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A Study of Reading Comprehension and Receptive Vocabulary Retention Using the Electronic Glossing Sandwich Approach

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Abstract

The present research deals with the English as second language apprentices' reading comprehension and receptive linguistic retention using the sandwich approach for the first language and making the way of communication simple by the use of electronic glossing in the education sector of Pakistan. The leading objectives of the article were to explore whether the learners who have approach to electronic glosses have better reading scores than the ones who have no access to electronic glosses in an ESL classroom and to investigate whether the learners who have access to electronic glosses have a higher vocabulary than the ones who have no access to electronic glosses in an ESL classroom. A quantitative research method was adopted to carry out this research. The data was collected from 40 students at a private school in Rawalpindi with different socio-economic backgrounds. The collected data was analyzed by three different analyses of variance (ANCOVA) conducted to get the results of reading comprehension of the students followed by instant vocabulary test, and delayed vocabulary test. Moreover, four univariate analyses of the covariate (ANCOVAs) were introduced to examine the hypotheses using the Statistical Package for Social Science (SPSS-24) software. The results of present study demonstrated the benefits of the electronic glossing in ESL classroom. The use of electronic glossing should not be neglected while learning English as second language in the private education sector of Pakistan, where direct method is used for teaching English as second language.

Keywords: *Sandwich approach, ICT, English Language, electronic glosses*

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Introduction

In the modern digital age, it has become a necessity of every common being to be equipped with the technology and specifically it is now essential for an ESL Learner in developing country like Pakistan to get aware of this advanced technology to communicate and connect with the world of future. As a matter of fact, countries with various native and traditional languages, it has become quite challenging for the learners to comprehend the English vocabulary with the different grammatical rules and phonics as compared to their regional language. Pakistan is home to a diverse population with active languages that vary significantly from English. The main problem that Pakistani people face problem in speaking English Language and it makes them uncomfortable when it comes to understanding and comprehending any text written in the English language. Despite the continuous process of learning a second language, foreign language learners encounter a number of frustrating feelings as they have not developed that second language like their first language L1. However, ESL must be evolved in non-native speakers as an obtainment of learning at critical age. A second language can be evolved up to the level that is near obtainment. For that purpose, it is needed to be learned with through reading comprehension and vocabulary acquisition to understand the basic text to make a person fluent in communication in the acquired foreign language.

Background

The inclusion of glossing, providing definitions or explanations of unfamiliar words, in English reading materials for ESL students can enhance their comprehension by reducing lexical barriers. The present study proves the impact of glossing upon ESL students reading and vocabulary learning skills. This support aids vocabulary acquisition, leading to improved retention and overall language skills development. Ko (2012) claimed that glossing is one of the techniques that promotes receptive vocabulary learning and develops reading comprehension skills among students. Lage (2008) argues that electronic glosses help learners in incidental vocabulary learning. Furthermore, Lage (2008) declares this particular process as the new way of learning vocabulary. While taking Lage's (2008) statement into account, EFL learners take advantage of electronic glosses in a way that defines the connotations of the problematic words in the form of hypertext and provides the learners with the description of the challenging words while reading, thus, resulting in vocabulary learning by the learners. According to Lenders (2008), electronic glosses are the latest techniques that support and accompany the acquisition of vocabulary and reading comprehension. As reading comprehension and vocabulary learning go side by side, therefore, EFL learners should have plenty of practice to develop their reading comprehension skills in a foreign language. A learner comprehends well if she knows the meanings of the words. Guidi (2009) holds a view that second language learners improve their reading comprehension

skills and vocabulary learning through annotating the text and glossing aids to develop these skills in second language acquisition.

Hypertext is embedded in electronic glosses to explain the meanings of difficult words. Gordon (2001) stated that hypertext provides learners, an opportunity to see the meaning instantly and clear the confusion which is not possible in the printed text. He further claims that many learners do not feel comfortable reading on screen. This research concluded that screen reading works effectively if it consists of hypertext, pagination, tables, column, and margins for the ease of the learner.

Ko (2012) piloted a study to investigate the effect of different types of glosses in a text and no gloss on L2 vocabulary retention. The participants were 90 Korean students from different universities who were grouped in a way that one group was given the electronic glosses in English reading comprehension and the other group took no glossed English reading comprehension. Soon after completing the tasks, the participants were given an MC vocabulary test. The outcome concluded that participants of the glossed condition scored better marks than the participants of the no glossed condition thus there was a significant impact of electronic glosses over no glossed text.

