher-centered approaches failed to engage students, leading to decreased learning interest and suboptimal academic outcomes.

However, interest is a crucial indicator of learning that comes from within the student, not from external forces, it may stem from how teachers present materials in an enjoyable and easily understood manner (Riamin, 2016).

Interest, as an internal drive, motivates students to learn something willingly without coercion, and lead to optimal learning outcomes. The study of Rumiyati et al. (2024:

45) revealed that students' learning interest increased with the enhancement of online learning methods.

Interest is affected by internal and external factors. Triposa (2022) stated that the internal factors are personal traits influencing a student's learning interest, including intelligence, focus, curiosity, perseverance, and physical and mental health. While Dalyono, (2010) mentioned that one main external factor is teaching method. An instructor's ability to deliver lessons can either stimulate or diminish student's interest.

Interest is the students' encouragement toward learning. Kim (2018) proved that artificially intelligent chatbots influence Korean EFL students' vocabulary learning. Also, their perceptions of vocabulary learning positively changed, increasing their motivation, interest, and confidence in English. To explore the students' attitudes, cognitive load and motivation concerning vocabulary acquisition, Alhebshi and Gamlo (2022) used mobile games "Quizizz" application for enhancing EFL students' vocabulary of 56 female foundation year students from a Saudi Arabian university. EFL teachers are, therefore, recommended to integrate mobile game-based learning into their vocabulary lessons. Emphasizing this relationship, Marpaung (2022) focused on the effect of using mime game on vocabulary learning interest at the VIII grade students of SMP N 2 Sorkam. The students lack interest, no habituation in learning, annoy friends, prefer to enter the room after the teacher, have low in memorizing the words and do not know the meaning of the words. It was concluded that there was a significant effect of Mime Game on vocabulary learning interest.

To measure the effectiveness of AR technology in vocabulary development, and its impact on student interest of 130 students aged 14 to 15 (9th-graders), Belda-Medina and Marrahi-Gomez (2023) evidenced positive attitudes and a strong interest in AR integration in language learning. For identifying students' interest in EFL vocabulary acquisition of secondary stage students and their interest through reading short stories, Khalid, (2024) showed that their interests had a significant effect on their learning EFL vocabulary. It could be concluded that students' interests had a strong relationship to their ability and passion to learn English vocabulary. Using augmented reality

applications, Sharaf (2024) developed primary stage pupils' EFL vocabulary learning and their interest in learning it.

Consequently, it was necessary to implement effective directions concerning teaching EFL based on the students' interests which can be assessed by a scale or a questionnaire as indicated by the previous studies. The reason for this demand and its relation to technology was the fact that AI chatbots ought to be as an integral part in EFL instructional practices. However, the research is still needed to focus on the AI chatbots, which enhance EFL students' high interests and implement future policies in medical English learning. Accordingly, teaching practices should in turn consider these interests and policies.

2.3. AI Chatbot (Poe AI)

2.3 .1 AI Chatbot & its Advantages

Integration of an AI chatbot, as a supportive tool within the context of English medical vocabulary learning, bolsters nursing students' interest in learning it by generating authentic language material. Manimurasu (2024: 25) has noted that AI chatbots stimulate the intelligence that humans possess through a wide range of ideas, approaches, technologies, and subfields, such as computer vision, machine learning, neural networks, cognitive computing, and scientific language processing. Anggraini and Faisal (2024: 950) defined AI chatbot, as a smart machine that thinks and behaves like humans, can simulate intelligence and make decisions similar to human reasoning through processes on computers or mobile phones, such as Google Translate, Able Platform, Orai, Elsa, Chatbot, Duolingo, Hello English Apk, and many others.

These technologies as intelligent machines that think and behave like humans can simulate intelligence and make decisions identical to human reasoning through a process used in both computers and mobile phones, such as Google Translate, text-to-speech (TTS) English Able, Orai, Elsa, Chatbot, Duolingo, Neo platforms and many others (M. Kannadhasan, 2024: 26). Kim, (2018) has added that it is a computer program that simulates human conversation through voice commands or text chats or

both. Chatbot, short for chatterbot, is a special kind of robot that is designed to stimulate conversation with human users via the Internet

Using AI chatbot to learn English has the following advantages: AI is capable of doing tasks that humans are unable to complete, such as analyzing English phoneme-by-phoneme and determining how quickly your language abilities have improved overtime. They can quicken learning through higher instruction levels, since learning from human instructors alone is getting harder and harder all the time. AI tools provide an environment free of pressure for students, who don't trust their ability to communicate (Manimurasu, 2024: 25)

2.3.2 The Relationship Between AI and English Language Teaching (ELT)

According to Manimurasu (2024: 25), intelligence is the cornerstone to AI technology. The word AI consisted of "Artificial" and "Intelligence". The word "artificial" was something simulated. Intelligence is a very complex concept including various forms: reasoning, self-awareness, emotional awareness, preparation and creativity. As Rabie (2023: 369) illustrated in figure 6, personalized learning emphasizes on: (i) what medical students learn, (ii) when they learn, (iii) where and with whom they learn, and (iv) how they learn.

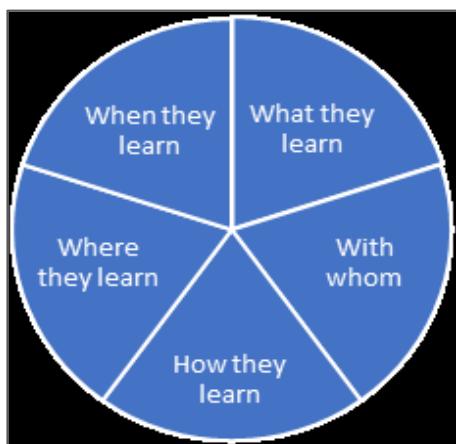


Figure (6): Purpose of Personalized Learning

With an adaptive learning, the content is adapted according to the students' understanding of the material, their evaluation results, and their preferences of materials (e.g., videos, audios, text).

Exploring the role of AI and Personalized Education or Learning in Medical Curricula, Rabie (2023: 377) indicated that the role of AI and personalized education in medical curricula is promising. AI can be used to analyze student data and provide personalized feedback and recommendations for individualized instruction. Additionally, personalized education in medical curricula can improve students' understanding of complex medical concepts, leading to better learning outcomes. AI can also be used to develop intelligent tutoring systems that provide personalized feedback and guidance to students.

The cognitive theory underscores the benefits of multimedia in learning. First, multimedia information (i.e. verbal and visual information transmitted via one's ears and eyes in sensory memory) can be synthesized into one's working memory and assembled into coherent verbal/pictorial models. This combination of verbal and pictorial models, together with learners' prior knowledge, is stored in long-term memory. Second, when learners are presented with textual information (e.g. word definitions and example sentences), they use their eyes to receive this input and bring it into sensory memory. Then, they select input and send it to working memory. Relevant information is then constructed. Third, the processing of multimedia input (i.e. textual, pictorial, and auditory) is complex in that sounds and images should not be separated: verbal and visual information should interact. Prior knowledge can thus be activated to process information for long-term memory (Teng, 2023: 740).

Additionally, AI is related to Connectivism Learning Theory (CLT). It is an unconventional theory for education that makes instruction more effective, interactive, and student-centered by incorporating current events and innovations in technology. CLT is considered as a process of connecting with various information sources and social networking. It enables learners to evaluate learning in networked environments.

Students in CLT have the chance to use media and social information to assign the skill being practiced (Siemens et al., 2020).

Educators highlighted the role of investigating CLT principles for affording visions into their application in teaching environment. It supports many approaches such as: a student-centered, and an inquiry-based instruction that boosts team work and critical thinking. Siemens (2005:163) presented the following principles of the CLT as follows.

1. The learning process requires combining particular nodes or resources of knowledge.
2. Learning can be presented through using non-human devices.
3. Aptitude to learn more is more acute than what is presently acknowledged.
4. Capacity to grasp associates among fields, thoughts, and perceptions is a fundamental skill.
5. Currency (precise, up-to-date knowledge) is the goal of all connectivist learning accomplishments.
6. Decision-making is a learning progression. Electing what to acquire and the significance of received data is grasped through the lens of an ever-changing realism

AI provides a real-life simulation platform for dialogue, such as spoken English, and enhances students' practice capacity. Learning English has become easier with the development of technology and platforms. AI chatbots offer opportunities to enhance English language skills (Anggraini and Faisal, 2024: 950). In his study, Wang (2019: 395) titled "Research on AI Driving Change in English Learning", showed the relationship between AI and English language teaching, as shown below:

1. The atmosphere of English learning is enhanced by AI. It offers a good learning environment for more in-depth English learning, integrating and interpreting information such as images, sounds, and text logically in a smart device.

