



ORIGINAL RESEARCH PAPER

Exploring the Effect of Google Docs on Learning Technical Vocabulary in ESP courses

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ABSTRACT

Received: 27 August 2023  
Reviewed: 19 October 2023  
Revised: 06 November 2023  
Accepted: 20 December 2023

KEYWORDS:

ESP  
Google Docs  
ICT  
Students in ESP Courses  
Specialized Vocabulary Learning

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**Background and Objectives:** Regarding the fact that most of the submitted official documents are written in or translated into English, all English for Specific Purposes (ESP) learners are not only required to learn professional knowledge but also need to know English technical vocabulary in their field of study. Therefore, enhancing technical vocabulary competence (VC) is one of the aims defined by ESP learners. In this new digital era, various techniques facilitate vocabulary learning via using Information and Communication Technology. Due to the advent of technology and the developmental trend of learning, learners are provided with the opportunity to use online and mobile applications in a very wide range to develop their English vocabulary knowledge. Accordingly, this study was an attempt to explore the effect of using Google Docs on ESP students' vocabulary learning. The research also intended to find out the learners' perceptions toward using Google Docs on learning and practicing target technical vocabulary.

**Materials and Methods:** To this end, a quasi-experimental research design was employed for gathering both quantitative and qualitative data. In this regard, 40 Iranian ESP nursing learners who were randomly allocated into an experimental (n=20) and a control group (n=20) participated in this study. The learners in the control group were asked to use their personal traditional techniques for learning technical vocabulary, while the experimental group was assigned to use Google Docs for vocabulary learning. Four data-gathering instruments were utilized; first, an Oxford Placement Test (OPT) was employed for homogenizing the participants. Second, each group underwent a pretest and a posttest to assess their learning of the assigned vocabulary lessons. Then, a survey was conducted among the experimental group to investigate learners' motivation about learning technical vocabulary through using Google Docs. Lastly, a semi-structured interview was employed with the experimental group to explore their thoughts and perceptions toward using Google Docs. A series of t-tests, including two paired sample t-tests and one independent samples t-test were employed to compare the performance of the two groups in terms of learning technical vocabulary.

**Findings:** Subsequent to validating the assumption of normality, the results of an independent samples t-test revealed that there was a significant difference between the students of the experimental and control groups on post-test scores. The obtained data revealed that both experimental and control groups were able to improve their vocabulary learning successfully. However, comparing the two groups showed that the experimental group performed significantly better than their counterparts in the control group who used their practical traditional techniques for learning specialized vocabulary in ESP courses. Additionally, face-to-face semi-structured interview results uncovered that the experimental group learners had positive perceptions toward using Google Docs for learning technical vocabulary.

**Conclusions:** Counting on the integration of technology into the curriculum of learning/ teaching ESP, it was concluded that Google Docs was an effective website tool that boosts, engages, and motivates learners to expand their technical vocabulary learning. Based on the limitation of the research, it is suggested to conduct a similar study with both male and female ESP learners, and also with a larger sample. The results of this research contain considerable implications for ESP instructors and learners and also curriculum and syllabus designers. Incorporating ICT into ESP education has revolutionized and changed the method by which ESP material developers construct ESP materials. So, findings can be implemented in any educational contexts as well as other languages.



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NUMBER OF REFERENCES  
57



NUMBER OF FIGURES  
1



NUMBER OF TABLES  
11

## بررسی تاثیر گوگل داک بر یادگیری لغت در دوره‌های تخصصی زبان انگلیسی

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## چکیده

**پیشینه و اهداف:** با توجه به اینکه اکثر اسناد رسمی به زبان انگلیسی نوشته یا ترجمه شده هستند، تمامی زبان آموزان انگلیسی برای اهداف ویژه نه تنها ملزم به یادگیری دانش حرفه ای هستند، بلکه باید واژگان تخصصی انگلیسی در رشته تحصیلی خود را نیز بدانند. بنابراین، افزایش دانش واژگان تخصصی یکی از اهدافی است که توسط زبان آموزان انگلیسی برای اهداف ویژه تعریف شده است. در عصر دیجیتال جدید، تکنیک های مختلف، یادگیری واژگان را با استفاده از فناوری اطلاعات و ارتباطات تسهیل می کند. با توجه به ظهور فناوری و روند توسعه ای یادگیری، زبان آموزان این فرصت را دارند که به میزان بسیار زیادی، برای توسعه دانش واژگان انگلیسی خود از برنامه های برخط و تلفن همراه استفاده کنند. بر این اساس، این مطالعه تلاشی برای بررسی تاثیر استفاده از Google Docs بر یادگیری واژگان زبان آموزان انگلیسی با اهداف ویژه بود. این تحقیق همچنین به دنبال یافتن میزان درک زبان آموزان از Google Docs در یادگیری و تمرین واژگان تخصصی مورد نظر بود.

**روش ها:** بدین منظور از طرح پژوهشی نیمه تجربی برای جمع آوری داده های کمی و کیفی استفاده شد. در این راستا، ۴۰ نفر از دانشجویان زبان تخصصی رشته پرستاری ایرانی که به طور تصادفی در دو گروه آزمایش (۲۰ نفر) و کنترل (۲۰ نفر) قرار گرفتند، در این مطالعه شرکت کردند. از زبان آموزان گروه کنترل خواسته شد تا از روش های سنتی برای یادگیری واژگان تخصصی استفاده کنند، در حالی که گروه آزمایش برای یادگیری واژگان از Google Docs استفاده کردند. در این پژوهش، چهار ابزار جمع آوری داده ها استفاده شد. ابتدا از آزمون تعیین سطح آکسفورد (OPT) برای همگن سازی شرکت کنندگان استفاده شد. در مرحله دوم، هر گروه برای ارزیابی میزان یادگیری دروس اختصاص داده شده تحت یک پیش آزمون و یک پس آزمون قرار گرفتند. سپس، نظرسنجی در بین گروه آزمایش برای بررسی انگیزه زبان آموزان در یادگیری واژگان تخصصی با استفاده از Google Docs انجام شد. در نهایت، یک مصاحبه نیمه ساختاریافته با گروه آزمایش برای بررسی افکار و میزان درک آن ها در مورد استفاده از Google Docs به کار گرفته شد. مجموعه ای از آزمون های t شامل دو آزمون جفتی و یک آزمون تی مستقل برای مقایسه عملکرد دو گروه از نظر یادگیری واژگان تخصصی و برای تجزیه و تحلیل داده های به دست آمده از پرسش نامه و مصاحبه نیمه ساختاریافته، از آزمون تی تک نمونه ای و تحلیل محتوا استفاده شد.

