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Use of Glosses for Reading with Computers by Turkish Pre-Service English Language Teachers

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ABSTRACT

This study investigates the use of L1 glosses during computerized reading in the English Language Teaching (ELT) context. A group of 26 ELT students at a large Turkish public university read three short texts and used pop-up glosses to promote their comprehension. Web pages were designed for reading and glosses, and a screen capture tool recorded the participants' on-screen actions. The glossed-items that the participants clicked were examined for word-type selections to see whether the clicked items were useful, high-frequency words in the main parts of sentences or if they were in the supporting details. Three nonsense words replacing three main lexical items were also employed to observe the students' purposeful clicking to understand the texts. The findings indicated that ELT pre-service teachers were careful and meticulous in their selection of look-ups. However, there was a discrepancy between the words that students claim to know and the words that they actually checked during glossed reading. The study confirmed the tendency for more look-ups with pop-up glosses as mentioned in the literature, even though the glossed items were not visually enhanced. The genuine look-up behavior was also confirmed with the moderately high clicks on the nonsense words. We can conclude that trainees are able to determine the types of words to be checked for better text comprehension but they seem to need training and more practice for using other strategies other than relying solely on gloss-type information sources. We suggested implications for further studies.

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1. Introduction

Reading skills are acknowledged as the principal mode of communication in today's Internet-dominated world, and that "reading is the most private" of all the language skills (McDonough et al., 2013, p. 121). Such privacy may present a challenge for satisfying the learner's text comprehension needs and for making sense of new key items of vocabulary. Since the early emphasis on reading skill strategies has begun (Clarke and Nation, 1980;

Nation, 1990), successful understanding of texts in a foreign language calls for guessing the meaning of unknown words from context (i.e., "inferencing", Ur, 2012, p. 144). Reading materials in foreign language education are carefully graded to cater for learners' proficiency level so that learners are involved in understanding the text rather than decoding copious amounts of unknown words.

To understand a text without difficulty, a learner needs the knowledge of at least 95% of the words in it (Ur, 2012). When guessing does not work because the key terms are not understandable from the context, especially with authentic texts replete with low-frequency lexical items unknown to the learner, availability of a good source like a dictionary is crucial. Dictionaries in general, and glosses in particular, are rich resources for autonomous comprehension of challenging texts (Tsai, 2019; Webb and Nation, 2017).

Efficient readers, to stop themselves from being distracted during a purposeful, flowing reading activity, may opt for ignoring some of the new words in a reading passage (Nation, 1990; Ur, 2012). Glossing is quite appropriate for learners to check meanings of words quickly (Webb & Nation, 2017). As an author of key reference works in the field of vocabulary studies, Nation (1990) also maintains that glosses help the learner carry on reading without stopping long to look for the word's meaning, make them more independent, and help them individualize their vocabulary learning process.

Also known as annotations, glosses are "clarifications that are are added to texts to support comprehension" (Boers, 2021, p. 1). They mainly appear in reading sections of EFL or ESL textbooks. When unfamiliar words in a text are glossed, they are usually made visually more noticeable (de Ridder, 2002; Webb & Nation, 2017). Glosses are placed in different locations with changing effects; either at the end of a text -as a glossary-, inside a text -as appositives or definitions-, or in the margin close to the line of the focused word, which is relatively more preferable than the previous two ways in the sense that learners reach the information and return to reading faster. A gloss may contain a very brief, clarifying text in L1 or L2, a picture, a combination of the two, a multiple-choice question related to the contextual meaning of the target item, an audio, or a video clip with or without definition text (Tadayonifar et al., 2021).

When using a dictionary to look up words themselves, learners face a problem of finding the suitable entry since they cannot discriminate between the correct definition and the others. The use of glosses seems to be a current prevalent input mode which is meant to present the intended contextual meanings, and have been found to be effective for increasing vocabulary knowledge as well as promoting text comprehension (e.g. Arpaci, 2016; Boers, 2021; Kang et al., 2022; Varol & Erçetin, 2016; Yanagisawa et al., 2020). Offering glosses can avoid potential misunderstanding of lexical items due to finding a wrong dictionary definition (Ur, 2012).