2. AI improves the students' understanding and use of vocabulary, both written and spoken.

3. AI helps students acquire practical skills in English classrooms.

The goal of AI is to create robots based on stimulating humans' natural language processing in the areas of perception, logic, object manipulation and movement, knowledge, and learning. This increases the ability of students and optimizes the impact of English language teaching. Many ELT applications are based on AI technology that students can use. These technologies as intelligent machines that think and behave like humans and that can simulate intelligence and make decisions identical to human reasoning through a process used in both computers and mobile phones, such as Google Translate, text-to-speech (TTS), English Able, Orai, Elsa, Chatbot, and many others (Manimurasu, 2024: 26)

Many studies dealt with using AI to develop medical vocabulary. The quantitative study of Manimurasu (2024) explored nursing students' experiences using a m Learning prototype to learn medical terminology. Results revealed a significant mean difference in knowledge of medical terminology between the pre and post assessment results. AI was characterized by Al Mukhallaifi (2020) as the use of systems for ELT to improve the process of organizing, structuring, and selecting content. It increases the variety of teaching sources and schooling flow based on students' levels and through the individualization of independent learning procedures, as well as intelligent systems and simulation of teaching and assessment methods.

One of AI technologies is Poe. Poe (Platform for Open Exploration) is a technological tool developed by Open AI and Anthropic (Gülen, 2023). Poe is a chatbot web application with AI technology that provides prompt responses to users' questions. Poe AI has deep-learning algorithms programmed to analyze immense amounts of data to support learning. This is an AI chatbot with cutting-edge language models as it introduces learners to Natural Language Processing (NLP) models such as ChatGPT-4. There are a variety of functions that Poe can offer to learners, ranging from multilingual support (Sage, ChatGPT), excellent writing samples (Claude or Claude+),

instant answering feedback (Dragonfly), and creative and problem-solving actions (GPT-4). According to Quora, (2022), Poe AI offers chatbot services based on various free and paid LLMs, including ChatGPT 3.5, ChatGPT 4.0, Claude, Llama, PaLM, and Gemini-Pro.

Poe AI could be used when teachers want to design and implement a specific L2 task with a set of target expressions by entering a detailed prompt when building a target conversational agent. It is noteworthy that Poe AI's language could be modified in terms of creativity (by adjusting the 'custom temperature') and vocabulary and sentence structure (via prompts), and thus language teachers could even build customized chatbots for different levels of students within their classes. Poe AI could be particularly useful for learners with relatively low levels of L2 proficiency and willingness to communicate, thanks to its built-in 'Answer suggestions' feature. ChatGPT, while similar to Poe AI (i.e., building chatbots via prompts), could be used to build a supplementary interaction-based tool for skill-building tasks, given its formal tone and informative responses. For example, in reading tasks, learners could use ChatGPT's conversational agent to ask any question that requires a high level of inference (e.g., to understand the author's intent or to figure out the underlying meaning of the idiomatic phrases in the passage), or in post-reading tasks that require learners to find more information about the target passage (e.g., find information about other types of pollution not discussed in the passage, and find any similarities and differences between different types of pollution(Shin & Lee, 2024:10).

The biggest reason for students to keep using Poe AI was that it helped them solve the difficulties related to their major in the present and the future. Poe could serve their learning needs, such as "answering the teacher's questions, doing homework, and searching for data". It is believed that this tool could help students "learn vocabulary faster" and effectively improve communication skills. Overall, students' perception of using Poe as a learning aid in the classroom saw general increases based on the findings of regular surveys on a weekly basis. Mainly, the results of Pham et al. (2024:142) indicated growth in students' participation in learning vocabulary using Poe.

Surprisingly, there was an increase in the number of students who spent more than 4 hours learning vocabulary using Poe.

De Vivo (2022) explored the importance of Poe AI. By working on real-world projects, students could apply what they had learned in the classroom and saw how it was relevant to the world around them. The results from interviewees showed that students used Poe to learn about issues in life, found the content of literary works, and answered questions related to their major.

Al-Smadi et al. (2024: 1835) revealed that the teachers have positive appraisals of AI that its use has six major impacts: i) enhancing the personalization of learning; ii) contributing to improved learning outcomes by advancing students' speaking, listening, reading, and writing skills; iii) playing a fundamental role in bridging educational gaps; iv) enhancing students' engagement and motivation; v) empowering educators with professional development opportunities; and vi) encouraging self-directed learning.

Regarding the benefits of the interactive conversational program (Chatbot), Haristiani (2019) stated that chatbot has given foreign language learners a way to practice their language skills to discuss with people. Kim (2020) looked into the efficacy of various chatbots regarding vocabulary and the four language skills (listening, speaking, writing, and reading). She noted that chatbots can be helpful tools for allowing EFL students to experience real, authentic input through textual and auditory methods. In addition, Kim (2016) highlighted the positive impacts of using chatbots to converse with EFL students at all competence levels –beginner, intermediate, and advanced- on their ability to speak the target language. Chatbots' primary goal is to simulate human communication by tricking users into thinking they are talking to real people while, in reality, they are conversing with robots.

2.3.3 Studies Related to AI Chatbot and English Vocabulary in General and Medical Vocabulary in Particular

Zahran (2025) proved the efficacy of the Poe ChatGPT-based TPACK model on EFL teachers' performance and their students' vocabulary learning. In exploring the learning strategies employed by nursing students to learn medical vocabulary, Alahmed (2024) showed that they use memory strategies followed by cognitive, and determination strategies. Kristanto; Glomjai and Putri (2024) found that using the Picmonic application enhanced long-term recall of medical terminology. Ho (2024) explored learners' behaviors, perceptions, and attitudes to Chat GPT usage in English language learning. Participants were 120 I.T. students in Vietnam – the Korea University of Information and Communication Technology and the University of Da Nang- who were learning English as a non-specialized subject. Data collection was conducted with multiple choices, a 4-point Likert scale questionnaire, and in-depth interviews. The findings highlight students' need for teacher's instruction and physical classroom despite recognizing ChatGPT's efficacy for ESP vocabulary acquisition, translation, grammar checking, and paraphrasing. Students predominantly exploited ChatGPT to find instant solutions to English learning difficulties.

Manimurasu (2024) revealed the positive role of AI in ELT. To explore the first-year nursing students' experiences of using a mLearning prototype to learn medical terminology, N. McAllister et al. (2024) revealed a significant mean difference in knowledge of medical terminology between the pre and post assessment results. Pham et al. (2024) assessed students' engagement in utilizing AI chatbot for vocabulary learning and their perceived usefulness and benefits. The findings revealed that they found the tool useful, and they were actively engaged in learning it. The results proposed valuable insights for university EFL teachers regarding the integration of AI tools like Poe into curricula to optimize students' learning experiences with innovative language instruction.

Examining pre-service teachers' perceptions of the application of Large Language Model (LLM)-based chatbots (three chatbot-building platforms such as ChatGPT, Poe AI), Shin and Lee (2024) revealed that the chatbots built via all three platforms were deemed beneficial, especially for engaging in realistic scenarios and providing

authentic, context-appropriate expressions. It was demonstrated the benefits of chatbot-assisted language learning, and the utility of LLM-based platforms in creating customized L2 learning chat bots.

Exploring the attitudes of EFL students toward using chatbots in their learning, especially their usability, precision, assessment, and strengths, Mohamed and Alian (2023) indicated that chatbots appeal to language learners since learners can utilize them without the help of the instructors, which in turn encourages them to become autonomous learners. Additionally, the students felt that it boosted their enthusiasm and confidence, which ultimately helped them feel active and more interested in learning.

Putri et al. (2023) revealed that learning materials based on Semantic Feature Analysis (SFA) substantially enhanced the acquisition of English medical terminology among nursing students. Using Personalized Education (PE) has the potential to transform Medical Education by providing individualized learning experiences that cater to the unique needs of medical students. Rabie (2023: 369) analyzed and synthesized the existing literature about the role of AI and personalized education in Medical curricula. The results indicated that AI has the potential to enhance medical learning outcomes, engagement, and interest in personalized education. Assessing the four multimedia input in EFL vocabulary learning (definition + word information + video, definition + word information + audio, definition + word information, and definition-only), Teng(2023) highlighted the importance of audiovisual input in vocabulary learning and retention.