**یافته ها:** پس از اعتبار سنجی فرضیه ی نرمال بودن داده ها، نتایج آزمون تی مستقل test- نشان داد که بین دانشجویان گروه آزمایش و کنترل در نمرات پس آزمون تفاوت معناداری وجود دارد ( $t = -0.573$ ،  $sig = 0.000$ ) با ۹۵ درصد فاصله اطمینان از ۸.۳۰- تا ۵.۷۵-). داده های به دست آمده نشان داد که هر دو گروه آزمایش و گواه توانستند یادگیری واژگان خود را با موفقیت بهبود بخشند. با این حال، مقایسه دو گروه نشان داد که گروه آزمایش به طور معنا داری از همتایان خود در گروه گواه عملکرد بهتری داشتند. علاوه بر این، نتایج مصاحبه نیمه ساختاریافته نشان داد که فراگیران گروه آزمایشی میزان درک مثبتی نسبت به استفاده از Google Docs برای یادگیری واژگان تخصصی داشتند.

**نتیجه گیری:** با توجه به ادغام فناوری در فرآیند یادگیری/ یاددهی زبان انگلیسی برای اهداف ویژه، این چنین نتیجه گرفته شد که Goggle Docs یک ابزار موثر است که باعث تقویت، مشارکت و انگیزه زبان آموزان برای گسترش یادگیری واژگان تخصصی خود می شود. با توجه به محدودیت های پژوهش، پیشنهاد می شود مطالعه مشابهی با فراگیران انگلیسی با اهداف ویژه مرد و زن و همچنین با نمونه بزرگ تر انجام شود. نتایج این تحقیق حاوی مفاهیم قابل توجهی برای مدرسان و فراگیران انگلیسی با اهداف ویژه و همچنین طراحان برنامه درسی است.

تاریخ دریافت: ۰۵ شهریور ۱۴۰۲  
تاریخ داوری: ۲۷ مهر ۱۴۰۲  
تاریخ اصلاح: ۱۵ آبان ۱۴۰۲  
تاریخ پذیرش: ۲۹ آذر ۱۴۰۲

## واژگان کلیدی:

زبان انگلیسی برای اهداف خاص  
گوگل داک  
فناوری اطلاعات  
دانشجویان دوره های تخصصی  
زبان انگلیسی  
یادگیری واژگان تخصصی

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۰۹۱۲-۵۳۸۳۰۴۶ ①

## Introduction

Information and Communication Technology (ICT) has modified almost everything in our lives

which yields to producing incredible resources for the process of teaching and learning. Being connected and interested in technological devices, learners of the technology-enhanced

generation are called 'digital natives' [1]. The learners of the latest generation have great comfort and a high tendency toward using technology, for instance, surfing the internet, using digital applications, and sending short messages [2]. Considering the fact that today's learners learn differently than those a decade ago, instructors must apply innovative techniques for better learning, particularly for learning technical vocabulary effectively by ESP learners.

ICT has been developing for a while now with lots of new developments. Stakeholders in education have focused on integrating ICT into the classroom during the information era. Because of the increased availability and prominence of ICT, countries are taking steps to improve education by forming policies, investing in technological infrastructure, and training teachers.

One of the pivotal aspects of learning any second or foreign language is learning vocabulary. Mastering a high number of English words is essential for EFL/ESL learners, particularly for learners of ESP. Because VC plays an important role in efficient spoken and written instruction, interacting in the target language effectively necessitates a wide range of vocabulary size [3]. Furthermore, vocabulary learning is considered to be a central component of the development of language skills [4]. Consequently, there is a strong need to use novel vocabulary learning strategies, especially for ESP students.

Scholars believe that ESP is an approach to teaching and learning English as a foreign language [5]. Nevertheless, in comparison with other pedagogical approaches, the content and purposes of ESP are related to the particular needs of target learners [6]. Concerning the transformative nature of language from one context to another, (i.e., medical, engineering,

politics, tourism, etc.), employing an innovative technique for learning ESP vocabulary is of utmost importance. Accordingly, people need not only to have acceptable general English knowledge, but also a high amount of vocabulary proficiency and communicative use of the language concerning their particular field of study or profession [7].

Most language learners consider vocabulary to be one of the most challenging components of language learning. Some studies concluded that learning and practicing vocabulary through technology has various advantages [8]. Moreover, the importance of learning technical vocabulary has been discussed in some research studies [9]. Although students are enthusiastic at the beginning of the semester, it has been noticed that as time goes on, their drive wanes [10]. Their performance also tends to deteriorate. Due to the correlation between motivation and language learning, this decline has occurred [11]. It has been demonstrated that constructing the instructional design in conformity with John Keller's model of motivational design can help avoid the negative effects of low motivation in EFL classrooms [12].

A number of investigations indicate that digital flashcards, such as cram.com, Quizlet, along with Studyblue, serve an important role in language learning because they provide additional advantages [13]. According to Bilová the performance of learners demonstrated that Google Docs and Quizlet are effective tools for not just vocabulary learning but also for language teaching. The suggested approach was developed for official English classes, but it can be applied to any language course [14].

Regarding the conducted studies, investigating the effect of Google Docs as an ICT tool for learning specialized vocabulary to reduce challenges in ESP classes has not been

explored so far. Google Docs, provided by Google Workspace for Educational institutions has been identified as one of the supportive and advantageous technological resources for acquiring skills and sub-skills, whether in an academic setting or a career for professionals [15]. According to Nasri et al., the platform has also contributed to students' educational experiences, especially by facilitating its promotion of teacher feedback in Google Docs [16]. This tool also supports students' educational involvement and helps them to broaden their educational techniques [17]. Google Docs has also been shown to help poor performers in terms of collaboration and technological proficiency [18]. To that end, Google Docs may find favor with pupils as well as educators. Expressly, there is a gap in the literature with relatively no study to investigate the effect of using Google Docs on technical vocabulary learning of Nursing students. Hence, the current study deals with English vocabulary learning of intermediate nursing students at Golestan University in Golestan, Iran. The article starts by providing an introduction of the findings related to vocabulary-building strategies, then explores the theoretical background of ICT and concludes with a discussion of the role of ICT in vocabulary learning. The following section introduces Google Docs and related research, and the final section states the participants' perceptions toward using Google Docs.