Presently, glosses appear in on-screen reading formats; that is, the target lexical items are hyperlinked to an external dictionary website, in which case the learner is temporarily interrupted from the reading activity. In a more favorable format, they appear on the same screen as the text, not impeding the reading effort. Providing glosses in pop-up windows is obviously less disruptive and more helpful, and thus leads to more learner look-ups (Varol & Erçetin, 2021; Webb & Nation, 2017). According to Varol and Erçetin's study, pop-up window annotations helped readers achieve better results with high working memory capacity in the comprehension test.

Society expects teachers and educational establishments to keep pace with technological advances. Therefore, it is imperative that both content and methods courses at educational institutions incorporate the use of a variety of technology tools for preparing future teachers. The participants in the current research, who are teacher trainees, were also provided with glosses which appeared in pop-up windows. Nevertheless, they weren't warned about an upcoming vocabulary test with the understanding as this may have altered their noticing and look-up behaviors for words during reading. According to Barcroft (2017), such a pre-announcement would have led to intentional vocabulary learning of the target words, focusing on language before reading comprehension (Webb, 2020; Yanagisawa & Webb, 2021).

The following section presents what previous research studies found regarding the various uses of glossing to support reading comprehension in the computer-mediated environment, analyzing recent academic research papers on the use and effectiveness of glosses for text comprehension and vocabulary acquisition.

2. Literature Review

2.1 Vocabulary Learning Strategies and Glosses

Clarke and Nation (1980, p. 213) contended that guessing "is a useful technique to urge learners not to be over-concerned about exact meanings" and so for an overall comprehension grasping the general meaning of a word in a given text would suffice. The researchers proposed that students merely guessed the meaning of words by analyzing word parts too early. Clarke and Nation further offered strategies consisting of various steps with a flexible application order. The steps consisted of deciding on the part of speech of the word, observing the immediate grammar, examining the word from a broader perspective and checking for correctness. Being able to guess and use contextual clues is highly demanding, yet it may be possible to achieve this through close cooperation between learners and teachers. Studies in the literature hold opposing views on the significance of dictionary use. However, in a general agreement, they conclude that success for dictionary use and look-up preference would depend on improving learners' strategy use.

When it is necessary for learners to deal with unknown words as determined by the purpose of the activity, one strategy is working with a dictionary or using glosses (Nation, 1990) but there is also the issue of selecting the type of such a reference. While studying the inclinations of ESL university students on their dictionary use, Wolter (2015) asked the learners to gloss five to ten words from the reading of two short academic texts including around 300 words, and collected the data via observation, interviews, and questionnaires. The results showed that the students opted for online dictionaries rather than printed ones and displayed selective use of dictionaries, favoring definitions and examples.

Learner preferences for the use of dictionaries were also explored in studies by Alhaisoni (2016) and Maden (2020), arriving at similar results concerning dictionary use. Using questionnaires and interviews, Alhaisoni found a greater preference for bilingual dictionaries over other types of dictionaries among 3993 Saudi EFL students in a university-intensive English preparatory year program. Likewise, Maden, who administered an attitude-scale survey, revealed that both digital and printed Turkish L1 dictionaries are used more frequently in line with student's grade level and Turkish students initially adopted dictionaries

in their middle school years. In line with the literature, we can argue that when the current activity is meaning-based, there is a general tendency towards using dictionaries that use translations in the learners' native language.

Unknown words in a passage are often neglected by confident learners Caner et al. (2021), having worked with 186 undergraduates, found that while reading an academic text, the prep-school students from different majors generally didn't attempt to use dictionaries or take notes. In a few other research studies, researchers found that participants looked up more words than they had actually reported as unknown formerly, a matter which has always been problematic for data collection and interpretation in the field.

To examine the relation of the use of glosses during learners' on-screen reading with vocabulary gains, some recent research studies benefitted from the recordings of an eye-tracker (Kang et al., 2022; Ouyang et al., 2020; Warren et al., 2018) or built-in tracking software (Varol & Erçetin, 2021). The present study uses a screen capture tool so as to record and understand the participants' look-up behavior of glosses with pop-up windows during on-screen reading of three short texts. The glossed items were not visually enhanced in the texts because the purpose of the activity was not vocabulary learning but reading comprehension. Webb and Nation (2017) recommend a low density (2% or less) of unknown words in such an activity that focuses on meaning rather than language.