Examining the use of learning strategies in relation to medical vocabulary by nursing students, Ahmed (2022) indicated that they would prefer to use written, verbal repetition, and bilingual dictionary strategies. Using hologram technology, Ja'ashan, Alfadda, and Mahdi (2022) revealed that the nursing students' English medical vocabulary retention could be improved. As interactive online platform, Qasem et al. (2022) revealed that the use of chatbots played a major role in enhancing and learning ESP vocabulary. The results of the study of Zafirovska1 and Xhaferi (2022) showed that the ESP textbooks for medicine should be interactive and precise and not

overwhelm students with general notions and ideas. Zaidi and Al Jadaan (2022) highlighted two recommendations: Firstly, learning medical terminology can become more interesting if interactive teaching methodology like medical apps was adopted. Secondly, students should be given more opportunities to practice medical vocabulary in the hospital.

Alizadeh; Ramazanzad and Sharifi (2021) developed medical terminology flashcards in the form of teaching and learning aids for use in the medical terminology courses. The results showed that the professors were satisfied with the potential learning effects, the structure, and the content of information of the flashcards. Yüksel, Mercanoğlu, and Yılmaz (2020) examined the impact of digital flashcards and wordlists on students' learning of technical vocabulary and their perception. The findings demonstrated that the students using digital flashcards outperformed in learning technical vocabulary and had positive perceptions about the use of digital flashcards to study technical vocabulary.

Ichiyama (2019) investigated the comparative difficulties between general vocabulary and medical terminology for nursing students through using Rasch analysis, examining whether there are differences in students' achievements between semantic processing skill, ability to formulate meaning from the inputted words, and graphophonemic processing skill, which is the ability to match letters and sounds. These results indicated that to succeed in acquiring English medical-specific vocabulary, the students require input regarding graphophonemic processing skills. Rosselot (2019) explored the utilization of a web-based smart device application (Socrative) to improve the overall academic performance of a vocational nursing students' basic medical terminology while taking a required Anatomy and Physiology (A&P) course.

AL-Jawadi and Safwat (2018) investigated the importance of word affixes in forming the medical vocabulary and its characteristics. It could be divided into three groups. The first group, were the medical words which were derived from the Greek language only e.g. the Greek word (kardia) was a root=cardi= heart. The second group, were the

medical words which have been derived from the Latin language only e.g. the Latin word (pulmo) was a root = lung. The third group, were the medical words which were derived from both Greek and Latin languages. e.g. Greek + Latin roots = nephron (Greek), ren (Latin) = kidney.

Najafi and Talebinezhad (2018) examined the impact of teaching medical vocabulary through collocations on vocabulary learning of nursing students. Results showed that the mean score of teaching medical vocabulary was increased in the experimental group after the treatment. Hsieh (2016) incorporated the 5 by 5 Bingo! -Team-based game into the two-credit English medical terminology course. This game is a useful teaching tool for large classes of students. Exploring and analyzing the difficulties faced by the hospital professionals in knowing and using medical vocabulary, Khan (2016) indicated that most of the trainees faced difficulties due to: difficulties in English, Greek and Latin borrowing, difficult word-structure and lack of opportunities to practice. Based on the findings, it could be suggested that the learners should apply some strategies to pursue self-learning via web resource, AI and peer learning. Investigating the difficulties encountered by the students of medicine in understanding medical terminology, Abdullah (2013) provided some strategies for the students such as breaking down strategy, identifying the word – parts, removing affixation (pre-and post) and memorization of eponyms (terms named after persons).

2.4 Hypotheses of the Research

The research tested the following hypotheses:

1. "There was a statistically significant difference among the mean scores of both the control and experimental group students on the post-administration of English Medical vocabulary test at the level of $\alpha \geq 0.05$, favoring the experimental group".
2. "There was a statistically significant difference among the mean scores of the experimental group students on the pre/post-administration of English Medical vocabulary test at the level of $\alpha \geq 0.05$, favoring the post one".

3. "There was a statistically significant difference among the mean scores of both the control and experimental group students on the post-administration of the interest in learning scale at the level of $\alpha \geq 0.05$, favoring the experimental group".
4. "There was a statistically significant difference among the mean scores of experimental group students on the pre/post-administration of the interest in learning scale at the level of $\alpha \geq 0.05$, favoring the post one".

3. Method

3.1 Design of the Study

The study is a quantitative one aiming to explore integrating Poe AI chatbot into medical English vocabulary learning classes for students of nursing and their interests in learning it. A quasi-experimental pre-post-test design was adopted and shown in fig.7.

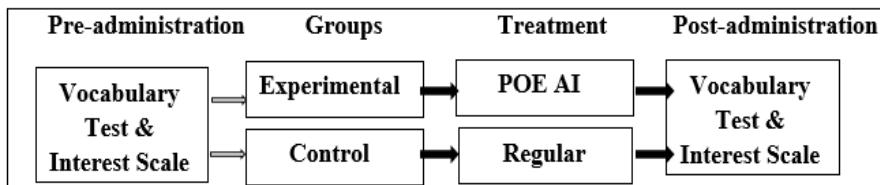


Fig. (7): Quasi-Experimental Design of the Study

3.2 Participants of the Study

The participants, a group of (60) EFL 2nd year students at TNI, and aged between 20 and 21 years, were divided into two groups: one was control and the other was experimental. They were recruited based on their willingness to participate voluntarily.

3.2 Setting

The intervention was applied to the 2nd year students at TNI, a private higher institute, Beni-Suef Governorate, Egypt, in the first term of the academic year 2024/2025.

Instruments and Materials

The instruments and materials were developed and designed by the researcher as follows:

1. A Needs Analysis Questionnaire (NAQ).
2. An English medical vocabulary test.
3. An interest in learning medical English vocabulary scale
4. A Poe AI chatbot based program

The materials manipulated in the study included topics selected from their textbook entitled "English for Nursing". The topics were related to the majority of the participants' needs and interests, e.g. the parts of the body & functions, diseases & symptoms, medical terminology & abbreviations, hospital departments & jobs, and nursing responsibilities. The designed chatbot content included all the vocabulary targeted to the level of the participants and related to words' synonyms and brief explanations of meanings, form and use.

3.3.1.1 Purpose of the NAQ

The NAQ aimed to identify the specific needs, challenges, and skills gaps related to English medical vocabulary learning among the targeted group of TNI students (N=100). It has two versions, one of them was addressed to the 2nd year students (N=100) and the other was addressed to the instructors (N=10). It assisted to identify the specific English medical vocabulary that nursing students need to learn and design a tailor-made chatbot (Poe AI) based program to meet their needs.

3.3.1.2 Sources of the NAQ

To develop and design the NAQ items, the researcher followed these steps:

1. Reviewing the regulation of TNI and specifications of the English for Nursing course (3).

2. Selecting the NAQ items through reviewing the literature and related studies, e.g. Khan, (2016); Ahmed, (2022); Alahmed, (2024); Ayadi, & Beghoul, (2024); Zhang & Wei (2024)
3. Conducting semi-interviews with the instructors (N=8) at TNI.

3.3.1.3 Description of the NAQ

The NAQ included three parts:

Part One: EFL Learning Situation or Context Analysis

It included questions related to: 1. The students' attitude, motivation and interest in learning medical vocabulary through the text-based book, 2. The importance of medical vocabulary as viewed by TNI students and instructors, 3. The percentage of time and practice devoted to it, in the course, and 4. TNI students' EFL level, priorities for improvement and to what extent the current instruction was satisfying their needs.

Part Two: EFL TNI Students' Requirements & Preferred Modes of Learning

It included questions related to the strategies of medical vocabulary learning and materials used to identify the students' preferred learning styles, formats, and resources.

Part Three: Medical Vocabulary Tasks Needs Analysis

It aimed to identify medical vocabulary list needed by the TNI 2nd year students, the frequency of these vocabularies, and specifying any other academic vocabularies required. The words were selected based on the following criteria: (1) they must be medical terms not general, and (2) they had to be new and were not taught in the previous course. All of them were taken from their English Course.

The findings of NAQ highlighted the nursing students' learning objectives, styles, formats, preferences, and obstacles in learning English medical vocabulary. Based on these results, the researcher could design and build learning materials targeted to the population's requirements and features. Activities and exercises focusing on the most difficult components of medical vocabulary, as well as multimedia resources catering to different learning styles and preferences, could be included in the learning materials.

3.3.1.4 Validity of the NAQ

The NAQ was submitted to a jury of staff members in EFL Curriculum and Instruction (N=6). The Jury approved it after modifying it, including questions that revealed the problematic areas from the students' and instructors' views and preferred modes of medical vocabulary learning.

The latest version of structured questionnaire covers six different themes and varied number of items as follows: on medical students' purposes of learning English (7 items), significance of learning medical English vocabulary (3 items), their expectations from the course (5 items), and preference of learning environment (5 items), and their preference of assessment type (5 items).(**Appendix 2**).