Considering the importance of learning technical vocabulary and also the efficiency of integrating technology into the process of learning and teaching, this study intended to answer the following research questions:

- Does Google Docs affect ESP learners' vocabulary learning?
- Does learning vocabulary through Google Docs make a significant impact on nursing

students' motivation?

- How do students perceive the use of Google Docs online website on their ESP vocabulary development?

## Review of the Related Literature

### Theoretical Background

The current study's investigation into the impact of Google Docs applications on vocabulary learning is based on two theoretical pillars: Technology-enhanced language learning, and the theory of Cloud computing. For many years, technology-enhanced language learning has been a major research topic in language instruction [19-20], and it has received several positive feedback. Golonka et al. carried out a significant study that summed up a wide range of technologies used in language learning from 1996 to 2010 [21]. It is worth mentioning that 1996 was almost the beginning of the emergence of educational technology for language education. Technology, according to Golonka et al. (1) enhanced language learners' incentive to learn, effectiveness, and interaction frequency, (2) established learners' language skills and knowledge (e.g., speaking, listening, vocabulary, grammar), in addition to metacognitive and metalinguistic expertise, (3) enhanced sources of input, and (4) inspired input from peers. The study supported the efficacy and feasibility of technology-enhanced language learning [21].

Furthermore, Cloud computing, as defined by the National Institute of Standards and Technology (NIST), is a model for providing convenient, on-demand network access to a shared pool of configurable computing assets (e.g., networks, storage devices, servers, applications, and services) that can quickly be supplied as well as published with minimal management effort or service provider

collaboration [22]. The cloud model promotes accessibility. It should be pointed out, nevertheless, that cloud computing remains a developing paradigm. Cloud computing is distinguished by its capacity to be accessed from any location with an active Internet connection. The ability to advocate on-demand self-service enables users to have computing capabilities without requiring a relationship with the provider of a service. It enables the user to obtain data in real time rather than having to wait for the service to "boot up" [22]. Another significant benefit is the ability to access data on any network, regardless of client platform (mobile phone, laptop, etc.). Having access to data from any place means that helpful resources are not being wasted. This brings us to a further aspect of location-independent resource pooling. Cloud computing may redirect inactive assets and shift them to where consumer demand is highest by freeing up precious resources [23]. Given that the goal of this paper is to investigate the impact of Google Docs on college students, the characteristics of these models would be applicable to our investigation.

#### **Learning Specialized vocabulary in ESP context**

The fundamental content of any ESP course is specialized vocabulary [24]. Professional language, which includes technical, semi-technical, and general vocabulary, is included in the well-known categorization of receptive and productive vocabulary [18]. Specialized vocabulary is elucidated as "content words whose meaning is restricted to the specific subject, characterizes the specific language as an individual area of the global language, and constitutes the terminology of the domain" [24, p. 162]. Semi-technical vocabulary is defined as general words of content that become specialized in a particular field while remaining

accessible in general settings [25]. Finally, the term 'general vocabulary' "refers to those phrases that are familiar to the general speaker and exist with technical and sub-technical vocabulary in a specialized content" [26, p. 105]. Specialized vocabulary is likewise strongly related to terms. The phrases, recognized as lexical units transferring knowledge, establish and represent the degree of specialization of words. As a result, Terminological vocabularies are the key component in teaching medical settings [27], and these include morphological variants, orthographic variants, elliptical forms, and abbreviations.

#### **Learning Vocabulary on Google Docs**

Google Docs (official Google Docs) is a kind of cloud software powered by Google Drive. [28] As the name recommends, it is an instrument for sharing and co-altering documents. It is for nothing for all Gmail holders and at the same time, an unlimited number of people can utilize it. When Google Docs is implemented for teaching purposes, it suggests new occasions, besides facilitating work. For instance, to create various types of student-generated content literature recognizes many regions in which this apparatus ended up being valuable, with collaborative learning and community-oriented composing being the most well-known [14]. Various composers concentrated on the effects of utilizing Google Docs for collaborative learning by contrasting the consequences of similar studies in two groups of students: one group uses Google Docs and the other uses a traditional face-to-face system.

#### **Advantages and Challenges of Utilizing ICT in ESP**

As stated by Tan, the current world of globalization and competitiveness has placed a greater value on preparing students (future



specialists) to be creative, think logically, and solve worldwide issues efficiently [29]. Some of the features of an ESP techno-enriched environment for learning, as described by Butler-Pascoe and Keshtiarast et al., involve creating communicative activities representative of the specified occupation; providing understandable field-specific input to students; making easier student creation; utilizing genuine resources from particular fields and professions; supplying cognitive capacities and critical thinking abilities; and incorporating cooperative learning [30].

Rafi et al. proposed that higher learning educational materials be enhanced by using electronic libraries and Internet-based knowledge. They additionally stated that university professors' experiences, students' interests, and requirements must be incorporated into curriculum design decisions via a web-based need evaluation [31].

Previous research on ICT integration suggests that how instructors understand the importance of ICT in teaching and their perception of capacity in using ICT influence their views toward ICT use, as reported by Goodwin et al. It was also discovered that students' and teachers' risk-taking opinions were an indicator of the relationship between a pair of problems, which includes cognitive playfulness as well as assumed ICT importance [32]. For instance, Mahdum et al. found that teachers' prior experience with ICT, convictions about the benefits of ICT, and the perceived importance of ICT in teaching all influenced their use of ICT in the classroom [33].

Plenty of educators have not used technology in their classrooms due to a lack of time, understanding, and enthusiasm [34]. According to some investigations, the main barriers to establishing CALL in the Iranian EAP context are a lack of supplies, inadequate

training programs for educators, and teachers' lack of technological understanding. Furthermore, other studies revealed that practitioners' technophobia was a barrier [30]. Therefore, it might be beneficial to suggest that "prior knowledge and achievement with this innovation are required for teachers to establish a sense of self-efficacy and a feeling of mastery before they are comfortable incorporating this technology within their instructing" [30, p. 286].

### Previous Research on the Advantages of Technology to Improve Language Learning in ESP Context

Incorporating ICT tools into an efficient ESP educational setting expands the potential for understanding of a cutting-edge teaching and learning approach based on interaction, communication, and cooperation [35]. According to the findings of Akll et al., using ICT to teach ESP allows us to employ hard copy, graphics, video, audio recording, and other instructional tools. Because all activities are carried out concurrently, information is acquired more quickly and with greater passion. The ESP course, which aims to assist learners in using a language for future professional activities, is implemented through a content-based curriculum in which students acquire English by concentrating on their specialization and using genuine resources. The Internet is a great resource for authentic materials tailored to the requirements of learners, as well as a helpful instrument to establish a more flexible and stimulating educational setting [36].

