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Research Paper

## Computer-Mediated Vocabulary Learning: Using Dynamic and Non-dynamic Glosses for Acquiring L2 Vocational Vocabularies in ESP Classes

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### Abstract

This study focused on the effects dynamic form of text-based vocational vocabulary glosses: Dynamic glosses are a series of incremental mediations intended to support students in identifying correct word definitions. After running a pre-test (TOFEL *ibt*), 34 ESP learners in medical university were chosen to participate in the study, 17 students randomly assigned to the treatment group and 17 randomly assigned to the control group. Participants in treatment and control conditions received three short ESP texts with many vocational vocabularies using the computers in the language lab and the Adobe Connect application. As the participants in the dynamic gloss condition faced unknown vocational vocabulary items in the passages, the teacher provided the learners with a set of mediations from the most implicit to the most explicit prompts, and the learners tried to identify the correct meaning of the word. In the non-dynamic gloss condition, the learners were given the L1 definition for the target words. The post-test results indicated that the treatment group meaningfully outperformed the control group.

**Keywords:** *Dynamic glosses, Non-dynamic glosses, Textual gloss, Vocational vocabulary*

کلاس‌های پویا و غیرپویا برای یادگیری لغات شغلی در کلاس‌های انگلیسی با اهداف ویژه این مطالعه بر روی تأثیرات شکل پویای کلاس‌های مبتنی بر متن و تأثیر آن بر یادگیری واژگان شغلی متمرکز شده است. کلاس‌های پویا مجموعه‌ای از واسطه‌های افزایشی هستند که برای کمک به دانش‌آموزان در تشخیص تعاریف صحیح کلمات طراحی شده‌اند. پس از اجرای پیش‌آزمون (TOFEL *ibt*)، 34 نفر از فراگیران درس انگلیسی با اهداف ویژه در دانشگاه علوم پزشکی برای شرکت در مطالعه انتخاب شدند، که از این تعداد، 17 نفر به طور تصادفی در گروه آزمایش و 17 دانشجو به طور تصادفی در گروه کنترل قرار گرفتند. شرکت‌کنندگان در شرایط آزمایش و کنترل، سه متن کوتاه انگلیسی با اهداف ویژه که حاوی تعدادی واژگان شغلی بود را با استفاده از رایانه‌های موجود در آزمایشگاه زبان و برنامه Adobe Connect دریافت کردند. شرکت‌کنندگان در گروه کلاس‌های پویا هنگام مواجهه با آیتم‌های واژگان شغلی جدید در متون، معلم مجموعه‌ای از میانجی‌ها را از ضمنی‌ترین تا صریح‌ترین را در اختیار زبان‌آموزان قرار می‌داد و زبان‌آموزان سعی می‌کردند معنای صحیح کلمه را با استفاده از واسطه‌ها تشخیص دهند. در شرایط کلاس‌های غیرپویا، به زبان‌آموزان تعاریف کلمات به زبان اول برای کلمات شغلی داده شد. نتایج پس‌آزمون نشان داد که گروه آزمایش به‌طور معنی‌داری بهتر از گروه کنترل عمل کرده است.

واژگان کلیدی: کلاس‌های پویا، کلاس‌های غیرپویا، یادگیری لغات شغلی

## Introduction

### The Importance of Vocabulary

Since a large number of the research in the field of language learning is dedicated to the realm of vocabulary learning, it can be concluded that it plays an undeniable role in language teaching and language learning (Nassaji & Tian, 2010; Zou, 2017; Sun, 2017; Rassaei, 2017, 2018; Nguyen & Boers, 2019). It is clear that vocabulary knowledge competence is a prerequisite for effective language acquisition, and it should be obtained by extensive reading (Huckin & Coady, 1999). Simultaneously, some scholars indicated that learners' processing and attentional capacities are limited, so incidental vocabulary learning through reading passages may face many obstacles and may not happen perfectly (Ko, 2012; Nation, 2001). One popular technique for acquiring vocabulary is the use of glosses for unfamiliar words (Al Seghayer, 2001, 2003; I.-J. Chen, 2016; Kim & Gilman, 2008; Kost, Foss, & Lenzini Jr, 1999; Ramezanali, 2017; Ramezanali, Uchihara, & Faez, 2021).