3.3.2.1 Purpose of English Medical Vocabulary Test

The study used English medical vocabulary test as a pre–posttest to measure the students' mastery of medical vocabulary before and after the instruction.

3.3.2.2 Sources of English Medical Vocabulary Test

The test was designed in the light of the following sources:

1. The TNI regulation and specifications of the English medical course (3)
2. The survey of literature and related studies (Chabner, 2022; Collins, 2008; Honč; Přívratská & Hellerová, 2023 & Wang, 2025).

3.3.2.3 Description of English Medical Vocabulary Test

The test was designed by the researcher to measure the students' mastery of medical vocabulary. The test included six questions. The overall test score is 60. Each item of the test is given one score for the correct answer and zero score for incorrect one. The initial form of the test included (65) items. Each item was in a three–Points-Likert format for identifying if it was “required = 3”, “Somewhat required = 2”, and “Not required = 1” by ticking (✓) in the space provided.

EFL vocabulary learning test have six parts. Each part was developed to measure students' mastery of words as follows:

- **Part One:** measures the mastery of the target words' synonyms and antonyms.
- **Part Two:** measures the mastery of the target words' meaning.
- **Part Three:** measures the mastery of the target words' roots, suffixes, prefixes and their meaning.
- **Part Four:** measures the mastery of the target words' medical expressions and abbreviations.
- **Part Five:** measures the mastery of the target words' collocations.
- **Part Six:** measures the mastery of the target medical terms' meaning.

The content of the test (test questions) was designed according to EFL academic vocabulary targeted to the participants in their English course. In addition, it was developed to meet the requirements of vocabulary knowledge of the students at this level. The test included six questions which covered the six previous parts:

- **Question (1):** Read and Circle the Correct Answer from a,b,c,d (10 items)
- **Question (2):** Decide whether the following statements True (T) or False (F): Correct the false statements (10 items).
- **Question (3):** Split the following terms into their different word parts: i.e. roots, suffixes, and prefixes. Write the meaning for the word parts (10 items)
- **Question (4):** Read Kyle's SOAP notes and find expressions or abbreviations in the SOAP note (10 items).
- **Question (5):** Complete the sentences with these phrases/words from the box. (10 items).
- **Question (6):** Match the following suffixes to the roots provided to make medical terms. Write down their meaning as well (10 items).

This diverse range of question types was chosen to assess both receptive and productive vocabulary skills, as well as the ability to understand vocabulary in context.

3.3.2.4 Validity of the Test

a) Jury's Validity

To decide the content and face validity, the test was submitted to a jury of EFL Curriculum and Instruction (N=10). They were asked to state their opinions regarding the following points:

- Clarity of the test instructions given to the students.
- Suitability of the test items for the students' level.
- Clarity of the test questions.
- Relatedness of each question to the test objectives.

The final form included (60) items for the test. Five items were omitted according to modifications given by the jury (N=10). Modifications were made and the jury agreed on the validity of the test, and its suitability for measurement in terms of its content and format (**Appendix 3**).

b) Internal Consistency Validity of the Test

The internal consistency validity of the test was calculated through two ways:

1. Calculating the internal consistency between the total score for each dimension of the six parts of the test and the total score of the whole test. It was measured by calculating the Pearson Correlation Coefficient (2). Table (4) showed the correlation coefficient and the significance level.

Table (4): The Internal Consistency between the Total Score for each Dimension of the Six Parts of the Test and the Total Score of the Whole Test

Test Aspects	N.	Correlation Coefficient	**Sig.
Aspect 1		0.923	0.01
Aspect 2		0.856	0.01
Aspect 3	30	0.781	0.01
Aspect 4		0.731	0.01
Aspect 5		0.745	0.01
Aspect 6		0.852	0.01

**** Correlation is significant at the 0.01 level**

According to this table, all correlation coefficients were high and all of them were significant at 0.01 which indicated the stability of each aspect of the test aspects as well as the test as a whole. This meant that the test was highly reliable.

3.3.2.5 Piloting the Test

1. Test Reliability

To measure the test reliability, the researcher administered it to a group of (30) of the students (other than the participants) at TNI. Reliability coefficient was calculated using Cronbach's Alpha formula. It was (0.93) which meant that the test was highly reliable.

Table (5): Results of the Reliability Coefficient (α) of the EFL Vocabulary Test.

Reliability Co.	N.	N. Questions	Value of Alfa Co (α)
Total	30	6	0.93

Results in table (5) indicated the significance of Alpha Cronbach was high (0.93) which was greater than 0.05. This showed that the test was reliable for the administration.

2. Timing the Test

To estimate the time, the time taken by the fastest student (60 minutes) was added to the time taken by the slowest one (80 minutes) then divided by two. It was estimated that (70 minutes) was an ample time for the test.

3. Scoring the Test

EFL vocabulary test had six questions. Each item was scored by one mark. The total score of the test was 60 marks. This was illustrated in table 6.

Table (6): EFL Vocabulary Test Specification

Test Part	Type of Q.	N. of Qs	Score
Part 1	Read and Circle the Correct Answer	10	1 mark for each Q
Part 2	Decide whether the Following Statements True (T) or False (F) then Correct the False Ones	10	1 mark for each Q
Part 3	Split the Following Terms into their Different Words Parts: i.e. roots, suffixes, and prefixes. Write the Meaning for the Word Parts	10	1 mark for each Q
Part 4	Read Kyle's SOAP Notes and Find Expressions or Abbreviations in the Note	10	1 mark for each Q
Part 5	Complete the Sentences with these Phrases/Words from the Box	10	1 mark for each Q
Part 6	Match the Following Suffixes to the Roots Provided to Make Medical Terms. Write down their Meaning as well	10	1 mark for each Q
Score		60	



3.3.2 The Interest in Learning Scale

3.3.2.1 Purpose of the Scale

The interest in learning scale was designed to assess the level of interest in learning English medical vocabulary among the TNI 2nd year students.

3.3.2.2 Sources of the Scale

The scale was designed in the light of the followings:

1. The TNI regulation and specifications of the English Nursing course.
2. The survey of literature and related studies, especially those concerned with interest in learning and its assessment, e.g. (Afify, 2021; Marpaung, 2022; Al-Ashmawi, 2024; Halim, 2024; Khalid, 2024 & Sharaf, 2024).

3.3.2.3 Description of the Scale

The scale included (30) statements (24 positive & 6 negative) related to the six domains of interest in learning (Motivation, Attention & Predisposition, Attitude, Studying Habits, Self-Concept and Student's Aptitude). In each domain, there were 4 positive items and one negative item. The scale is a five-point Likert Scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). The researcher translated the interest scale into Arabic and the translated version was distributed to help students understand its items. The students are required to put (✓) under the suitable response in the column that is proper for them.

3.3.2.4 Validity of the Scale

To estimate the validity of the scale, it was submitted to a panel of jury members and experts in the field of TEFL. The Jury were asked to validate the interest scale, giving their suggestions. Some of the modifications suggested by the jurors were:

- Omitting some repeated items and adding others.
- Rephrasing some items.
- Using simple words easily understood and most students are familiar with.

<http://dx.doi.org/10.29009/ijres.8.4.3>

-Translating the interest in learning scale into Arabic to help students understand the statements (**Appendix 4**).

3.3.2.5 Piloting the Scale

1. Reliability of the Scale

To examine the reliability of the scale, it was applied as a piloting scale to a group (other than the study participants) who were randomly selected. The reliability of the scale was measured by Cronbach Alpha reliability coefficient. The following table showed the reliability of the interest in learning scale.

Table (7): Estimating the Reliability Coefficient (α) of the Interest in learning Scale.

Reliability Coefficient	N.	Items	Value of Alfa co (α)
Total	30	30	0.84

Results in table (7) indicated the significance of alpha Cronbach was high (0.84) which was greater than 0.05. This showed that the scale was highly reliable for the administration.

2. Timing the Scale

To estimate the time, the time taken by the fastest student (20 minutes) was added to the time taken by the slowest one (30 minutes) then divided by two. It was estimated that (25 minutes) would be enough time on the scale.

3. Scoring the Scale

The scale had 25 positive statements and 5 negative ones. Each one scored on a five-point Likert Scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). The total score of the scale was 150 marks.

3.3 The Proposed Treatment

3.3.1 The Pre-Administration of the English Medical Vocabulary Test & Interest in Learning Scale

The "Mann Whitney" test for independent groups was used to determine the significant differences between the mean ranks of the experimental and control groups in the medical vocabulary test and interest in learning scale before the treatment in order to ensure the equivalence of the two groups as shown in Table (8) and (9).