The result of a study which has been done by Horvat et al. indicates students prefer using Moodle learning management system in ESP class because of its collaborative learning environment and they believe online tools can pave the road for improving their skills. They

concluded that this application was not bored easily and they were eager and more motivated and interested in learning independently [37].

Menéndez-Otero et al. investigated the use of ICT in an ESP course. Their findings demonstrated that Office and Moodle are effective deterrents to faculty unprofessional behavior and student opportunities. compared to face-to-face cooperation, all technological activity can be quickly, completely, and consistently recorded, tracked, and used as verification if necessary. As a consequence, instructors will be hesitant to abdicate their course management responsibilities, and only learners who have compelling reasons for believing they have been unjustly evaluated may challenge their scores. In every case, while ICT is incorporated into the evaluation procedure, just a few pupils will believe they have been unjustly or unequally examined. However, the advantages of ICT do not stop there [38].

Tan supported that the use of ICT has changed the roles of a teacher and a student in the ESP educational process: the former is transformed from a translator of knowledge into a moderator of students' intellectual activity, and the latter becomes an active participant able to transform information and perform intellectual activity. Teachers must complete the move from being lecturers to becoming organizers. It will become crucial for them to encourage students' critical thinking skills, promote information literacy, and introduce collaborative working practices to prepare students for their future professional activities [39].

In addition, Keshtiarast et al. discussed the benefits and difficulties of integrating ICT in ESP through the eyes of Iranian higher-learning students and teachers. The findings revealed that, in general, Iranian tertiary students and

teachers had positive perceptions of using ICT in ESP courses. Nevertheless, there were some challenges, such as (a) the absence of adequate technical assistance to assist educators, (b) the ineffectiveness of training programs for educators, (c) inadequate time and passion, (d) a lack of acquaintance with employing ICT use on the part of students and teachers, (e) an absence of the necessary infrastructures and instruments difficulty, (f) a shortage of efficient online resources, and (g) the challenge of summative evaluation in ESP courses with a large number of (h) fear of technology, (i) Abuse such as chatting and networking on social media, which cause attention to be diverted. In the Iranian context, these variables impede the integration of ICT in ESP instruction at higher education institutions. This study also looked into the benefits of ICT integration in ESP, the benefits of ICT techno-enriched ESP courses using ICT-based materials including improving communication on professional problems between students and teachers in class and outside of class, making easier collaboration between students, creating self-determination, increasing self-motivation, allowing teachers more planning time, providing genuine resources from their significant, and boosting high school graduation rates [30].

## Method

The present research aimed at investigating the effect of an independent variable, i.e., Google Docs on technical vocabulary learning of nursing students, the dependent variable.

## Participants

Based on the Convenience Clustered Sampling technique, a total number of 60 ESP learners took an Oxford Placement Test (OPT) to select a homogenized target sample. After interpreting

the scores, 40 female learners with an intermediate level of language proficiency, studying Nursing at Golestan University, Golestan, Iran, were selected as the target participants of the study. These learners, whose English language proficiency level was B1 based on the Common European Framework of Reference, were between 20-22 years. The participants were randomly divided into two groups: an experimental and a control group, each having 20 learners.

**Table 1: Demographic Background of the Participants**

No. of Students	40 Undergraduate Students
Gender	Female
Native Language	Persian
Major	Nursing Students
Universities	Golestan University, Golestan, Iran
Academic Years	2022-2023

**Instruments**

*Oxford Placement Test*

The Oxford Placement Test (OPT) is one of the most famous and standard tests, which is used for determining learners' level of language proficiency. The scores of 20 ESP students who filled out the consent form to participate in this study ranged between 22 and 29; as a result, those 40 students were chosen as participants. Based on Geranpayeh's guidelines [40], they met the necessary criterion by passing the intermediate level. In other words, the administrator can use this test to homogenize the participants and place them at a suitable level for a language course.

*Pre- and Post-Tests of Vocabulary*

Pre- and post-tests were the initial quantitative data collection instrument. The pre-treatment survey was divided into two sections. The first section was intended to collect demographic information (age, gender, smartphone and

PC/tablet ownership). The second component was created to collect data on students' technical vocabulary acquisition strategies. The items in this category were developed by students' professors based on a review of prior studies as well as informal interactions with students [39]. This section included six items in which students were asked to rate their frequency of using word study techniques (items such as "I prepare a word list to remember technical words") on a 5-point Likert scale ranging from 1 (never) to 5 (always). Before the experiment, one of the instructors who is a nursing expert chose a set of technical words. This technique was used to ensure that the questions were standard and that students had no prior knowledge of them. Lastly, the teacher instructed students not to use self-reading techniques outside of the classroom and to only use the methods asked for by the instructor to acquire vocabulary throughout the project.

Pre and post-tests utilized 35 target technical vocabularies and were comparable to one another. The item forms matched the language and cognitive abilities of the learners. By piloting the test with 100 EFL young learners who were similar to the participants in the main study, the content and construct validity were established. The reliability of the pre- and post-test was also calculated, and the outcome was  $r = 0.86$ . Both the control and experimental groups received pre- and post-tests before and after the intervention.

*Keller's Instructional Materials Motivation Survey (IMMS) Survey*

To answer the second research question, a modified version of the 'Instructional Materials Motivation Survey' (IMMS) developed by Keller [41], was applied to the current study. More specifically, a modified version of 'Instructional



Materials Motivation Survey' (IMMS) was utilized in the current study. The questionnaire was piloted with three ESP teaching experts. According to their feedback, all of the questions were clear for participants [42].

The ARCS Model of Motivational Design is based on a thorough review of motivational literature, which resulted in the categorization of motivational principles into four structures: (A)ttention, (R)elevance, (C)onfidence, and (S)atisfaction [41]. The results of this sort of evaluation could be used to enhance the overall course design or to tailor a program to an individual's motivational needs [43]. The internal consistency reliability (internal structure evidence) of the questionnaire is reportedly outstanding: 0.82. Furthermore, we used the Keller 2010 model in the present investigation since it has been employed in various contexts and there are validated instruments assessing motivation regarding the four elements [44-45]. Participants had 30 minutes to complete the questionnaire, which included 12 questions, covering demographic information of learners.

### *Semi-Structured Interviews*

For gathering more reliable qualitative data, semi-structured interviews were conducted to explore the participants' perceptions toward using Google Docs for learning technical vocabulary. Randomly, twelve participants from the experimental group were asked five questions about their opinions and experiences with utilizing Google Docs to study and learn technical language. For developing the questions, three colleagues who were experts in their field gave constructive feedback to alter and modify the questions. Two of these experts

assisted researchers in conducting interviews and guided researchers in identifying appropriate themes during the analysis.