Glosses draw learners' attention to the target word and facilitate vocabulary comprehension as well as reading comprehension (Nagata, 1999). Many scholars investigated the role of the glosses in the vocabulary learning, and they find it a fruitful technique (Hulstijn, Hollander, & Greidanus, 1996; Laufer & Shmueli, 1997; Kost, Foss, & Lenzini Jr, 1999; Moreno & Mayer, 2000a, 2000b; Brinton, 2001; Al Seghayer, 2001, 2003; Kim & Gilman, 2008; Sydorenko, 2010; Mayer & Fiorella, 2014; I.-J. Chen, 2016; Ramezanali, 2017; Ramezanali, Uchihara, & Faez, 2021). Many other studies put some steps further and concentrated on the effectiveness of various kinds of technological and computer-mediated glosses for L2 vocabulary learning (Al-Seghayer, 2001; Plass et al., 2003; Sydorenko, 2010; Yanguas, 2009; Yoshii, 2006). A meta-analysis was done by Abraham (2008), who considered 11 studies and focused on the role of computer-mediated glosses. The results of the study demonstrated the large effect size for the computerized glosses (Cohen's  $d = 1.40$ ); he concluded that computerized glosses are more flexible and easier to use.

While prepared glosses are fixed, one concern is that learners are passively faced with glosses, and it may decrease the learners' mental processing of the vocabulary acquisition (Rassaei, 2020). Considering the Involvement Load Hypothesis, the deeper involvement in the vocabulary learning task, the more effective vocabulary learning occurs (Hulstijn & Laufer, 2001; Kim, 2008; Nassaji & Tian, 2010).

The following study uses the concept of dynamic glossing (DG) introduced by Rassaei (2020) to increase vocational vocabulary acquisition while reading passages. In this way, the passive nature of the presenting glosses in both usual format (regular and traditional way) would compensate. Rassaei (2020) stated that DG is operationalized based on the notion of dynamic assessment (DA); that is, learners can develop their ability to gain the L2 by receiving proper mediations like prompts, hints, and so on (Davin, 2013; Herazo, Davin, & Sagre, 2019; Lantolf & Poehner, 2011; Poehner & Lantolf, 2010). Likewise, DG is a technique to help L2 students recognize the correct definition for an unfamiliar L2 word and finally promote vocabulary acquisition by providing students with graded mediations rather than directly providing the students with the correct definitions (Rassaei, 2020).

To the best knowledge of the researcher, there is a less tapped area on the role of synchronous communication for enhancing vocational vocabulary learning in ESP classes. Therefore, the following study uses Computer technology to operationalize DG and to face the ESP learners with dynamic glosses while they are reading vocational passages. To this end, the ESP classes were held online by the use of individual computers and the Adobe Connect application.

The present study aims to focus on whether computer-mediated DG that involves participants actively comprehending the correct definition of unfamiliar words would be more effective for learning new and unfamiliar vocational vocabularies rather than ready-made glosses incorporated

into the passages. It should be kept in mind that the notion of DG differs from the strategy of guessing the meaning that is used by readers to guess the meaning of unfamiliar vocabularies based on the context in that. While the meaning guessing is achieved only by students, DG is mediation and a kind of scaffolding activity. And it provides step-by-step and graded support by the class mediator to help students identify and acquire unfamiliar vocabularies (Rassaei, 2020).

## Literature Review

### Glossing and Vocabulary Learning

Reading comprehension is the major source of L2 vocabulary learning (Hulstijn, 2001), and one effective way to learn L2 vocabulary is to use glosses for the passage's unfamiliar words because glosses provide learners with some explanations to ease the comprehending the new vocabulary (Nation, 2001).