Table (8): Results of Mann Whitney of the Experimental and Control Groups in the Pre-administration of the English Medical Vocabulary Test

Groups	N.	Mean Rank	Sum of Ranks	U	Z	Sig.*
Experimental	30	17.34	243.6	96.3	1.126	Non
Control	30	20.76	287.8			

Results in table (8) showed that there was no significant difference between the mean ranks of the experimental group and the control group students in the pre-administration of the test, as (Z) value wasn't significant at (0.05) level*.

Table (9): Results of Mann Whitney of the Experimental and Control Groups in the Pre-administration of the Interest in Learning Scale

Groups	N	Mean Rank	Sum of Ranks	U	Z	Sig.*
Experimental	30	16.03	246.4	131.4	0.286	Non
Control	30	16.87	271.4			

Results in table (9) showed that there was no significant difference between the mean ranks of the experimental group and the control group students in the pre-administration of the interest learning scale, as (Z) value wasn't significant at (0.05) level*.

- **Aims of the Treatment**

The treatment using Poe AI chatbot mainly aimed at:

1. Enhancing English medical vocabulary learning and their interest in learning it.
2. Making the best use of the AI chatbots and grabbing EFL instructors to the value of it as a vital tool to develop ESP skills.

- **Content**

The researcher depended mainly on topics of English Nursing course studied by the 2nd year TNI students. The choice of these topics of interest was motivated by the idea that they would increase the existing knowledge base of the students. A wide knowledge base is an important factor that shapes learning as it provides the basis on which new learning can build and helps them to make sense of new information.

The researcher tailored their sessions according to a harmonious combination from the known to the unknown, from the easier to the most difficult. The researcher grasped the students' interest points, knew the various activities concerned by the students, and added the materials.

Procedures of the Proposed Treatment

The implementation of the Poe AI-based program (**Appendix 5**) went through three phases: Pre-Implementation, Implementation and Post-Implementation as follows:

1.Pre-Implementation: Before implementing the program, English medical vocabulary pre-test and the interest in learning pre-scale were administered to the participants of the study to measure their level before the implementation of the program. Instructions for the test and scale were given orally by the researcher of the present study.

Before the training, an orientation session was given to clarify the overall procedures of the treatment, such as objectives, content, time, activities, teaching/learning methods, and evaluation techniques. The instructor did the followings:

- Be sure about the internet connection and other suitable settings e.g. mobiles, aids, worksheets, vocabulary maps...etc
- Ask the students about what vocabulary they knew and would like to learn.
- Give them a brief about the Poe AI chatbot and how they set-up and use.
- Ask them to join and use the app through signing <https://poe.com>.
- Dividing the experimental group students into teams (5-6 members in each one)
- Have a list of topics and academic targeted vocabulary they would acquire and distribute them to groups.
- Ask them to have points of interest about each vocabulary through a mind map which they fill in about the form, meaning and use about these vocabularies.
- They can have a scribe to write down and each one in the group would use the word either in spoken or written form.

2. **Implementation of the Program:** After the study participants were pretested, the researcher implemented the program in the Technology Unit at TNI. The program lasted for 6 weeks, and two sessions per week; each session lasted for nearly 60 minutes according to the content and objectives of the session.

Some sessions were offline (face to face) while others were online. During the online sessions, the researcher was in contact with the study participants via a Whats App group sharing the sessions' content and links with the study participants, received the answers and screenshots from them and provided them with instant feedback. The researcher followed these steps:

- Ask the students to search the new words using the Poe AI chat.
- Check the students' pronunciation of the new words.
- Discuss the contextual meanings with the students.
- Clarify the meaning through giving definitions and examples.

- Ask them to give synonyms to the words and try to replace them.
- Then, the students practiced the newly instructed vocabulary aspects (meaning, synonymy, antonym, compounding, collocation, derivatives) through Poe AI chatbot activities and tasks created through the use of various resources such as Quizizz, Quiz game master and Word wall.

At the end of the session, the researcher assigned the study participant some offline and online activities as a consolidation to make sure that they achieved the session's objectives through using some resources such as vocabulary games, quizzes...etc.

3. Post-Implementation: At the end of the implementation, the researcher administered the English medical vocabulary post-test and the interest in learning scale to the study participants to explore how Poe AI integration into nursing classes would affect English medical vocabulary learning and interests in learning it. The data were statistically analyzed and interpreted.

• **Evaluation of the Poe AI-based Program**

The evaluation used in the program had two types: formative and summative.

▪ **Formative Evaluation:** was conducted during the program sessions for assessing the students' medical vocabulary. After each session, the students were given an offline game as well as an online vocabulary quiz (outside the classroom) to assess their understanding of content of the session.

▪ **Summative Evaluation:** was conducted at the end of the experiment through administrating the English medical vocabulary learning post-test and the interest in learning scale.

○ **The Instructor's Roles**

▪ **A guide:** through describing what the students had to do with the given tasks and activities throughout the program sessions.

▪ **A monitor:** through observing students' performance on the tasks and activities given.

▪ **An assessor:** provided them with feedback about the performance.

○ **The Students' Roles**

-**Active Participants:** as they did the following:

- Engage in various English medical vocabulary learning activities and tasks according to their personal learning needs and interests.
- use the target vocabulary words in sentences from their own.
- They are encouraged to work in teams.

4.1 Results and Discussion

4.1.1 Verifying the First Hypothesis

The first hypothesis stated that "There was a statistically significant difference among the mean scores of both the control and experimental group students on the post-administration of English Medical vocabulary test at the level of $\alpha \geq 0.05$, favoring the experimental group". The t-test for paired dependent samples was used to test the first hypothesis as shown in Table (10).

Table (10) Results of T-test of the Control and Experimental Group Students on the Post-administration of English Medical Vocabulary Test

Groups	N	Mean	St. D.	T-Value	D. F.	Sig.
Experimental	30	27.21	2.513	18.231	58	0.05
Control	30	13.26	2.461			

Table (10) showed that the mean scores of the experimental group students were higher than those of the control group as the total mean scores of the control group was (13.26) while the total mean scores of the experimental was (27.21). This development was due to the proposed treatment. Thus, the first hypothesis was verified.

4.1.2 Verifying the Second Hypothesis

The second hypothesis stated that "There was a statistically significant difference among the mean scores of the experimental group students on the pre/post

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administration of English medical vocabulary test at the level of $\alpha \geq 0.05$, favoring the post one". The t-test for paired dependednt samples was used to test the second hypothesis as indicated in Table (11).

Table (11): Results of T-test of the Experimental Group Students on the Pre& Post-administration of the English Medical Vocabulary Test

Measurement	N	Mean	St. D.	T- Value	D.F.	Sig.
Pre		8.3	2.276			
Post	30	29.47	2.454	33.46	29	0.05

Results in Table (11) indicated that the mean scores of the experimental group students on the pre-administration of English medical vocabulary test was (8.3) while the mean score on the post one was (29.47). The results indicated that the T-value was (33.46) which was significant at 0.05 level. So, it could be concluded that the scores of the experimental group was much greater in the post- test than the pre-test due to using Poe AI chatbot. Therefore, the second hypothesis of the study was accepted.

To estimate the effect size of the treatment, An Eta Squared (η^2) equation was used as illustrated in Table (12).

Table (12): Value of (η^2) and the Effect of the Treatment on the English Medical Vocabulary Learning

Vocabulary Learning	N	Mean	St. D.	Sig	(η^2)	Size
	30	28.46	2.621	0.05	0.92	Large

Table (12) illustrated the effect size of the proposed treatment on the experimental group students' vocabulary learning. Results indicated that the effect size (0.92) was large.

4.1.3 Verifying the Third Hypothesis

The third hypothesis stated that "There was a statistically significant difference among the mean scores of both the control and experimental group students on the post

administration of the interest in learning scale at the level of $\alpha \geq 0.05$, favoring the experimental group". The t-test was used to compare the scores of both the experimental group and those of the control group after the administration of the treatment as shown in Table (13).