### **Data Collection Procedure**

Regarding ethical concerns, the principal of Golestan University granted permission to carry out this research among nursing students. A consent form document was also used to obtain the participants' approval. The research started in early August 2022 using taking an Oxford Placement Test (OPT) to include homogenized participants in the study. Second, a vocabulary test focusing on target words selected from Career Paths English: Nursing book was developed. Afterward, the developed test was administrated as a pre-test to both experimental and control groups to ascertain their knowledge of target words before the intervention. Then, the treatment sessions started and lasted for four weeks. The target ESP words were taught and practiced by the same instructor in the two groups, however, the applied vocabulary teaching techniques were different. During the intervention, the 20 learners in the experimental group used Google Docs for learning technical words inside and outside the class, while 20 learners in the control group used traditional techniques for learning technical vocabulary. Students in this study group were exposed to texts from their course books. They were instructed to read the text, take notes, look them up in a dictionary, and finally write down and memorize the meanings of the unknown words. After the treatment period, both groups took a post-test under similar conditions on the same day.

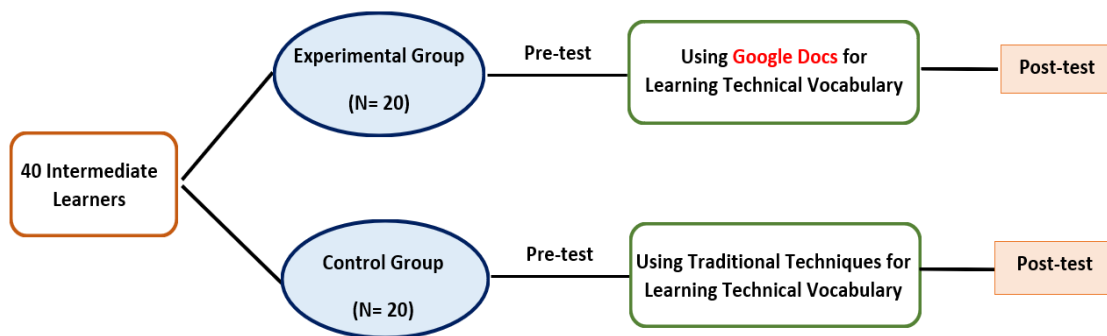


Fig. 1: Schematic Design of the Study

Then a survey was employed to explore learners' motivation toward using Google Docs for learning technical vocabulary. Ultimately, to inquire into the analysis, the learners' experiences and perceptions toward using Google Docs for learning technical vocabulary were analyzed through a semi-structured interview. This interview was carried out to put forward the participants' opinions about learning materials and the pros and cons of the learning environment, motivation, self-evaluation of success, challenges of the instruction, and suggestions for possible modifications.

**Data Analysis Procedure**

With respect to quantitative data analysis, the scores were registered to the Statistical Package for Social Sciences (SPSS), version 16. As the first step, two normality tests were carried out to ensure that the sample data had been selected from a normally distributed population. Subsequently, two paired sample t-tests as well as one independent sample t-test were employed to compare the performance of the two groups in terms of learning technical vocabulary. Third, data drawn from the motivation survey were analyzed via the one-samples t-test technique. The questionnaire used in this study was an adapted version of the Keller survey [41] with a reliability of 0.82. The

face and content validity of the questionnaire were also examined. Finally, a program software entitled "NVivo" was used for analyzing the qualitative data extracted from the semi-structured interview.

Participants in the interview were selected depending on their willingness to take part in this section. Interviews were conducted over four weeks using Google Docs to reduce recall bias while giving participants enough time to apply what they learned. These semi-structured interviews were conducted by phone, email, or instant messaging. Anonymized interview transcripts were used for the analysis. The open-ended questions were used, and the order was established by the direction each interview participant took. Before exploring the interviewee's perception, each interview began with an overview of their most recent use of the website. The demographic characteristics of each participant (age, gender, ethnicity, educational attainment, and current or most recent occupation) were also recorded. The manuscripts ready from the interviews were reviewed several times and listened to the audio recordings to be conscious of the inner emotions and hidden meanings of their reports to gain an overall comprehension of the interviewees' perception. The participants' conversation has been simplified and displayed into an insightful transcript. Following data

collection, it was recorded, reduced to a meaningful form by Nvivo software, and computed. The transcript has been arranged into themes and subthemes for use in the qualitative results of the discussion's thematic analysis. Three distinct themes were discovered according to the subsequent headings, which were organized by the interview topic direct questions, which are provided in the results section. Furthermore, the obtained Cronbach's alpha (0.81) indicates that these questions were highly reliable. Data from the surveys and interviews were stored in encrypted documents protected by a password computer. Both instruments of this study were approved by the participants.

### Design

The current mixed-method study used a quasi-experimental pre-test treatment post-test design to investigate the effect of using Google Docs on vocabulary learning of ESP learners. The target sample of intermediate students was randomly divided into control and experimental groups. The study dealt with English vocabulary learning of nursing students at a university in Golestan University, Golestan, Iran. The research was conducted from August to October 2022.

### Results

This article discusses the issue of the impact of Google Docs and traditional vocabulary acquisition procedures on ESP students, examining whether there were any differences between the two methods or not. In-depth analysis and presentation of the pre-and post-test, survey, and online semi-structured interview results were done in this part. To validate the findings and provide additional insight into the participants' driving forces

behind learning CALL vocabulary, the survey and semi-structured interview questions were further analyzed.

### Normality test

To ensure that the data were distributed normally, the Shapiro-Wilk normality test and the Kolmogorov-Smirnov test were used. The findings of two well-known normality tests, are shown in Table 2, pre- and post-test scores for the participants in the control and experimental groups were normally distributed, according to the statistically significant value ( $p > 0.05$ ).

Before applying an independent samples t-test on pretest scores, to make sure about the homogeneity of participants of two groups, the assumption of equality of variance should be checked based on the data in Table 3.

As detailed in Table 3, the  $P$  value of Leven's test is .77 which is higher than 0.05. Accordingly, the assumption of equal variance is not violated on the pretest scores of participants in the control and experimental groups.