Jung (2016) steered a study to examine the effect of glosses of L2 text on English reading comprehension skills and vocabulary learning. The participants were 52 Korean college students, divided into two groups. The experimental group was the glossed group and the control group was the no-gloss group. Participants were given three different types of tests: pre-test, post-test and delayed vocabulary test. The scores of these tests showed that participants of the glossed group did better than no gloss group participants. Hence, it was proven that glosses have a substantial influence on participants' reading comprehension and vocabulary learning of the L2 language. Hence, different researchers have concluded the essential role of electronic glosses in vocabulary learning and reading comprehension of the L2 language. Taking forward the previous research the present study aims to examine the use of electronic glosses and its impact on the student's reading comprehension and vocabulary learning skills in Pakistan.

Problem Statement

In the current scenario, private sector educational institutes in Pakistan use the traditional method for second language learners' receptive vocabulary retention and reading comprehension in which no means of comprehending the difficult words in the target language. They have access to language teachers but this access is limited to school time only. After school time, a student at home, if encounters a difficult word, he/she cannot comprehend the difficult word. Thus, this adds a barrier to the learning process. Contrary to it, there is a purposed alternate process which is electronic glossing. In this particular method, the student comprehends any difficult word in the second language and continues the learning process, and clarifies the confusion. Thus, establishing smooth communication between the language learner and the

second language text. So, it can be concluded that Electronic Glossing smoothens the ways for second language learners' Reading Comprehension and Receptive Vocabulary Retention. Ko (2012) states that glossing is one of the modern techniques that assist the language learner with vocabulary learning and developing reading comprehension. The main aim of this study is to investigate the impact of electronic glosses on EFL learners' English reading comprehension skills and receptive vocabulary retention.

Research Objectives

- i. To investigate whether the learners who have access to electronic glosses have better reading scores than the ones who have no access to electronic glosses in an ESL classroom.
- ii. To explore whether ESL learners who utilize electronic glosses demonstrate an enhanced vocabulary compared to those without access to such resources in the classroom.

Methodology

A quantitative research method is used to carry out this particular research. The material used for this particular research is taken from books, journals, previous research, and authentic internet websites. In this study, 40 students were included. Among these, 12 were girls and 28 were boys. All of these participants were studying in grade 8. Participants were selected from a private school in Rawalpindi with different socio-economic backgrounds but the same learning environment was included. Most of the participants were having Urdu as their primary speaking language, and English was treated as L2. The researchers had no access to the previous scores or grades, as well as the overall performance and grading of the participants involved in the study conducted.

To collect the required data for the research questions, total number of the participants were 50 (25 males and 25 females) of the same grades but different sections of the same private school of Rawalpindi. The age group of the participants was in between 13 to 15. Before data collection, the study was thoroughly explained to the learners. Participants' confidentiality was ensured to be kept and they were also informed about it to maintain the authenticity of the study.

Instruments

This particular section task elaborately ponders the materials used for the successful implementation of the current study. These materials include the peculiar and thorough selection of the glossed text or words, the procedure involved in creating the said glossed texts, and drafting the reading comprehension.

i. Glossed Words and Drafted Reading Passage

An efficient strategy was adopted to enhance and increment the overall probability of the practical usage of the electronic glossed words by the participants. The first portion of this

strategy involved a total of 50 words, which were thoroughly and efficiently selected by the linguistics experts (ESL language teachers in specific). These words were further rated by the ESL teachers and linguistics experts based on their difficulty for the target students participating in the current study. The scale of difficulty was defined from 1 to 10, where one was considered to be the least difficult or the easiest word, while ten was considered to be the most challenging word. Only those words were selected for electronic glossing or digital glossing, graded with an average difficulty of 7 marks or higher on the difficulty scale by the ESL teachers and linguistics experts. Therefore, a set of 20 words were classified and selected by the panel of ESL teachers and linguistics experts as the target words for electronic glossing or digital glossing for the participants of the current study.

ii. Creating Hypertext

A technique was designed to make the hypertext or hyperlinks visible to the participants of the current study. For this said purpose, the digital glossed or electronic glossed words were highlighted with a hyperlink instead of adding a symbol or underlining the glossed words for making them prominent for the participants of the study. This verdict was implemented constructed on the findings of the study conducted by De Ridder (2002), which stated that although there was no direct relationship between both the increase in vocabulary retention of the L2 learner and the facilitation of reading comprehension by the reader with highlighted hyperlinks. However, they were proven to increase the consultation by the readers or L2 learners more efficiently and effectively.

Tests

i. Prompt for instant Multiple-choice Queries:

The comprehension passage was adapted from www.the-office.com/dolphin.html. This passage had 538 words of which there were 10 gloss words. From these gloss words, 5 were adjectives, 4 were verbs and 1 was a noun. The test of multiple-choice questions adapted from the passage was conducted straightaway after the reading comprehension test was completed. The answer keys of the reading comprehension and immediate multiple-choice reading test are also attached to the appendix below.

ii. Instant Multiple-choice Vocabulary Test:

The objective of the instantaneous multiple-choice vocabulary test was to assess how electronic glossing components affect the retention of vocabulary. In particular, the goal of this assessment was to ascertain the comparative effectiveness of various electronic gloss components in facilitating vocabulary retention. Participants took the test subsequent to reviewing a distinct list of words accompanied by glosses.

iii. Deferred Multiple-Choice Vocabulary Test:

The deferred multiple-choice vocabulary test was aimed to conduct after two weeks of the intervention to find the impact of glossing upon vocabulary retention of the participants. The very similar test was conducted with the change of only order number of the glossed vocabulary list. Both of the finding results of the participants, delayed vocabulary test and immediate vocabulary test, were compared in the end.