Many studies have been done to investigate the effectiveness of using glosses on L2 vocabulary learning. For example, for the effectivity of textual glosses on L2 vocabulary learning (Hulstijn et al., 1996; Laufer & Shmueli, 1997); multi-modal glosses and L2 vocabulary learning (Al-Seghayer, 2001; Chun & Plass, 1996; Rassaei, 2018; Yanguas, 2009).

Regarding L2 vocabulary learning, the following studies were done and mentioned results obtained. In one study, Chun and Plass (1996) compared and considered the effectiveness of textual, video, and pictorial glosses and concluded that texts accompanied by pictures are more fruitful than texts with videos or text glosses. Al-Seghayer (2001) considered the three formats of the glosses. The first format was the text-only gloss, the second one was the accompanying text and picture, and the third one was text and video. The results indicated the higher effectivity of text and video format. Yeh and Wang (2003) also focused on the effects of textual, pictorial, and audio glosses and their combinations. The results showed priority of the combination of text and pictorial glosses.

Yanguas (2009) observed the effects of textual, pictorial, and the combination of text and picture glosses on three variables; namely, L2 vocabulary learning (three conditions were effective), noticing of the glossed words (learners were more willing to pay attention to the words in text than glossed items) and also reading comprehension (the combination of the text and picture was more effective). Plonsky and Ziegler (2016) also described a large effect size for the use of computer-mediated glosses compared to paper-based glosses for vocabulary learning (Cohen's  $d = 1.33$ ).

Reviewing the studies illustrates that text-only glosses are less effective, and it is a demand for textual glosses to be accompanied by another type of glosses. And as Yanaguas (2009) declared, learners are less intended to pay attention to glossed words in a circumstance where the gloss type is "text-only"; therefore, deep processing for vocabulary learning would not occur.

So, the real concern for using textual gloss is to what extent students tend to notice the textual glosses while they are reading passages. Hulstijn and Laufer (2001), by the use of the involvement load notion, stated that those activities that require deeper processing are more effective than activities that require shallow processing because activities that require deeper processing induce deeper task involvement. They determined effective factor "need" and cognitive factors "search and evaluation."

To compare the efficiency of vocabulary learning tasks, these three aspects are allocated numerical values of 0, 1, and 2, depending on how they are incorporated into the task, and a total score is calculated as an index of task involvement (Eckerth & Tavakoli, 2012; Keating, 2008; Nation & Webb, 2011).

Psycholinguistically, successful reading comprehension needs both bottom-up processing (like paying attention to the word definition) and top-down processing (like meta-cognitive strategies) (Alderson, 2000; Schramm, 2008). Skilled readers can derive the unfamiliar words' meanings

because they are trained enough to simultaneously use top-down and bottom-up processing to maximize their understanding of the vocabulary and passage by paying attention to both form and meaning (Grabe & Stoller, 2002; Pulido, 2007).

Less experienced readers, on the other hand, may find it difficult to focus their attention on both the meaning and the unfamiliar words when reading. Due to the low engagement that glosses elicit and the lower processing power of students, and in spite of research findings that have provided evidence of the efficiency of glosses, glosses in their standard form are likely to offer suboptimal conditions for learning vocabulary while reading. As mentioned above, there is empirical evidence that students shortly focus on glossed items in a passage (Yanguas, 2009). Therefore, it seems interesting to study other techniques that accompany glosses to maximize their efficiency and improve the processing of glossed elements by learners.

### **Dynamic Assessment and Dynamic Glosses**

The notion of dynamic gloss is based on the DA, and the DA framework is based on sociocultural theory. The theory indicates that by cognitive functions and through social interaction, learners move from other-regulation toward self-regulation (Lantolf & Thorne, 2006; Poehner, 2008).