### The Differences Between Google Docs and Traditional Methods of Learning Vocabulary

Following the four weeks of study, Table 4 demonstrates significant vocabulary-knowledge gains for both groups. In both groups, there was a discernible gain in vocabulary learning, regardless of the group they were in or the activities they were likely to conduct, according to the data. However, the experimental group outperformed the control group on the posttest, as shown in the table. Particularly when compared to the control group, the experimental group's vocabulary-knowledge increases were much larger, demonstrating the success of the class's vocabulary-teaching strategy.

In accordance with the table above, the  $t$  value and mean difference in the two sets of

scores are 0.573 and .18258 respectively, with a 95 percent confidence interval ranging from a lower bound of -8.30 to an upper bound of -5.57. Considering the *P* value, the obtained value is larger than 0.05 ( $P= 0.3 > 0.05$ ). Therefore, it can be stated that there's no significant difference in the mean scores on the pretest of vocabulary for each of the two groups. Expressly, the participants of the two groups had the same level of vocabulary knowledge before the intervention. In addition,

it can be concluded that the scores of receptive vocabulary pretest of both groups don't differ, and any significant difference that may rise from the findings of the research can be regarded as the effectiveness of Google Docs.

Receding the conduction of another independent samples t-test on participants' vocabulary post-test scores, checking the equality variance assumption is a prerequisite. The results of this test are provided in Table 5.

**Table 2: Test of Normality**

Group	Kolmogorov-Smirnov			Shapiro-Wilk			
	Statistic	Df	Sig.	Statistic	df	Sig.	
Pre-T	Control	0.165	20	0.086	0.875	20	0.344
	Experimental	0.147	20	0.238	0.948	20	0.398
Post-T	Control	0.161	20	0.141	0.938	20	0.276
	Experimental	0.178	20	0.103	0.929	20	0.164

**Table 3: Leven's Test of Equality of Variance on Pretest Scores**

Variable	Levene Statistics	df1	df2	Sig.
Vocabulary Learning	0.77	1	66	.779

**Table 4: Independent Samples t-test Results Between Groups**

Pretest Scores	T-test for Equality of Means						
	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	-0.573	67	0.3	.18258	.969	-8.30	-5.57

**Table 5: Leven's Test of Equality of Variance on Posttest Scores**

Variable	Levene Statistics	df1	df2	Sig.
Receptive Vocabulary	3.019	1	66	.076

As it is demonstrated in Table 5, the obtained *P* value was .076. This value is larger than the threshold of 0.05 (Sig.= 0.76 > .05). Considering the result, variances were assumed to be equal, so the assumption of equal variance is not violated.

As Table 6. discloses *t* value is -5.579 with a mean difference of -1.1756 and a standard mean difference of .26783. The 95 percent of confidence interval spanned from a lower bound of -1.7681 to the upper bound of -1.7681. Paying attention to the *P* value, this value equals .000 which is remarkably less than 0.05. Consequently, there's a significant difference in the mean vocabulary post-test scores between the two groups. Therefore, it can be inferred that there's a visible distinction between learning vocabulary through the Google Docs approach and traditional methods.

A paired samples t-test was performed on

the scores of the experimental group's pretest and post-test. This test provided the researcher with an opportunity to compare the performance of learners on the pretest vs. post-test. Analyzing the obtained data in this regard would be possible by focusing on Table 7.

As shown in Table 7, the experimental group's *t* value is -5.318, the degrees of freedom (df=52), the mean difference between the two sets of scores is 15.517, and the standard deviation is 7.181. Taking the *P* value (= 0.001) entitled Sig. (2-tailed) into account, this value is less than the 0.05 threshold, implying that there is a significant difference between the scores of the vocabulary pre- and post-tests in the experimental group. In other words, the vocabulary scores of the experimental group before and after the interval are statistically different. In the current study, the use of Google Docs in ESP classes improved learners' vocabulary learning.

**Table 6: Independent Samples t-test on Posttest Scores**

Posttest Scores	T-test for Equality of Means						
	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Equal Variances assumed	-5.579	66	.000	-1.1756	.26783	-1.7681	-.54612

**Table 7: Results of Paired Samples t-test Within Groups**

	N	M	SD	T	df	Sig (2-tailed)
C. G. Pretest	20	10.2400	5.5387			
C. G. Posttest	20	17.0458	7.0386	-1.143	52	0.001
E. G. Pretest	20	12.4828	9.4005			
E. G. Posttest	20	18.5517	4.9618	-5.318	52	0.001



Another paired samples t-test was applied to the scores of participants in the control group. A thorough analysis of the data presented in Table 7 gives the resources to figure out the effectiveness of Google Docs on ESP learners' vocabulary learning.

The results of performing a paired samples t-test on the pre-test and post-test scores of participants in the control group demonstrated a mean of 13.643 and, a standard deviation of 6.289. Regarding the *P* value provided in the last column ( $.001 < .05$ ), there's a significant difference between the pre-test and post-test scores of participants in the control group. The results also showed a relative improvement in the test scores of the control group members due to the amount of time they spent memorizing and repeating during the four weeks.

In short, both groups improved their vocabulary knowledge during the intervention period. It can be implied that the use of Google Docs had a constructive effect on learners' technical vocabulary learning. These results answer our first question.

### The Effects of Google Docs on Learners' Motivation

The authors of this study conducted an adaptation of Keller's 'Instructional Materials Motivation Survey' (IMMS). This survey was utilized by et al., who found it to be valid and trustworthy for gauging students' motivation. The instrument was used since the objective was to evaluate students' motivation for a particular course rather than a broad evaluation of students' motivation [41].

The items are graded on a Likert scale of 1 to 5 points. Participants were asked to select one of five options ranging from 1 to 5 to indicate how strongly they agreed or disagreed with each statement. The survey was translated

from English to Persian to prevent misunderstanding or misinterpretation. The original survey's dependability coefficient (Cronbach Alpha) is 0.96. This version of IMMS was found by Kutu and Sözbilir [46] to be valid and reliable to use, making it a suitable instrument for researching the impact of instructional components on learner motivation [46].

The questionnaire application's statistical findings are shown in Table 8, together with measures of central tendency, and variability. Results indicate that every answer is upbeat (close to or more than 4 on a 5-point Likert scale). Examining the negative skewness of items 1, 2, 3, 5, 7, 8, 10 and 12, more respondents have lower assessments than the mean result compared to the number of respondents who offered higher scores. Conversely, items 3, 5 and 9 which are low but positive skewness indicates that compared to those who gave it a low assessment, more respondents assessed the item more positively than the mean results. These findings are shown in Tables 9 and 10 given that the means are generally quite considerable. Additionally, an increase in students' motivation of using Google Docs in comparison to conventional vocabulary acquisition techniques on ESP children was compared using a one-sample T-test.