2.2 Dictionaries and Glossing

In several experimental studies, we can observe a learner preference for bilingual input in books. Zhang and Webb (2019) studied 83 EFL students in the third year of a vocational school in China, and discovered that vocabulary acquisition is enhanced by reading bilingual materials, and was significantly maintained when the students read glossed text and bilingual text. In the same way, Pyo (2020) investigated to what extent the writings of college-level Korean EFL learners were influenced by the use of a bilingual dictionary app, comparing them with the written texts of the learners in the control group who did not use the app. Both groups were asked to write in narrative and argumentative genres. The written products of the experimental group were found to contain more diversity in vocabulary, while the overall text quality did not change between the groups significantly. Another finding was that when the students looked up verbs from a dictionary, they experienced problems with their proper use (Pyo, 2020). Pyo recommended integrating dictionary use into writing classes to retain the words looked up with this specific focus for longer periods of time.

Other studies compared different modes of glossing as well as L1 and L2 glossing and proficiency levels, and obtained differing results. In a meta-analysis (Yanagisawa et al., 2020), L1 and L2 glossing modes as well as language proficiency were found to not be different from each other for vocabulary recall. In a later study, though, Kang et al. (2022) showed that L1 glosses and L2 glosses were both helpful for building form-meaning associations. Additionally, this study pointed out that 81 Korean undergraduates' reading was improved with the use of L1 or L2 glosses, as opposed to the no gloss mode, even though students were not faster or more fluent processors of the L2 reading comprehension activity, and that the time spent by students using L2 glosses paralleled the form-meaning association test results. Not surprisingly, picture-only glosses promoted the best vocabulary meaning acquisition in the study by Warren et al. (2018).

Digital dictionaries also came to the attention of the study by Gavriilidou et al. (2020). They examined 1141 individuals' self-reported uses of digital dictionaries in terms of three aspects of gender, age, and career orientation with an online questionnaire. They found the first two as significant factors. Dictionary use was higher in most subscales among females and adults. The researchers suggested that instructors should consider "their students' individual differences in the classroom" (Gavriilidou et al., 2020, p. 72).

Having investigated the effects of glossing type, language, and learning style on vocabulary and reading comprehension, Tadayonifar et al. (2021) found that with intermediate level EFL students (19-20 ages) L1 textual glosses are deemed more effective than L2 glosses because of the relative ease of understanding L1 glosses. L2 glosses require high working memory capacity (Varol & Erçetin, 2021), and can be useful as long as they are designed to be brief, comprehensible, and suited to the learners' proficiency level, and then they may have a globally wide range of uses, together with mixed L1 classes (Boers, 2021). This research makes use of L1 Turkish translations of selected unknown words in the on-screen glosses as the participants are at various L2 proficiency levels.

Within the framework of reading comprehension enhancement and vocabulary acquisition with dictionary use, Prichard (2008) tried to discover how selective Japanese learners of English were when they looked up unknown words while trying to understand nonfiction texts. First-year and second-year university students marked on a vocabulary list whether they knew the words on it or not. A week later, they read three passages of different lengths and genres using computer software and clicked the words they wished to look up from an internet-based bilingual dictionary linked to the software used. To ensure the authenticity of the reading task for the participants, they were requested to produce a brief summary afterwards, which was not focused on in the study. The findings revealed that "roughly one in three participants relied on the dictionary perhaps to an excessive degree, instead of using other vocabulary strategies, which research suggests should have been possible" (Prichard, 2008, p. 224). They were reported to have mostly looked up words in clauses rated as reflecting the main ideas in the passages and ignored, or guessed, the unknown words which were not related to the main issues. The differences were significant, and the researcher concluded that "high-intermediate and advanced learners often use the selective dictionary use strategies" (Prichard, 2008, p. 226) and that some learners may be in need of learning how to use dictionaries in a more resourceful way. Inspired by Prichard, the present investigation likewise presents learners with a vocabulary list to check as known or unknown, three short texts to read which include L1 definition glosses for the selected items, and a final request to briefly summarize the texts. Unlike Prichard's study, however, the present research strives to observe the look-up behavior of English teacher trainees, and how they work with texts with pop-up window glosses, rather than glosses that use hyperlinked words that open a separate web page. Lastly, the students ended the reading activity by writing a short summary simply in their L1.