The other facets of the DA are constructed on Vygotsky's zone of proximal development (ZPD) (Vygotsky, 1978). It is the distance between what a learner can do independently and what he can do in case of receiving some assistance. DA aims to focus on the learner's proximal level of development (Davin, 2013; Poehner, 2008). That is, how much mediation does a learner need to complete the activity that he/she is unable to do independently (Davin, 2013). Regarding DA assessment and instruction are two inseparable wings; this idea means that as the mediator provides a mediation, he/she can assess the learner's ability (Lidz & Gindis, 2003; Poehner, 2008). The role of the mediator is to provide some hints, leading questions, and graded prompts to help learners to complete the task that he/she is unable to do it independently; the mediations should move from the most implicit to the most explicit. According to Aljaafreh and Lantolf (1994), mediation should be graduated, dialogic, and contingent on learners' errors. In other words, mediation should be provided in an incremental pattern beginning from the most implicit prompts and moving toward more explicit ones involving a learner and a mediator, and the process of mediation should stop as soon as the learner is able to respond to the mediation (Poehner, 2008).

Because according to Vygotsky (1978), what a learner can do in the existence of mediation today, is independent performance. The least prompts a learner needs and the most implicit mediations that learners need to do the task show that the learner is more developed (Herazo et al., 2019; Poehner, 2008; Shrestha & Coffin, 2012). Therefore, learners' actual score shows the learners' performance in an unassisted context, and the DA score shows what a learner can do potentially and with some help (Poehner & Lantolf, 2013).

In the following study, dynamic glosses are used as mediations within the DA framework. Learners are given graduated and incremental mediations to help them learn the accurate meaning of unfamiliar vocabulary among a set of options in the treatment group, and for the control group, learners are presented with predetermined fixed definitions for the unknown words.

Although many studies have been done on the realm of DA and children's vocabulary learning and teaching (Burton & Watkins, 2007; Camilleri & Botting, 2013; Peña, Iglesias, & Lidz, 2001); and few studies on the role of using DA framework on L2 vocabulary learning (Rassaei, 2020) as far as the researchers are aware, no study has been done in the context of L2 vocational vocabulary learning by the implementation of DA framework in computer-mediated context.

## From Technology-Based Dynamic Assessment to Mobile-Mediated Dynamic Glosses

Implementing DA frameworks in educational settings needs the mediator's considerable amounts of time and effort (Nirmalakhandan, 2007). Because of the time limitation, it is somehow hard to mediate all the learners in large classes. The Iranian university classes are commonly held by a large number of students. Therefore, many scholars tried to use a computerized DA framework for different facets of L2 acquisition or feedback providing (Heift, 2002, 2003; Teo, 2012; Lan-tolf & Poehner, 2014; Poehner et al., 2015).

Teo (2012) developed a computerized program for implementing the DA framework to enhance the learners' reading comprehension level among EFL learners. During the treatment sessions, learners were given four levels of computerized mediation for their errors in reading comprehension, and the results showed better comprehension ability among the EFL learners.

Poehner et al. (2015) also, through providing pre-scripted prompts, assessed learners' independent and mediated performance on both reading comprehension and listening comprehension tests by the use of online computerized DA. The researchers found that the DA framework put some steps further, and besides the elaborations on correct and incorrect answers, it provides both learners' potential level ZPD and independent performance.

The possible way for DA implementation in large classes is the utilization of computerized applications, like Adobe Connect. Adobe Connect is a kind of ubiquitous technology that can be used for any kind of instruction. Using this application, instructors and learners can share various kinds of information. Moreover, considering the Covid-19 pandemic, almost all Iranian educational institutes, universities, and schools use the Adobe connect. Thus, this application has become a prominent part of educational life for presenting and sharing the available information.

The present study is a shot to implement computer-mediated DA for the instruction of L2 vocabulary. More specifically, the present study intends to offer textual glosses in an incremental and graded manner based on the DA framework. The present study uses dynamic glossed (DG) as mediation for the L2 ESP learners to identify the correct definition of unknown vocational vocabularies in ESP passages. The mediations will be provided from the most implicit to the most explicit in order to help learners to identify the new words meaning. Non-DG in the following study refers to the ready-made textual gloss for the unfamiliar vocational vocabularies in ESP passages.

It should, however, be noted that, in contrast to the studies that computerized DA used a computer program for presenting automated mediation (Teo, 2012; Lantolf & Poehner, 2014; Poehner et al., 2015), the Adobe Connect application in the present study was employed as a medium to facilitate learner–mediator dyadic interactions.