Based on the results of the survey, participants defined the use of Google Docs for ESP instruction. The results demonstrate that all respondents agreed that the quality of the course material helped keep their attention (mean = 4.24, SD = 1.21). The majority of them agreed that the arrangement of the information increased their attention (mean = 4.14, SD = 0.87). However, fewer participants believed that the variety of reading passages, exercises, illustrations, etc., helped keep their attention

(mean = 3.86, SD = 0.90) Furthermore, the association between the course content and what they already knew was evident to them (mean = 3.98, SD = 1.27). The majority of respondents did not collaborate to achieve the goal of having the course's content and writing style convey the impression that the content is worth knowing.

Most of the respondents did not work together to achieve the aim that the content and style of writing in the course express the impression that the content is worth noticing. (mean = 3.96, SD = 0.92). Most of the ESP learners were in agreement with the usefulness of the content of the course material (mean = 4.31, SD = 1.30). On the other hand, few respondents were unanimous that they were confident to learn from the content, as they worked with the course material (mean = 3.95,

SD = 0.93), Nonetheless, after studying the educational material, they were self-assured in their ability to complete the course successfully. (mean = 4.03, SD = 1.13). In addition, a few of them were consistent in their belief that the foundation of the content made them more confident in their ability to acquire the course material. (mean = 3.87, SD = 1.09). Most of the respondents contend that, the course material was so enjoyable to them, that they were so eager to comprehend more about the topic (mean = 3.92, SD = 0.99). To boot, the course material was enjoyable to them (mean = 3.96, SD = 1.10). At last, most participants in the experimental group stated that, the course was so well designed that the learners get pleasure from studying in this way (mean = 4.20, SD = 0.87).

**Table 8: Descriptive Statistics**

Item	Mean	Mode	Median	Standard deviation	skewness	Kurtosis
1	4.2450	5.0	5.0	1.21412	-1.794	2.937
2	4.1460	5.0	4.0	0.87871	-1.479	-0.812
3	3.8618	4.0	4.0	0.90934	-1.356	2.615
4	3.9839	5.0	5.0	1.27429	0.284	0.373
5	3.9689	4.0	4.0	0.92576	-1.034	1.686
6	4.3194	5.0	4.0	1.30380	0.328	0.386
7	3.9506	4.0	4.0	0.92736	-1.368	1.647
8	4.0325	5.0	5.0	1.13981	-0.347	-0.672
9	3.8754	5.0	4.0	1.09536	0.362	-0.903
10	3.9215	5.0	4.0	0.99016	-0.494	-0.928
11	3.9605	5.0	4.0	1.10163	0.382	-0.540
12	4.2001	4.0	4.0	0.87428	-1.202	1.627

**Table 9: One-Sample Statistic**

N	Mean	Standard deviation	Standard error mean
12	4.00	0.1723	0.689

**Table 10: One-Sample T-test**

T	Df	Significance, 2-tailed	Mean difference	95% confidence interval of the difference	
				Lower	Upper
58.722	5	0.000	4.000	3.843	4.306

**The Effects of Google Docs on learners’ perception**

Semi-structured interviews with 12 members of the experimental group who had been using the Google Docs website to learn ESP vocabulary were conducted to collect qualitative data. With the help of thematic analysis, we set out to analyze data based on student feedback to provide improvised guidance on strengths and weaknesses and to raise awareness among students using Google Docs when learning ESP vocabulary.

The qualitative results of the semi-structured online interview were assessed, and three categories and themes were identified by keyword analysis of transcripts. The first and the third questions formed the first theme of the interview which related to the effects of using Google Docs. The second question organized the second theme which linked to the title of advantages of Google Docs over the traditional methods of learning. Finally, last but not least theme was drawbacks and recommendations which was represented in question number four of the interview. The detailed evaluation of categories related to the themes are presented in percentage in the following table.

According to the outcome of the first interview question which was: “From your point of view is using Google Docs an efficient website for learning vocabulary? Why?” Google Docs was found to be motivating, creating a competitive atmosphere, and increasing learning vocabulary capacity. In compliance with the results of the third question which was: “From your perspective did Google Docs increase your motivation in the process of learning vocabulary?” It is possible to conclude that, not only do learners find Google Docs motivating and competitive, but also, they came to realize that they could remind the researcher's target vocabulary. They also expanded their nursing vocabulary, which they were unfamiliar with previously. Based upon the result of the second interview question which was: “What are the benefits of using Google Docs over traditional methods in learning vocabulary?” Analyzing the responses resulted from interviewees mentioned flexibility, Expressing Individual Progress. Yet, it has a lower frequency when compared to the other advantages of Google Docs over traditional methods; some learners emphasized the importance of this feature, as they receive their scores instantaneously after making progress. Almost all students mentioned the importance of accessibility.

**Table 11: Interview Categories Related to the Themes**

Theme	Category 1	Percentage	Category 2	Percentage	Category 3	Percentage
1	Motivating	75	Creating Competitive Atmosphere	58.3	Increasing Learning Vocabulary Capacity	83.3
2	Flexibility in Learning	91.7	Expressing Individual progress	66.7	Easy and Accessible	83.3
3	Offline mode is preferable	66.7	Gaming mode is preferable	58.3	Visual item is preferable	66.7

The fourth and final question in the online semi-structured interviews seeks responses on the limitations of Google Docs and has recommendations that interviewees make to improve its efficiency. Seven people believe that having access to games while practicing is preferable. Another drawback of Google Docs, according to 8 of the participants, is the absence of visual things since associating a word with a visual item makes it easier for the mind to remember, which improves the lifespan of technical vocabulary. Altogether, All the observation reports about the application of Google Docs, by the interviewed students were positive.

## Discussion

Students' attitudes toward the Google Docs online website were positive, and they valued learning through this website. After rehearsing and learning target vocabulary on Google Docs, they felt a feeling of preparedness for nursing English lessons. Furthermore, since they were unfamiliar with the nursing specialized vocabulary at the start of the semester, and a large number of the words were difficult to learn and would require much more effort to memorize them, learners stated that they would continue to use Google Docs online website in their vocabulary learning process. Notwithstanding, another advantage of Google Docs is not only it gives learners a valuable perspective, but also makes the process of training and learning time shorter and easier for the students.