In light of the research findings in the literature, the present study sought to investigate the glossed word-checking behavior of ELT pre-service teachers while reading on computer screens. The study thus explores the following research questions:

1. Do pre-service ELT teachers check enough words to foster reading comprehension but also use other strategies when needed?

2. Do pre-service ELT teachers check useful, high-frequency words rather than infrequent words?
3. Do pre-service ELT teachers mainly check words relevant to the main points or the supporting details?
4. Do pre-service ELT teachers use or ignore the glosses to enable better comprehension of the text?

3. Research Methodology

3.1 Research Design

The present study used a quasi-experimental design where all of the volunteer participants used the same material produced.

3.2 Participants

The participants of the study were 26 first-year and second-year English language teaching majors (14 females and 12 males) studying in the Department of English Language Teaching at Bursa Uludag University, Turkey. The participants had studied English for about nine to twelve years and had passed an English as a foreign language test in a high-stakes test while entering the university.

3.3 Instruments

The present study included three authentic reading passages similar to what Prichard (2008, p. 221) had called " passages that learners might read for pleasure", that were also suitable for students' academic work. The selection process was completed by another group of first and second-year students who skimmed over 12 texts and labelled them as interesting or irrelevant based on their interest levels. Three texts were chosen based on the ratings. The first reading text was a short news item (Calmes, 2010) from a newspaper, the second one was an introductory section from an ELT book (Broughton et al., 1980), and the third was a longer news story (Castle, 2010).

3.3 .1 Preparation of the Instruments

The procedure of the research is explained in detail in what follows.

3.3 .1 .1 Before the Study

The texts were entered into an online corpus analyzer program adapted by Cobb (1999) named VocabProfile, which provides information on how many words a text contains from the first 1000 and second 1000 word families, and the Academic Word List (AWL). The other words are labelled as off-list words by the program. Proper names were manually removed from the input text. (e.g. the surname of the former prime minister of the UK, Gordon Brown, which is also a colour).

The first text consisted of 380 tokens and 210 types without proper names. The number of words in the 2000+AWL list was 311, with a percentage of 81.85, and the remaining 69 words were listed as off-list words, with a percentage of 18.15. The second text consisted of 403 tokens and 195 types. The results showed that 368 words in the 2000+AWL list with a coverage rate of 91.31 and 35 words in the off-list with a coverage of 8.68 comprised the whole text. This introductory ELT text was written using high-frequency vocabulary items. The third text, about politics, included 709 tokens and 318 types. 596 of these tokens with a

rate of 256 types pertaining to the 2000+AWL list with coverage of 84.07%, and the remaining 113 words in the off-list covered 15.93% of the text.

The text analysis helped create a vocabulary list for the participants. Despite being a severe issue, few researchers have mentioned the challenges caused by homonym words, such as the example of "Rose" in the second text. Therefore, occurrences such as "Led (verb)" and "Rose (verb)" were clearly labelled. The final list resulted in 606 alphabetically sorted words. The learners indicated their lexical knowledge by putting a tick for known words and a cross for unknown words. Throughout the study, this test is called the pre-test and the checking of these words during screen-reading is called the post-test.

3.3 .1 .2 Session 1

The participants were informed about the scope of the study, and their questions were answered. Later, they were given the 606-word type list to be completed at their discretion. To better account for the student's vocabulary knowledge, they were also given the Vocabulary Levels Test by Schmitt et al. (2001). The reading section of a past Cambridge Advanced English (CAE) Exam was given to check the participants reading proficiency. The results from both tests showed no significant differences in students' scores.