Both cognitive perspective and sociocultural perspective of vocabulary learning will be operationalized in the current study. With regards to cognitive notion, learners' ability to identify and use words in the post-test will be considered; and for the sake of sociocultural perspective, learners' awareness of mediations and prompts will be considered to measure learners' performance development.

To this end, the following research question guides the present study:

RQ. Is DG more effective than non-DG for promoting L2 vocational vocabulary learning?

## Methodology

### Participants

This study used 34 Iranian female ESP students in a paramedical university. They were in the upper-intermediate level. They were enrolled in ESP classes based on their curriculum design. The students were asked to take part in the TOFEL *ibt* test for choosing the homogeneous students. Of over 100 students, 34 of them were homogeneous based on their performance in the TOFEL test. The selected participants' scores were from 60 to 70 out of 120. The participants

were randomly assigned to treatment condition (dynamic gloss) and control condition (ready-made and fixed gloss). The participants' age ranged from 18 to 21. They have attended their ESP class three times a week for 90 minutes in each session. The researcher invited a DA expert to take part as a mediator during the DG session.

### **Design**

The following study is an experimental study following the DA framework. All the participants, before assigning to the experimental and control group, were asked to take part in a pre-test. In the next session, after the pre-test, the participants in the dynamic gloss condition participated in a computerized DG session, and they were read the passages through Adobe Connect; they were provided text-based glosses for all vocational vocabularies. In the other group, in no dynamic gloss condition, the participants received ready-made and fixed textual glosses for the target vocational vocabularies. The treatment and instruction time for both groups was equal. Two days after the treatment session, the post-test was administered to the learners of both groups, and they were asked to take part in a post-test.

### **Target Words**

In order to measure the impact of glossing conditions on L2 vocational vocabulary learning, the first step was to prepare a list of unfamiliar vocational words as target words. Therefore, the researcher prepared a list of 50 vocational vocabulary items as a pre-test, and all participants in both DG and non-DG conditions were asked to write the Persian meaning in front of each item. After running the pre-test, a list of 21 vocational vocabulary items was selected as target items.

### **Treatment Materials and Procedure**

Three short passages chosen from the Shiraz Medical University's pamphlet were chosen for the treatment session. Each passage contained 200 to 250 words. In the treatment session, the learners were given passages, and each passage contained seven targets of vocational vocabulary. The target vocabulary items were embedded with some nontarget vocational vocabulary items.

### **The Dynamic Glossing Group**

There were 17 participants in the DG condition; the session was held online via Adobe Connect, and the learners were given three passages containing the L2 target and nontarget vocational vocabulary item. Then, the learners were notified of the initiation of the treatment session via the mediator's announcement. Then after the learners were announced their readiness, the mediator shared the first passage via Adobe Connect. Then, via the private chat, each learner was instructed to read the passage, and as soon as they faced italicized words and sent the Persian meaning of the item to the mediator in case of facing an unfamiliar vocabulary item, the learners were asked to send it to the mediator as well.

If the sent meaning was incorrect, so the mediator found out that the item was unfamiliar to the learner, and he started the computer-mediated DG. Thus, the first prompt was sent to the learner via Adobe Connect's private chat to assist the learner in guessing the true meaning of the word. second, third, and fourth mediation was sent to the learner in case they were unable to guess the correct meaning. If still, the learner was unable to guess the correct meaning, the mediator provided the learner with the true meaning, and the learners were asked to continue reading the passage. This procedure continued for all L2 vocational vocabulary items. Rassaei (2020) focused on the role of DG and non-DG gloss types with regard to the role of mediation. The current study made use of the mediation that he used in the mentioned study. This process continued for all three passages. The list of mediations is presented in the following:

1. Ask learners to read the sentence again and guess the meaning.

*Example: No, this is not a correct definition. Could you please read the last sentence again and try to guess the meaning of the word?*

2. Highlight some parts of the text that provide contextual clues for the learner to get the correct answer.

*Example: Pay attention to this part of the text, please: "after drinking alcohol drinks the most common side-effect is hallucination"*

3. Asking a leading question that provides clues for the meaning of the word.

*Example: what happens first if the brain mechanism shortly distorts?*

4. Using the target word in a new, more transparent context.

*Example, we say "the fall of sensory perception."*

### The Nondynamic Glossing Group

The second condition, the non-DG group, had the same process, but the teacher sent the Persian meaning of the underlined vocational vocabulary item as a textual gloss for each learner via Adobe Connect's private chat.