Table (13): Results of t-test of the Control and Experimental Groups on the Post-administration of the Interest in Learning Scale

N.	Domains	Group	N.	Mean	S.D.	T-Value	D.F .	Sig.
1	Motivation	Exp	30	14.76	1.168	22.76	58	0.05
		Con	30	7.51	1.23			
2	Attention & Predisposition	Exp	30	15.53	1.42	21.54	58	0.05
		Con	30	6.31	1.118			
3	Attitude	Exp	30	14.84	1.06	22.71	58	0.05
		Con	30	7.43	1.024			
4	Studying Habit	Exp	30	16.76	1.91	27.76	58	0.05
		Con	30	8.34	1.43			
5	Self-Concept	Exp	30	18.45	1.98	29.76	58	0.05
		Con	30	7.12	1.23			
	Student Aptitude	Exp	30	14.81	1.79	28.91	58	0.05
		Con	30	7.32	1.87			
-	Total	Exp	30	85.72	2.61	43	58	0.05
		Con	30	43.56	4.65			

Table (13) indicated that there was a statistically significant difference at 0.05 level between the mean scores of the post- administration of the interest in learning scale of the experimental group and those of the control group in favor of the experimental group; as the t-value (43) was statistically significant at 0.05 level and D.F.=58. These results showed that the experimental group outperformed the control group, which may be attributed to the effect of proposed treatment (Poe). Thus, the third hypothesis was confirmed.

4.1.4 Verifying the Fourth Hypothesis

The fourth hypothesis stated that "There was a statistically significant difference among the mean scores of experimental group students on the pre/post administrations of the interest in learning scale at the level of $\alpha \geq 0.05$, favoring the post one". T-test for dependent samples was used to test the fourth hypothesis as shown in Table (14).

Table (14) Results of t-test of the Experimental Groups on the Pre/post-administrations of the Interest in Learning Scale

N.	Domains	Measurement	N	Mean	S.D.	T-Value	D.F.	Sig.
1	Motivation	Pre	30	7.21	1.54	24.72	58	0.05
		Post		14.67	1.27			
2	Attention & Predisposition	Pre	30	6.34	1.61	26.74	58	0.05
		Post		14.65	1.04			
3	Attitude	Pre	30	7.34	1.803	20.23	58	0.05
		Post		13.76	1.04			
4	Studying Habit	Pre	30	6.32	1.52	22.67	58	0.05
		Post		14.65	0.980			
5	Self-Concept	Pre	30	5.56	1.561	24.08	58	0.05
		Post		13.67	0.782			
6	Student Aptitude	Pre	30	6.76	2.87	26.65	58	0.05
		Post		13.76	2.67			
-	Total	Pre	30	37.23	2.93	67.14	58	0.05
		Post		82.67	2.58			

Results in table(14) showed that the mean scores of students on the pre-adminstration of the interest in learning scale was (37.23) while the total mean score of students on post-adminstration of the interest in learning scale was (82.67). These results indicated that the high mean score was obtained for the post-administrations results. The t-value for the total interest in learning scale was (67.14). Results in table

(14) confirmed that the estimated t-value was significant at the 0.05 level. Thus, the fourth hypothesis was vlidated.

To estimate the effect size of the treatment, An Eta Squared (η^2) equation was used as shown in Table (15).

Table (15): Value of (η^2) and the Levels of Effect Size

N.	Domains	Measure ment	N	Mean	S.D.	D.F	Sig.	η^2	Effect
1	Motivation	Pre	30	5.18	1.54	29	0.0	0.96	Large
		Post		11.34	1.27		5	1	Large
2	Attention& Predispositi on	Pre	30	6.42	1.61	29	0.0	0.95	Large
		Post		14.38	1.04		5	2	Large
3	Attitude	Pre	30	7.89	1.803	29	0.0	0.92	Large
		Post		13.43	1.04		5	3	Large
4	Studying Habits	Pre	30	6.65	1.52	29	0.0	0.93	Large
		Post		15.23	0.980		5	1	Large
5	Self- Concept	Pre	30	4.43	1.561	29	0.0	0.91	Large
		Post		12.17	0.782		5	2	Large
6	Student Aptitude	Pre	30	5.16	2.87	29	0.0	0.92	Large
		Post		12.32	2.67		5	0	Large
-	Total	Pre	30	34.61	2.93	29	0.0	0.94	Large
		Post	30	80.40	2.58		5	1	Large

Table (15) reported the large effect of Poe AI chatbot on the total score of the interest in learning scale, as the value of (η^2) in the total score on the interest in learning scale was 0.941.

4.2. Discussion of the Results

The previous results confirmed that there was a remarkable development in the experimental group students' English medical vocabulary on the post- administration

of the English medical vocabulary learning test and their interest in learning scale. This development might be attributed to the following aspects:

Validating the first and the second hypothesis confirmed enhancing the experimental group student's English Medical vocabulary learning due to the training program. This result was consistent with the results of many studies such as (Putri et al., 2023; Rabie, 2023; Zaidi & Al Jadaan, 2022 & Zhang, 2024) which indicated that students' exposure to words and lexical phrases in the input through posing real, active and interactive conversation with the Poe AI chatbot which assisted them to pick up the words incidentally. Because of intelligent tutoring systems, Poe provided personalized feedback and guidance to students.

Furthermore, the more frequently a certain word or lexical phrase appeared in the input, the more likely they would be acquired or retained. Hence, Poe AI, as a chatbot, was an effective in enhancing students' medical vocabulary, assured by the studies of Pham et al. (2024); Shin and Lee (2024); and Zahran, (2025).

Validating the third and fourth hypothesis indicated enhancing the experimental group student's interest in learning due to the proposed treatment. This result was consistent with the results of many studies such as Belda-Medina and Alhebshi and Gamlo (2022); Marpaung (2022); Marrahi-Gomez (2023); and Sharaf (2024) which recommended enhancing interest in learning vocabulary using online methods e.g. Poe AI chatbot. Poe AI enhanced TNI 2nd year students' curiosity to learn medical vocabulary, pose questions, search the synonym, antonym, collocation, etc. Poe enhanced interactivity with the educational content and helped the students collaborate as a team to shape their learning experience with passion and interest.

It was evident from the research that social interaction was the key to develop interest. Social interaction in the form of Poe-AI chatbot, teacher–student interactions; and peer interactions formed the basis of developing interest in the various topics of the program.

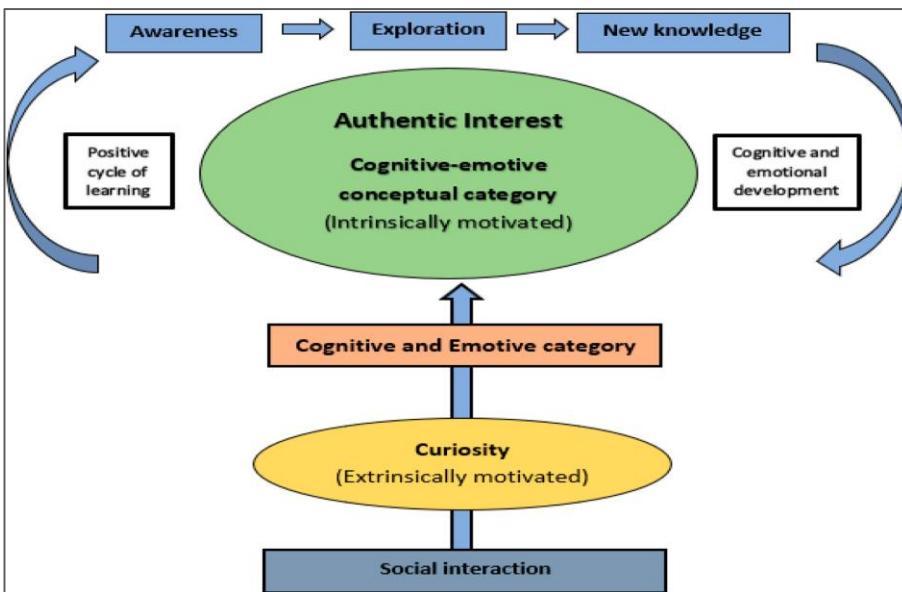


Figure (8): Model of Authentic Interest Development (Ellie Christoffina van Aswegen & Donna Pendergast, 2023: 1341)

As the students in the Poe AI conversation and research became authentically interested in a topic, it was observed that their awareness of the topic increased as well as their eagerness to independently explore the topic through the Poe. Raised awareness and exploration, leading to new knowledge, were seen as further indicators of authentic interest in a topic.

Exactly, it was an amazing journey to the students as they moved from a personal conversation to another smoothly and interactively in accordance with their needs and interests. Their interaction and discussion with the Poe AI according to their personal learning encouraged them to self-learn and have the high interest to acquire knowledge about the English medical vocabulary. Hence, integrating Poe AI chatbot was an effective in English medical vocabulary learning for nursing students and their interest in learning it.

3. Conclusions

The following conclusions were extracted in the light of the previous findings:

1. The development of the TNI 2nd year students' English medical vocabulary and their interest in learning it was due to interactivity with learning material, the activities of visualization, retelling, self-regulated learning, ...etc.
2. The program should accommodate to diverse students' needs, and characteristics giving them numerous opportunities to interact in real situations of vocabulary acquisition.