3.3 .1 .3 Session 2

An analysis of the student's vocabulary pre-test results indicated 105 words to be glossed. An online Turkish-English dictionary was used to gloss the words with context-bound meanings. To create the web page, the Microsoft Frontpage program with a pop-up window feature was used for its practical nature (Varol & Erçetin, 2021). Each 105-word type marked by students as unknown was glossed, including plurals and inflected form occurrences. The last session occurred in a computer lab with 32 computers where the "Total Screen recorder program" was used to record clicking behavior and word frequency look-ups. The program saves the screen actions and is hidden when activated. The students were not informed about the capturing procedure so as not to affect their actions.

The students were not in any way informed that their look-up behavior would be recorded (see Erçetin, 2013; Peters, 2007). They were informed that the task would in no way be a test, and this announcement had to be repeated because previous research had found that knowledge of an upcoming test would increase the number of look-ups (Knight, 1994; Peters, 2007). Three high-frequency words in the texts were replaced with nonsense words from Hu and Nation (2000) to observe the actual look-up behavior of the participants. After completing the reading session individually, students were given a filler summarization task intended to promote a sense of a reading comprehension task rather than a vocabulary-focused activity.

4. Findings

4.1. Do pre-service ELT teachers check enough words to foster reading comprehension but also use other strategies when needed?

Prichard (2008) aimed to answer this question by counting the number of words looked up by each participant in the study and adding them to the total number of words marked as known in the pre-test (p. 222). However, for our study, it was impossible to carry out an analysis of this kind. By examining the number of times each word would appear in the texts, Prichard

(2008) estimated the percentage of looked-up words and tried to see if the participants reached the 95–98% level by checking words.

Prichard accepted the fact that "participants may have sometimes looked up words marked as known in the pre-test" (2008, p. 222), and he attempted to give a rough estimate of percentages. However, for the present study, as will be mentioned later in detail, the number of words claimed to be known did not actually represent the participants' knowledge. For example, participant number 4 in our study declared in the pre-test that she knew 582 words in the alphabetized 606-word list. During the reading session however, she looked up the meanings of 58 words, although she claimed she only did not know 24 words in the pre-test. If we apply her results to Prichard's formula, the resulting number of words would be 640, and the resulting percentage would be 105.61%. Therefore this stage of analysis is deemed inapplicable for the present study.

As for the degree of the participants' clicking preferences on the glossed words in the three reading texts, there was a world of difference in the individuals' look-up actions for the unknown words. From a list of 606 stated unknown words, 105 vocabulary items were glossed (17.33%), which the learners looked up by clicking at considerably varying degrees ranging as much as 7 to 58 times.

4.2. Do pre-service ELT teachers check useful, high-frequency words rather than infrequent words?

The study by Prichard (2008) automatically assumed the usefulness of each word on an assumption of whether it was included in the first 2,000 level plus the Academic Word List or deemed each word less useful if they were off-list words. Prichard considered the vocabulary level and the academic level words as most helpful to learn. As a result, the number of words in the 2,000-word list and the AWL was compared to off-list words.

To get a picture of the participants' vocabulary level, frequencies were calculated by comparing the number of words looked up by each student to the number of words marked as unknown in the pre-test in each category (Prichard, 2008, p. 223). A paired, two-tailed t-test was used to examine the data to see whether the students preferred to look up high-frequency words significantly more often than the words in the off-list.

The results of paired samples t-test for the investigation of the comparison between corpus list and off-list is given below in the tables.

Paired samples t-test for the pre-test revealed that there is a statistically significant difference between the average 2000+AWL scores ($\overline{X}$ AWL=2.96) and off-list scores ($\overline{X}$ OFF =22.15) of the participants [t(25)=-13.55, p<0.01] (Table 1). Table 1 shows that an average of only 2.96 words were marked as unknown in the pre-test. Nevertheless, 22.15 words from the pre-test were on the off-list. The students tended to pick high-frequency off-list words more than useful 2000+AWL words.

Table 1: Selection of useful and OFF-list words in the pre-test

WORD SCORE	N	$\overline{X}$	S	df	t	p
Pre-test 2000+AWL	26	2.96	3.23	25	-13.55	0.000
Pre-test OFF	26	22.15	9.44			

Paired samples t-test for the post-test revealed that there is a statistically significant difference between the average 2000+AWL scores ($\overline{X}$ AWL=3.23) and off-list scores ($\overline{X}$ OFF =21.07) of the participants [t(25)=-14.05, p<0.01] (Table 2).