### Testing Instruments

Two tests were used for the current study; a pre-test and a post-test. The pre-test was used to select the target vocabulary items. The researcher prepared a list of 50 vocational vocabulary items as a pre-test, and all participants in both DG and non-DG conditions were asked to write the Persian meaning in front of each item. After running the pre-test, a list of 21 vocational vocabulary items was selected as target items.

And for the post-test, a list of 21 targeted vocational vocabulary words was prepared, and the learners in both groups were asked to write the correct Persian meaning for each item.

### Analysis

After collecting the learners' scores in the post-test, an independent sample t-test was run to identify the differences between the two conditions.

## Results

### Post-test Results

Table 1. displays descriptive statistics for the learners' grouping and their performance on the vocabulary test. It should be noted that since the target words were selected among those vocabulary items that the learners were unfamiliar with, so their pre-test score was 0. The results in table 1 indicate that the DG group attain better scores in the post-test.

**Table 1**

*Descriptive statistics on learners' performance on the post-test*

Conditions	N	Mean	Std. Deviation
DG Condition	17	19.8	1.16
non-DG Condition	17	17.1	1.87

Thus, to realize that this obtained difference is meaningful, an independent sample t-test was run. The statistics aim to indicate whether the mean scores are significantly different. Levene's test results show that the variance of the scores for two conditions (DG and nonDG condition) is the same. So, as the Sig. value for the Levene's test is larger than 0.05 (Sig. 0.54), the equal

variance for the two conditions assumed. The obtained t-value for the learners' performance is 5.04, and the value is Sig. (2-tailed) is less than the cut of 0.05, so there is a meaningful difference between the mean scores for the two groups. That is, learners in the DG condition successfully outperformed the learners in the non-DG condition.

**Table 2***Learners' performance on the post-test*

	Levene's Test for Equality of Variances		t-test for Equality of Means		95% Confidence Interval of the Difference		
	Sig.	t	df	Sig. (2-tailed)	Mean Difference	upper	lower
<u>Equal variances assumed</u>	.054	5.04	32	.000	2.7	1.61	3.79

In order to find the magnitude of the obtained results between the DG condition and non-Dg condition groups, the test of effect size was run to calculate the eta squared. Eta squared formula is:

$$\text{eta squared} = \frac{t^2}{t^2 + (n1 + n2 - 2)}$$

The obtained eta squared score is 0.5 based on the guidelines proposed by Cohen (1988, pp. 284– 7) (.01=small, .06=moderate, .14=large effect); this result suggests a very large effect size.

To sum up, An independent-samples t-test was conducted to compare the DG scores and non-DG scores. There was significant difference in scores for two condition (DG = 19.8, SD = 1.16) and for non-DG condition (M = 17.1, SD = 1.87; t (34) = 5.04, p = 0.000, two-tailed). The magnitude of the differences in the means (mean difference = 2.7, 95% CI: -1.61 to 3.79) was very large (eta squared = 0.5).

### Discussion

The following study was conducted to measure the effect of computer-mediated textual DG on L2 vocational vocabulary learning. To this end, the DA framework was used, and learners received mediations. Besides, the study assessed the learners' vocabulary knowledge after the treatment session via a post-test. Thus, the results provide some evidence for the development of learners' vocational vocabulary competence. Peña et al. (2001) focused on LQ acquisition and discussed that standardized non-dynamic vocabulary test is not enough for L1 acquisition among learners with various cultural and linguistic backgrounds.