4. Recommendations

In the light of previous results, the following recommendations could be presented to:

1. raise the students' curiosity and interest to learn EFL. Building their high interest in learning vocabulary is the first step before making any decision about which teaching practices the instructors ought to implement in the future teaching context.
2. update ESP courses integrating AI technologies and take into consideration the students' personal needs, interests and the learning outcomes.
3. learn vocabulary, and activities in an integrated course and in accordance with the technological innovations.

5. Suggestions for Further Research

1. Exploring the impact of Poe AI chatbot on improving EFL creative writing skills and self-regulated learning skills.
2. Investigating the effectiveness of a training program based on Poe AI in promoting EFL speaking skills and willingness to speak.

References

Abdullah, G. (2013). Strategies and Approaches for Teaching and Learning of Medical Terminology. *International Journal of English and Education*, 2, (2), 225-240.

Afzal, N. (2019). A Study on Vocabulary-Learning Problems Encountered by BA English Majors at the University Level of Education. *Arab World English Journal*, 10, 81-98.
<https://doi.org/10.24093/awej/vol10no3.6>

Ahmed, R. (2022). Nursing students' medical terminology learning strategies. *International Journal of English Language Teaching*, 10 (7), 50-62.
<https://doi.org/10.37745/ijelt.13/vol10n75062> .

Akbari, Z., & Tahirian, M. H. (2009). Vocabulary learning strategies in an ESP context: The case of Para/medical English in Iran. *The Asian EFL Journal Quarterly*, 11(1), 39-61.

Al Mukhallaifi, T. (2020). Using artificial intelligence for developing English language teaching/learning: An analytical study from university students' perspective. *International Journal of English Linguistics*, 10 (6), 40.

Alahmed, K. (2024). Medical Terminology Knowledge and Vocabulary Learning Strategies Employed by Nursing Students at Ninevah University. *Surra Man Ra'a Scientific Refereed Journal*. 20, (80), 25-42.

Alhebshi, A. A., & Gamlo, N. (2022). The Effects of Mobile Game-Based Learning on Saudi EFL Foundation Year Students' Vocabulary Acquisition. *Arab World English Journal*, 13 (1) 408-425. DOI:
<https://dx.doi.org/10.24093/awej/vol13no1.27>.

Alizadeh, I; Ramazanzad, Y. & Sharifi, S. (2021). Creating Medical Terminology Flashcards for Use in Specialized Language Courses at Medical

Sciences Universities. International Journal of Research in English Education, 6, (3), 60-68.

AL-Jawadi, A. & Safwat, S. (2018). The Importance of Word Affixes in Medical Terms. International Journal of Humanities and Cultural Studies. 5, (3),1-7. <http://www.ijhcs.com/index.php/ijhcs/index>.

Anggraini, A. & Faisal, F. (2024). The Use of Artificial Intelligence Based Technology in English Language Teaching. Golden Ratio of Data in Summary Journal, 4, (2), 950- 957.

Askarova, K. (2023). Teaching Medical Terminology to (ESP) Medical Students in English. Science and Innovation International Scientific Journal, 2,(1),77-79.<https://doi.org/10.5281/zenodo.7517327>

Asrianti, (2020). "Students' Interest in Literacy-Based Indonesian Language Learning," Ethnolinguual 4, (1) p. 3, <https://e-journal.unair.ac.id>.

Ayadi, K. & Beghoul, Y. (2024). A Discourse-Driven Approach to Basic Medical Vocabulary in the Algerian Medical Context. El-Ryssala Journal for Studies and Researches in Humanities.8,(4),11-29.

Belda-Medina, J.; Marrahi-Gomez, V. The Impact of Augmented Reality (AR) on Vocabulary Acquisition and Student Motivation. Electronics, 12, 749. <https://doi.org/10.3390/electronics 12030749>.

Cerrato, L. (2022). Faculty Perceptions on Using Retrieval Practice to Learn Medical Terminology: A Qualitative Multiple Case Study. Ph. D. School of Education, Northcentral University.

Chabner, D. E. (2022). Medical terminology: A short course-e-book. Elsevier Health Sciences.

Collins, E. C. (2008). A Short Course in Medical Terminology: Enhanced Reprint. (1st). Lippincott Williams & Wilkins, USA.

De Vivo, K. (2022). A new research base for rigorous project-based learning. *Phi Delta Kappan*, 103(5), 36–41.

<https://doi.org/10.1177/00317217221079977>

Dujardin, et al. (2021). Tools and Teaching Strategies for Vocabulary Assessment and Instruction: A Review. *Social Education Research Social Education Research*, 3, (1). 33-66.

Ellie Christoffina van Aswegen & Donna Pendergast (2023). The impact of interest: an emergent model of interest development in the early years, *Early Child Development and Care*, 193:13-14, 1335-1349, DOI: 10.1080/03004430.2023.2245575.

Elsanousi, R. ; Hamad, M. & Ahmed, A. (2021). Investigating of ESP Vocabulary Difficulties Encountered by EFL Learners. *White Nile Journal for Studies and Scientific Research*. (18). 103-120.

Ghoneim, N. & Elghotmy, H. (2020). Using an Artificial Intelligence Based Program to Enhance Primary Stage Pupils' EFL Listening Skills. *Sohag University Faculty of Education Journal*. 1, (83).2-32.

Gülen, K. (2023). “Poe AI offers multiple LLMs in the same interface”. IEPA. <https://dataconomy.com/2023/07/25/what-is-poe-ai-and-how-to-use-it/>

Hassoun, Z. (2019). Problems of teaching and translation of medical English to students of tertiary level. *Advances in Social Sciences Research Journal*, 6(10), 105-117.

Hidi, S. and Renninger, K. (2006). The four-phase model of interest development. *Educational psychologist* 41, (2) , 111–127.

Ho, P. X. P. (2024). Using ChatGPT in English language learning: A study on I.T. students' attitudes, habits, and perceptions. *International Journal of TESOL & Education*, 4 (1), 55-68. DOI: <https://doi.org/10.54855/ijte.24414>.

Honč, P.; Přívratská, J.; Hellerová, K. (2023). Essential Medical Terminology: Your lifeboat in the sea of terms. Charles University: Karolinum Press.

Hsieh C. (2016) Bingo! Team-Based Game in English Medical Terminology for Baccalaureate Nursing Students. *Int Arch Nurs Health Care* 2:046.

Hsu, M.H.; Chan, T.-M. & Yu, C.S. (2023). Termbot: A chatbot based cross word game for gamified medical terminology learning. *International Journal of Environmental Research and Public Health*, 20 (5), 4185. doi:10.3390/ijerph20054185.

<https://poeai.quora.com/>

Hurlock, E.B. (1993). *Developmental Psychology: A Lifespan Approach* (Fifth Edition). Jakarta: Erlangga.

Ichiyama, Y. (2019). Comparing the Knowledge of EFL Students' General Vocabulary and Medical Terminology. *International Journal of Science and Research (IJSR)*. 8 (3), 1806-109.

Ja'ashan, H.; Alfadda, A., & Mahdi, S. (2022). Using a holographic application in learning medical terminology for English as a foreign language students. *Interactive Learning Environments*, 32(2), 600-613.

<https://doi.org/10.1080/10494820.2022.2093913>

Javid, C. (2013). English for Medicine (part two): An Intermediate ESP Course for Students of Medicine

https://www.academia.edu/11304732/English_for_Medicine_Part_2?nav_from=f9fcde11-702b-4bd7-9e7b-c82074f58133

Junianto, J., & Mahmudi, A. (2016). Efektivitas Pendekatan Kontekstual Terhadap Minat Dan Prestasi Belajar Matematika Siswa Smp Negeri 6 Yogyakarta. *Jurnal Pendidikan Matematika Dan Sains*, 1–12.

Khalid, G. (2024). The effect of reading short stories on enhancing EFL vocabulary acquisition of secondary stage students and their interests. Thesis (M. S.), Mansoura University. Faculty of Education.

Khan, I. A. (2016). Difficulties in Mastering and Using English for Specific Purpose (Medical Vocabulary): A Linguistic Analysis of Working Saudi Hospital Professionals. International Journal of Education, 8(1), 78-93.

Kim, H. S., Y. Cha, & N. Y. Kim. (2020). Impact of Mobile Interactions with AI on Writing Performance.” Modern English Education 21,(2): 1–13.
<https://doi.org/10.18095/meeso.2020.21.2.1>.