In addition, the students liked how they could practice vocabulary at their own pace without feeling rushed, and how they could use different modes of Google Docs to see the same words over and over again in digital flashcards. This technique improves the memory and

ability to respond quickly of students as well as effectively use technical vocabulary [47]. The results of this study are similar to the findings of a study conducted by Lai, Lin, Lin, and Tho. They found that using digital flashcards for teaching vocabularies, considerably enhanced the learners' vocabulary capacities and knowledge [48].

Besides, Researchers of this study concluded that integrating ICT skills into education would increase students' motivation. Several studies can be found in the literature on the effects of technology use and educational motivation, and the results are relevant to this study. Huang and Hew found out that students' level of motivation enhanced when technology was incorporated into instructional design. Their study used widely available online courses as research material and provided a positive motivation for the appearance of ARCS-based elements in IMMS questionnaires [49]. Furthermore, the results of the study were in agreement with Setiawan and Wiedarti, which was admitted that ICT applications for learning vocabulary were not bored easily and they were eager and more motivated, and interested in learning independently [50].

The final research question looked into how experimental group students perceived learning ESP vocabulary using the Google Docs service. The results of the online semi-structured interview revealed that learners found that Google Docs is very stimulating and useful for maintaining vocabulary. Furthermore, learners found the Google Docs online website to be more effective and practical than the traditional teaching methods used for years to learn and practice vocabulary. Findings of Khalil were parallel to our findings. They argued that the Google Docs website has many advantages, such as flexibility, practicality, accessibility, and a competitive

environment that encourages more learning than ever before. In summary, Google Doc was viewed as a practical and helpful online website that learners should use in the future for vocabulary learning processes [51].

Overall, Google Docs improved ESP students' nursing vocabulary learning and practice. The findings showed that this website empowered students to learn and practice technical vocabularies without the aid of the instructor and give them a sense of achievement. Previous studies by various researchers have confirmed the results of the current study [52, 53] which support the present findings in that they all, much like the present study, emphasized on motivational effect of learning ESP through technology. Last but not least, our findings confirm Bilová's conclusion that affirm that Google Docs is one of the efficient tools for learning vocabulary, since it can be a collaborative and individual learning facilitator. So, it is necessary for a teacher to plan carefully for which purposes they are going to use them [14]. Our findings confirm this finding, since, educators should have careful plans during the treatment to get the best result. According to Baicheng, using instances of sentences in vocabulary learning promotes learners' vocabulary gain and retention, as well as enhanced data processing and slowing the rate of memory fading. However, they concluded that students' English proficiency is also important. They demonstrate that weak students had difficulty finding an illustrative example sentence, and their sentence choice frequently indicated that they were unable to comprehend the word itself [54]. The current study used intermediate students to ensure that they had no prior vocabulary knowledge, but with meticulous preparation and the use of technology-enhanced language learning theory as well as

the Cloud computing model, which is a model for offering easy, instantaneous network access [22], we were able to achieve the best results.

Finally, because of the first part of the pre-test evaluation, all learners in this study had access to smartphones as well as an internet connection. According to some studies, however, integrating ICT in language classes can be an incentive for those without access to technological resources. As a consequence of these initiatives that have been carried out around the world, a number of schools have been equipped with ICT, and their technological abilities have grown. There are issues, such as a lack of technical support for technologies integrated into learning environments, as well as a lack of educational software and educational materials to use with these advances in technology [55]. Muslem et al. examined the perceptions and limitations of ICT use among Indonesian English educators and concluded that challenges include a lack of equipment, insufficient training for teachers, and teachers' absence of technological understanding [56]. According to Emre, numerous educators have not used modern technology in their classrooms due to a lack of time, expertise, and passion [57].

## Conclusions

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In conclusion, considering the impact of learning vocabulary by Google Docs online website revealed that this website works as a highly effective tool which supports ESP students and enables them to expand their vocabulary and effectively engage their vocabulary learning. Moreover, contrasted with different strategies for vocabulary learning, not only does Google Docs provide more learning opportunities and more independence to learners, but also, teachers are able to get more



response and perception into learners acquiring. Furthermore, both teachers and ESP learners can get benefit of findings of this study as their learning guidelines. Students can improve their vocabulary autonomously in a shorter period of time. In addition, technology products developed by students can be used to enhance interaction and learner-centered learning. Also, ESP instructors can benefit from CALL in the classes, in face they have more insight on students and also, using innovative instruments help them to be more updated.

Finally, the findings of the study could be useful to ESP material developers. In fact, incorporating ICT into ESP education has revolutionized and altered the way ESP material developers create ESP materials. The consequences of ICT collaboration with ESP instruction have implications for language teaching. Indeed, the findings could aid in the transition from traditional ESP teaching and methods that place an overabundance of emphasis on text comprehension and memorizing vocabulary, which prepares students for communicative applications of ESP. As a result, the findings can be applied to any educational context as well as other languages.

The major limitations of this study are the lack of male participants as well as small sample size. In reality, the most significant limitation is that the results of this research are limitations in obtaining a large sample size.

Ultimately, a number of recommendations for further investigation are given in light of this study's findings. First, it's crucial to look into how students perceive using Google Docs to learn vocabulary in order to learn ESP vocabulary because the study's results showed that doing so significantly increases ESP learners' vocabulary knowledge. Furthermore, since teachers and students hope about the future of ICT in ESP teaching and learning, it can thus be suggested that further studies focusing

on the perception of teachers. In general, the study's findings support the use of Google Docs for vocabulary learning, but adjustments to vocabulary design are also required, and additional research with bigger sample numbers is advised.

### Authors' Contribution

Zahra Cheraghi, Hengameh Omranpour and Atiye Motaharinejad made a significant contribution to the research presented in the manuscript. However, some parts of the literature review section were written by Fatemeh Moghisseh for the first draft. Expressly, the extended version of the current research was done by the contribution of the first three authors.

### Acknowledgments

We wish to extend our sincere gratitude to the Head and Director of Golestan University Faculty of Humanities for their steadfast support and leadership throughout our research endeavors. Our appreciation also goes to our esteemed ESP Professor at Golestan University whose expertise and guidance greatly enriched our work. We would like to acknowledge the entire Golestan University community for providing a conducive research environment. Lastly, our thanks go to all participants and contributors who made this research possible.

### Conflict of Interest

There was no conflict of interest among the authors.

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**Citation (Vancouver):** Cheraghi Z, Omranpour H, Motaharnejad A, Moghisseh F. [Exploring the Effect of Google Docs on Learning Technical Vocabulary in ESP courses]. *Tech. Edu. J.* 2024; 18(1): 227-248

 <https://doi.org/10.22061/tej.2024.10206.2965>