The results showed that both DG and non-DG groups could pass the post-test, but the DG group meaningfully outperformed the non-DG group. One reason to obtain such perfect performance is that the learners in the DG condition received mediations, they were involved in deep processing of vocabulary learning, and they successfully moved toward other regulated to self-regulated language users.

Using non-dynamic glosses for the control and the better performance of the DG group provides greater evidence for the great efficacy of the computerized DG in the realm of vocational vocabulary learning. To get a picture, the results of the post-test demonstrated that both conditions could enhance L2 Vocational vocabulary learning; but as the DG condition outperformed the non-DG condition, so the answer to the study's research question is positive.

The reason for such results is that dynamic glosses calibrate the learners' ZPD and bring the learners' potential ability to real ability because the contingent and gradual mediations are directly suited to learners' needs.

The study, as well as much other previous research, provides a new indication of the effectiveness of glosses in the realm of vocabulary learning (Chun & Plass, 1996; Hulstijn et al., 1996; Laufer & Shmueli, 1997; Al-Seghayer, 2001; Yanguas, 2009; Rassaei, 2018).

It should be kept in mind that some scholars believe that vocabulary knowledge is dynamic in nature (Rassaei, 2020). He explained vocabulary knowledge is made gradually by facing a special vocabulary in various contexts. So, vocabulary learning is an incremental and multidimensional process (Fitzpatrick & Clenton, 2017; Rassaei, 2020). So it can be concluded that computer-mediated non-dynamic glosses manipulate the learners' proximal level of development to promote the learners' vocational vocabulary knowledge.

This study is in the same vein as those study that provides evidence for the effectiveness of ZPD-sensitive assistance (Lantolf & Poehner, 2011; Poehner, 2009; Davin, 2013; Rassaei, 2014). All previous research and the current study indicate that through providing mediations, learners' engagement and involvement in vocabulary learning enhance, and therefore, better performance is observable. And this declaration could be supported by the Involvement Load Hypothesis and the level of mental processing that learners are engaged in while vocabulary learning (Hulstijn & Laufer, 2001).

The study also shed light on the effect of using computer-mediated vocabulary learning (Hulstijn & Laufer, 2001; Al Seghayer, 2001, 2003; Lu, 2008; Thornton & Houser, 2005; I.-J. Chen, 2016; Kim & Gilman, 2008; Kost, Foss, & Lenzini Jr, 1999; Ramezanali, 2017; Ramezanali, Rassaei, 2020; Uchihara, & Faez, 2021). However, this study focused on the synchronous aspect of communication. In contrast to automated mediation providing or face-to-face mediation providing, by the methodology used in the current study, mediators can send mediation to several learners simultaneously. Temporarily, using automated prompts has its own weaknesses. As earlier studies suggest (Davin, 2013, 2016), fixed pre-scripted mediations may not properly calibrate learners' ZPD.

### Conclusions

The present study results found that computer-mediated glosses are beneficial for promoting L2 vocational vocabulary knowledge. Moreover, the results specified that dynamic glosses via mediations and prompts would inspire learners to identify the correct definition, and it is more effective than non-dynamic glosses. This finding does not tend to reject the effectiveness of conventional non-dynamic glosses, but the finding clearly shows that dynamic glosses are highly effective for acquiring the L2 vocational vocabulary, and this is absolute as a result of mediation provides.

Thus, the findings of this study showed that in the presence of the using technology and particularly computers, employing DA in vocational vocabulary learning is fruitful; besides, computers are used for sending both dynamic glosses and non-dynamic glosses and highlighted the undeniable role of using DG for L2 vocational vocabulary learning. Therefore, both university instructors and school teachers are recommended to use and send dynamic glosses while teaching L2 vocabularies and, specifically, L2 vocational vocabularies.

The major limitation of the current study is that a textual modality of the glosses was used for the DG sessions. It would be fine to prepare and use other types of gloss modalities as mediation while teaching L2 vocabularies. Further research can be done using other kinds of computerized applications and technologies and focusing on the other aspects of the L2 language, whether with a concentration on general or academic English.

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