Kim, N. (2018). Chatbots and Korean EFL Students' English Vocabulary Learning. Journal of Digital Convergence. 16, (2), 1-7,
<https://doi.org/10.14400/JDC.2018.16.2.001>

Kim, N. Y. (2016). Effects of Voice Chat on EFL Learners' Speaking Ability According to Proficiency Levels. Multimedia-Assisted Language Learning 19, (4): 63–88.

Krapp, A. (2002). Structural and dynamic aspects of interest development: Theoretical considerations from an ontogenetic perspective. Learning and instruction, 12, (4) 383–409.

Kristanto, B. ; Thanee Glomjai,T.; Putri, D. (2024). Enhancing Nursing Students' Long-term Retention and Engagement in Medical Terminology through Mnemonic-Enhanced Multimedia Mobile Learning. Journal of Advanced Health Informatics Research (JAHIR),2, (1), 12-23. DOI: 10.59247/jahir.v2i1.178.

M. Kannadhasan, (2024). “Use of Technical Intelligence in English Teaching and Learning”, International Journal of Multidisciplinary Research and Modern Education, 10, (2), 25-27.

Mahdi, H. & Gubeily, M. (2018). The effect of using Bizarre to enhance vocabulary learning. *Journal of Social Studies*, 24, (1), 111-133
<https://doi.org/10.20428/JSS>.

Manimurasu, K. (2024). "Use of Technical Intelligence in English Teaching and Learning", *International Journal of Multidisciplinary Research and Modern Education*, 10, (2), 25-27.

Marpaung, Sri Wahyuni (2022). The effect of mime game on vocabulary learning interest at the VIII Grade Students of SMP N 2 Sorkam. Undergraduate thesis, IAIN Padangsidiimpuan.

Masita, M. & Fitri, N. (2020). The Use of Plickers for Formative Assessment of Vocabulary Mastery. *Ethical Lingua*, 7, (2), 310-320 DOI 10.30605/25409190.179

Mohamed, S. S.A., & Alian, E. M. I. (2023). Students' Attitudes toward Using Chatbot in EFL Learning. *Arab World English Journal*, 14 (3) 15-27. DOI: <https://dx.doi.org/10.24093/awej/vol14no3.2>.

N. McAllister et al., (2024). Leveraging an m-Learning Prototype to Teach Medical Terminology to Nursing Students: A Linguistic Approach, Teaching and Learning in Nursing. 1-7.
<https://doi.org/10.1016/j.teln.2024.08.006>

Najafi, M. & Talebinezhad, M. (2018). The Impact of Teaching EFL Medical Vocabulary Through Collocations on Vocabulary Retention of EFL Medical Students. *Advances in Language and Literary Studies*, 9 (5), 24-27.

Nation, I.S.P. (1990) *Teaching and Learning Vocabulary*. Heinle & Heinle, Boston.

OpenAI. (2023a). ChatGPT.

OpenAI. (2023b). ChatGPT: Optimizing language models for dialogue.

<https://openai.com/blog/chatgpt/>

Pham, T. T., Nguyen , L. A. D., Dang, H. M., & Le, T. T. P. (2024). Exploring Tertiary Vietnamese EFL Students' Engagement in Vocabulary Learning through the Use of an AI Tool. Proceedings of the AsiaCALL International Conference, 4, 129-149. DOI: <https://doi.org/10.54855/paic.23410>

Putri, et al. (2023). SFA-based learning material design to improve English medical terminology acquisition among South East Asian nursing students. Journal of English Language Teaching,12,(2),110-121.

Qasem, F. et al. (2022). Dialog chatbot as an interactive online tool in enhancing ESP vocabulary learning. Saudi Journal of Language Studies,3,(2), 76-86. DOI 10.1108/SJLS-10-2022-0072

Quora, (2022). Delving into Poe AI Chat by Quora: Fresh Insights

Rabie, R. (2023). The Role of Artificial Intelligence and Personalized Education in Medical Curriculum: A Systematic Review of Applications and Challenges. Faculty of Education Journal - Alexandria University, 23, (4). 365-384.

Reber, R., Canning, E. A., & Harackiewicz, J. M. (2018). Personalized Education to Increase Interest. Current Directions in Psychological Science, 27(6), 449-454. <https://doi.org/10.1177/0963721418793140>

Riamin. (2016). Menumbuhkan Minat Belajar Siswa dalam Pembelajaran. 14 April. <https://www.kompasiana.com/riamin/570ec6323697738d1a3e38b6/menumbuhkan-minat- belajar-siswa-dalam-pembelajaran>

Rohmatillah, R. (2014). A STUDY ON STUDENTS' DIFFICULTIES IN LEARNING VOCABULARY. English Education. 6, (1).

Rossetot, K. (2019). Smartphone Application for Learning Medical Terminology and Improving Academic Performance in Vocational Nursing Students. Ph.D. Capella University. ProQuest Number 27664402.

Rumiyati, R., Kusumanigrum, A., Purba, N., & Binar, S. (2024). The Impact of Online Learning on the Learning Interest of Students at Anak Bangsa Christian High School in Surabaya. *Journal Didaskalia*, 7(2), 45-60. <https://doi.org/10.33856/didaskalia.v7i2.426>

Shahin, W. (2023). The effectiveness of an electronic program based on the accelerated learning theory in developing EFL phonological performance, vocabulary use, and oral reading of preparatory school students. Ph.D. Faculty of Education, Zagazig university.

Sharaf, S (2024). Using mobile augmented reality applications to develop EFL vocabulary learning of primary stage pupils and their interest in learning it. MA thesis, faculty of Education, Mansoura University.

Shin, D., & Lee, J. H. (2024). Moving from off-the-shelf chatbots to a user-designed bespoke L2 chatbot. *Language Learning & Technology*, 28(1), 1-14. <https://hdl.handle.net/10125/73581>.

Siemens, et al. (2020). Human and artificial cognition. *Computers and Education: Artificial Intelligence*. 3 (2022) 100107.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology & Distance Learning*, 2, 3-10.

Sinadinović, D. (2013). The importance of strategies in learning and acquiring medical English vocabulary. *JAHR*, 4, (7). 273-291.

Slameto. (2010). *Belajar dan Faktor-faktor Yang Mempengaruhinya*. Jakarta. PT. Rineka Cipta

Teng, M. (2023). The effectiveness of multimedia input on vocabulary learning and retention, *Innovation in Language Learning and Teaching*, 17, (3), 738-754, DOI: 10.1080/17501229.2022.2131791

Thornbury, Scott. (2002). *How to Teach Vocabulary*. England: @ Pearson Education Limited.

Triposa, D. H. P. G. D. R. (2022). Dampak Perubahan Kurikulum Pada Minat Belajar Pendidikan Agama Kristen. *Jurnal Pendidikan Agama Kristen*, 4(2), 83–96.

U.S. Department of Education. 2017. *Reimagining the Role of Technology in Education: 2017 National Education Technology Plan Update*. (2017). <https://tech.ed.gov/fles/2017/01/NETP17.pdf> .

Wang, C.W. (2025). *English for Medical Communication: A Guide to Course Design* (1st ed.). Routledge. <https://doi.org/10.4324/9781003375654>.

Wang, R. (2019). Research on Artificial Intelligence Driving Change in English Learning Advances in Social Science, Education and Humanities Research, 392-395.

Yuwanta, I., Dewi, H. I., & Wicaksono, D. (2020). Pengaruh Metode Pembelajaran dan Gaya Belajar Terhadap Hasil Belajar IPA. *Instruksional*, 1(2), 152-158. <https://doi.org/10.24853/instruksional.1.2.152-158>.

Zafirovska1, A. & Xhaferi, B. (2022). Vocabulary Acquisition in English for Medicine-Students' Perspective. *The Journal of Teaching English for Specific and Academic Purposes*. 10, (3), 505–532.

Zahran, F. (2025). The Impact of Using Poe ChatGPT-Based TPACK Model on English as a Foreign Language Teachers' Performance and Their Students' Vocabulary Learning. *Higher Learning Research Communications*, 15 (1).DOI:10.18870/hlrc.v15i1.1622.

Zaidi; H. & Al Jadaan, O. (2022). Student' Linguistic Skills and Problem in Learning Medical Vocabulary at a Health Sciences University in The UAE. European Journal of Education Studies. 9, (6), 90-104.

Zhang, H. & Wei, W. (2024). Challenges in promoting sustainable use of mobile technologies in developing medical terminology for doctor trainees Computer Assisted Language Learning Electronic Journal (CALL-EJ), 25(3), 82-101.

Zhao, Y. (2014). On How to Arouse the Students' Learning Interest in Foreign Language Teaching. International Conference on Education, Management and Computing Technology (ICEMCT).