Table 2: Selection of useful and OFF-list words in the post-test

WORD SCORE	N	$\overline{X}$	S	df	T	p
Post-test 2000+AWL	26	3.23	3.73	25	-14.05	0.000
Post-test OFF	26	21.07	8.42			

The results indicate a slight increase in the number of words from the 2000+AWL list checked during the reading session. Nevertheless, a great majority of the words (21.07) checked were still on the off-list.

In order to see whether the slight increase in the 2000+AWL list in Table 2 was significant, the below analysis was carried out (Table 3). However, paired samples t-test revealed that there is no statistically significant difference between the average 2000+AWL pre-test scores ($\overline{X}$ Pre=2.96) and 2000+AWL post-test scores ($\overline{X}$ Post =3.23) of the participants [t(25)=-2.10, p>0.05].

Table 3: Selection of useful words in the pre- and post-tests

WORD SCORE	N	$\overline{X}$	S	df	t	p
Pre-test 2000+AWL	26	2.96	3.23	25	-2.10	0.765
Post-test 2000+AWL	26	3.23	3.72			

The pre-test and post-test results of the off-list words were investigated to check the point of significance from the other lists' perspectives. Paired samples t-test revealed that there is no statistically significant difference between the average OFF-list pre-test scores ($\overline{X}$ Pre=22.15) and OFF-list post-test scores ($\overline{X}$ Post =21.07) of the participants [t(25)=0.55, p>0.05] (Table 4).

Table 4: Selection of OFF-list Words in the Pre and Post-tests

WORD SCORE	N	$\overline{X}$	S	df	t	p
Pre-test OFF	26	22.15	9.44	25	0.55	0.586
Post-test OFF	26	21.07	8.42			

4.3. Do pre-service ELT teachers mainly check words relevant to the main points or to the supporting details?

Prichard (2008) assumed that a word would be more significant to learn if it is in any of the clauses labelled by the researcher himself as the main points rather than the words in

supporting clauses. However, we doubted whether a single individual could determine the importance of a word and thus consulted four other instructors with MA and PhD degrees from the ELT department on their ideas about the significance of any clause or sentence. A total of five complete analyses of the main points in texts were compared, and only the clauses that were found in at least three analyses were regarded as main points. In the study conducted by Prichard (2008), the participants' pre-test results were used; however, as mentioned above, there was a huge discrepancy between the words that were claimed to be known and the words actually checked. Therefore, it is assumed that an account of percentages might indicate some brief information.

As shown in Table 5, there is near equivalence in the percentages of the words' contexts that have been checked. Namely, 52.14% of the words the students checked were in main points and 47.86% in the supporting details. Prichard (2008) reported similar results expressing that the students were able locate the main points in the texts.

Table 5: The contexts of the words

	Word in main points	Word in supporting details
Dictionary use	52.14%	47.86%

As shown below in Table 6, 60.57% of the words that the students checked in glosses were either frequent, useful words, or words in one of the passages' main points, and circa 40% in the supporting details. The ratio between the percentages is not so high. Therefore, the students might be encouraged to use the dictionary more selectively.

Table 6: Word frequency and context

	Frequent word or word in main points	Infrequent word in supporting details
Dictionary use	60.57%	39.43%

4.4. Do pre-service ELT teachers use or ignore the glosses to enable better comprehension of the text?

Another issue that was investigated during reading was guessing behavior regarding nonsense words. The use of nonsense words was preferred as it helped the verification of instances concerning whether or not the participants were solely guessing the words they did not know (de Ridder, 2002; Peters, 2007).

Table 7 below shows students' preference for clicking the glosses for the nonsense words and their ignoring-the-word behavior. Two second-year students and one first-year student simply ignored all of the nonsense words and did not check any of them.

Table 7: Checking glosses for nonsense words

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	n	%
Dracted	+	+		+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+		+	+	+			**21**	**80.7**
Emartically				+	+	+	+	+	+	+		+	+		+	+	+	+	+					+		+	**16**	**61.5**
Vesbian	+	+		+			+		+	+	+	+	+	+	+	+	+	+	+	+		+	+	+		+	**20**	**76.9**

The most frequently clicked word *dracted* was a replacement for the verb "to call" in the first text and was preferred by 21 students. The least checked nonsense word was *emartically* which replaced the adverb "widely" in the second original text. It may be argued that the -ly suffix and the verb usage in the context helped the participants easily guess the meaning of these distracters. The word *vesbian*, which was used for the noun "chairman", was located in the third text, and 20 students checked the meaning of that word assuming it as unfamiliar. The above findings indicate that most students did not ignore the nonsense words and checked the meanings. They might have guessed the words' meanings, but as a confirmation technique, they used the gloss provided.

5. Discussion

By careful syllabus planning, students can become familiar with strategies to better their learning process and partially compensate for their lack of knowledge during communications with people or texts. The current programs in ELT departments do not emphasize the importance of learning or teaching strategies explicitly. Besides, pre-service teachers usually learn about the strategies and their benefits merely as course content without any particular emphasis on their application and success. Future teacher candidates who lack knowledge and understanding of the aspects and uses of learning strategies should not be expected to apply strategies and instruct their learners when they themselves may fail to grasp their use and importance. The literature mentioned in this paper is concerned with the strategic and effective use of dictionaries.

Today's teachers should be informed about recent technological advances and integrate the use of a range of technology tools in their classes. Therefore, it is imperative that both content and methodology courses in education faculties prepare future teachers judiciously. With this urgent need in mind, the present study aimed to investigate the pre-service English language teachers' use of L1 glosses while reading on a computer.

In the light of the findings, we can discuss the major findings in line with the research questions and add a number of implications.

Research question 1 asked whether pre-service ELT teachers checked enough words to foster reading comprehension but also used other strategies when needed. Despite some similarities such as the use of glosses, the present study differed from Prichard's (2008) study in several ways. Specifically, the use of video recordings, and keeping log files on the actions of the interaction with the computer and the dictionary revealed the students' actual look-up and word-checking behavior. The recordings revealed an apparent discrepancy between the words that a student had first no intention to look up and then actually looked up. Advances in computer technology made it possible to keep a log of student's actions or capture a video to better record activities or behavior patterns. The records of ELT students' look-ups thus revealed two serious concerns; the first is the inconsistency between the stated known words and the words checked subsequently, and the second is an unforeseen variation among the participants' clicking numbers, both of which need to be interpreted cautiously.

Raising learners' awareness of different strategies can be fruitful provided that learners are given a chance and can select the strategies which lead to more gains in the target language. Rather than forcing learners to guess meanings from the context, teachers may opt for getting them acquainted with different strategies for learning new words and introducing

new words in efficient ways in context, strategies that go better together with glossing. Findings from the experimental research administered by Van den Broek et al. (2022) demonstrated that the gains of retrieval opportunities in contextualized learning surpassed the gains in the inference practice in intentional exercises. The researchers underlined that "newly learned words were retained better over time if they were, after initial encoding, repeated in a story context" (p. 10) and that an "informative story context led to higher post-test results than the retrieval context" (p. 11).

Research question 2 was related to whether pre-service ELT teachers checked useful, high-frequency words rather than infrequent words. We hoped that they would look up useful academic words more often, this was not the case. The checked words were commonly on the off-list, and the reading activity did not lead to an alteration in the word-list types (2000+AWL and off-list) of the glossed and checked words. The process of look-up activities can be complicated for some learners. Farina et al. (2019) conducted interviews with Slovenian undergraduates to examine the habits of the use of monolingual dictionaries, and found that the advanced level learners of English "lost valuable time in locating the infrequent senses of our contexts. During the course of the look-up activities, some users noticed the small drop-down menu and others never did" (Farina et al., 2019, p. 472). In his experimental research, Gong (2022), on the other hand, ensured a great improvement over one semester in the vocabulary learning of "freshmen in the Japanese department of a private college" (p. 25) who were given strategy training and tasks on the use of electronic dictionary look-ups.

Webb & Nation (2017) and Wolter (2015) stress the importance of training learners in dictionary use, which encompasses both how to look up words in a dictionary and how to use the information found in dictionaries. These aspects are absolutely vital to trainee teachers and should be included as a field education course in education faculties.

Research question 3 dealt with whether pre-service ELT teachers mainly checked words relevant to the main points or to the supporting details of the sentences in the reading passages. We predicted that they would look up unknown lexical items in the main parts of sentences in the texts, and infer the meanings of the unknown words in the subordinate parts or ignore them totally. The contexts of the words that have been checked, however, were not extremely polarized on one type of context, the more frequent words in the main parts being checked a little more than the infrequent words in subordinate parts. A further study on recording the use of glosses in relation to the types, frequency and range of words might exhibit rich information on the vocabulary knowledge of pre-service teachers.

Research question 4 dwelled upon whether pre-service ELT teachers used or ignored the glosses to enable better comprehension of the text. We projected that nonsense words would not be overlooked by the majority of the participants, which more or less took place during the research. Learners' engagement with glosses indicated that the glossed word and its gloss were noticed by the participants, but this does not inform us about what was going on in the student's mind, namely the reason of look-up or the processing effect of the information (Boers, 2021, pp. 12-13).

Furthermore, not all the glossed items were encountered multiple times in the reading texts used in the present research. Regarding the route to get the rewards of glossed reading, Boers (2021) suggests that:

> … the best learning outcomes as far as vocabulary gains are concerned tend to emerge when learners (a) access the glosses (instead of ignoring them) and do so more than once, (b) access the glosses and then re-encounter the words in the text, and (c) treat the glosses as study material rather than mere reading support. All this is under the assumption that (d) the quality of the glosses is such that they foster accurate understanding of the words' meanings, and (e) the learners find the amount of new information cognitively manageable. (p. 15)

This study did not attempt to examine the use of L2 glosses, which, as a further step, can be conducted by replacing the L1 definitions in the glosses with L2 monolingual dictionary definitions to see whether that would make any changes in the tendency in learners' look-ups. The research to date has found that the students look up more words when working with bilingual dictionaries (Alhaisoni, 2016), which was the case at present. Making selective use of glosses to look up unfamiliar words, efficient readers looked for clues in different parts of the text, including the title, with a "bottom up" processing strategy (McDonough et al., 2013, pp. 117, 121).

Still another alternative gloss content can be adding different types of lexical information, such as meta-linguistic information in the form of "drove = past tense of *drive*" and collocation information (Boers, 2021, p. 15) to "encourage close interaction between the reader and the text" (McDonough et al., 2013, p. 113).

6. Conclusion

The present study, it is hoped, has formed the key issues mentioned in the literature and provided a contribution to the investigations of glossary usage styles, which is believed to help developing a better understanding of English for students from different cultural backgrounds.

The present study has a number of limitations, the first of which is the limited generalizability of the findings. As a major limitation, we should state that the participants were pre-service ELT teachers enrolled at a Turkish public university in their undergraduate study years, who had some differences in their language proficiency and vocabulary knowledge. A replication of the study in other settings might yield different findings. Secondly, some participants did not use the glosses for words they claimed that they didn't know. Therefore, a thorough investigation of participant behavior could have been investigated through retrospective think-aloud. Thirdly, a survey or an interview examining participants' beliefs and behavior patterns while interacting with glosses would have triangulated and provided valuable data for the current study.

The findings have important implications for the field of foreign language teacher education, chiefly promoting the notions that trainee teachers should be judiciously educated on vocabulary strategies used in recognition tasks, involved in plentiful activities comprising the introduction and uses of various types of dictionaries and glosses, and further engaged in creation tasks using the latest web technologies. In these suggested tasks, the trainees can be scaffolded to prepare digital reading and vocabulary building materials, working collaboratively on various facets of the work such as selecting a level- and topic-appropriate text, the vocabulary items to be glossed and their number. They can further work on the language and mode of each gloss (visually enhanced or not; single mode vs. multi-modal; L1

or L2; end-of-text, marginal or pop-up, length and clarity, (Boers, 2021, p. 15), and prepare follow-up activities for production. Last but not the least, trainee teachers can design electronic testing materials either intended for language skills, vocabulary development, or translation, that accommodate on-screen glossing.

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