Procedure

The study was started from June 2018 to November 2018. Participants were separated into two groups, the Experimental (Glossed) group, and Non-experimental (No-Glossed) group. Each group consisted of 25 students of which 25 boys and 25 girls were included. The participants were given consent explaining the research project, and they examined and endorsed the document before commencing the reading of the comprehension passage. The experimental group was taken to the IT lab and instructions were given to the participants. For this particular task, 30 minutes were assigned to the participants to complete the reading and vocabulary test. However, the No-Gloss group was given reading comprehension. The instant multiple-choice reading comprehension test was given to the participants and they were asked to complete the test. All the scores were calculated and then after the gap of two weeks of any interventions' participants was administered with deferred multiple-choice vocabulary test to access the extent to which they had retained their target.

Data Analysis

The following sections explains the analyses of obtained data from the reading comprehension test and instant vocabulary test and deferred vocabulary test. In this study, three different analyses of variance (ANCOVA) were conducted for the reading comprehension test, prompt vocabulary test, and delayed vocabulary test. The statistical analyses for the present study were carried out using the Statistical Package for Social Science (SPSS 24).

Results

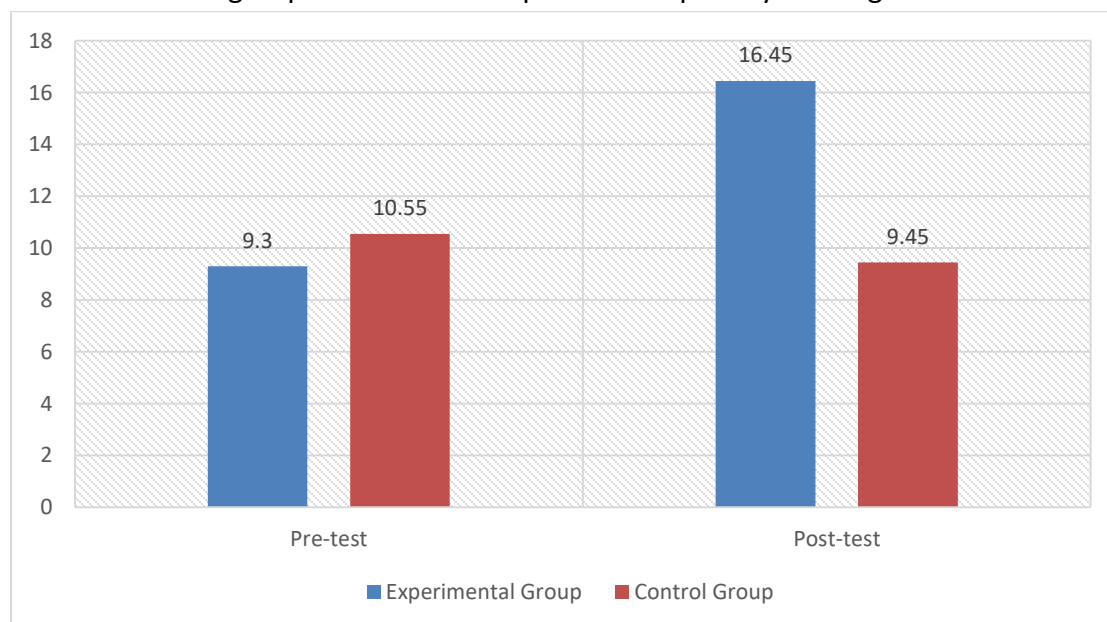
Table 1: The Reading Result of the Two Groups on the Pre-test

Group	M	SD	t	df	p
Control Group	10.55	2.58	1.66	38	.105
Experimental Group	9.30	2.15			

Table 2: The Reading Result of the Two Groups on the Post-test

Group	M	SD	t	df	p
Control Group	9.45	-12.36	38	.000	
Experimental Group	16.45				

After assessing the homogeneity of the two groups, the Independent Samples t-test was performed on the post-test. The results summarized in Table 1 and 2 show that the experimental group students displayed significantly more improvement in their reading scores ($M = 16.45$, $SD = 1.70$) than the control group students [$M = 9.45$, $SD = 1.88$; $t(38) = -12.36$, $p = .000$]. The computed extent of the disparity in the average scores between the two groups was remarkably significant ($\eta^2 = .25$). These overall results posit the importance of electronic glosses in explaining ESL learners' reading scores. The series of Independent Samples t-test were run to analyse the data collected against the first research question of the study. These findings outlined that equally experimental and controlled group students were homogeneous on the pre-test. However, the experimental group students showed a significantly more improvement in their reading scores than the control group students on the post-test as portrayed in Figure 1:

**Figure 1** Summary of the First Research Question**Table 3:** Vocabulary Score of Two Groups on the Pre-test

Group	M	SD	t	df	p
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Control Group	14.60	3.04	2.13	98	.035
Experimental Group	13.30	3.41			

Due to the diversity in vocabulary pre-test scores between the two groups, the vocabulary post-test was analysed while controlling for their pre-existing difference on the pre-test (Pallant, 2020). To this end, t-test was replaced with one-way ANCOVA where the pre-test score was treated as a covariate. According to Table 4.4, experimental group students' vocabulary score (M= 16.84, SD= .361) was higher than the control group students (M= 13.33, SD= .364).

Table 4: Descriptive Statistics of the Post-test on Vocabulary

Group	M	SD
Control Group	13.33	.364
Experimental Group	16.84	.361

Whether the mean score differences across the two groups were significant, the results summarised in Table 4.5 were interpreted. The results indicated that there were significant discrepancies in the mean scores between the two groups [F (1, 97) = 45.60, p= .000, partial eta squared= .320]. As indicated by the partial eta squared, 32% of the experimental group students' vocabulary score was explained by the intervention (i.e., electronic glosses).

Table 5: The Results of One-way ANCOVA

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	306.15	2	153.07	23.64	.000	.328
Intercept	726.75	1	726.753	112.24	.000	.536
V1	46.94	1	46.942	7.25	.008	.070

group	295.24	1	295.24	45.60	.000	.320
Error	628.03	97	6.47			
Total	23705.00	100				
Corrected Total	934.19	99				

The intervention based on electronic glosses also tried to unravel if it also exerted any effect on experimental group students' vocabulary score. Since the two groups were not homogenous on the pre-test, therefore; t-test was replaced with one-way ANCOVA in which it was found that the designed intervention helped experimental group students enhance their vocabulary score on the post-test. Figure 2 emphasizes the general disparities in mean scores between the pre-test and post-test for both groups:

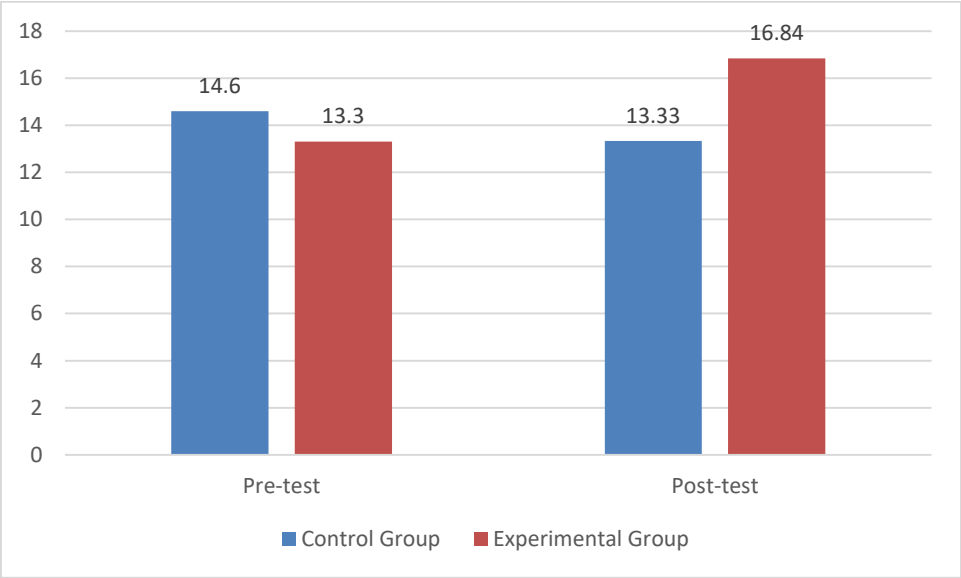


Figure 2 Summary of the Second objective

Table 6 Time 1 and Time 2 Vocabulary Score of Experimental Group Students

Group	M	SD	t	df	p
Time 1	16.84	2.92	1.97	49	.055
Time 2	17.20	2.94			

The study's third research question aimed to investigate whether an intervention based on electronic glosses enhances vocabulary retention in ESL learners. The results emanated from the vocabulary post-test and the vocabulary delayed-test portrayed that students were able to retain the vocabulary as they did not show any statistically significant changes in their vocabulary size from Time 1 to Time 2. The Figure 4.3 summarizes the overall results:

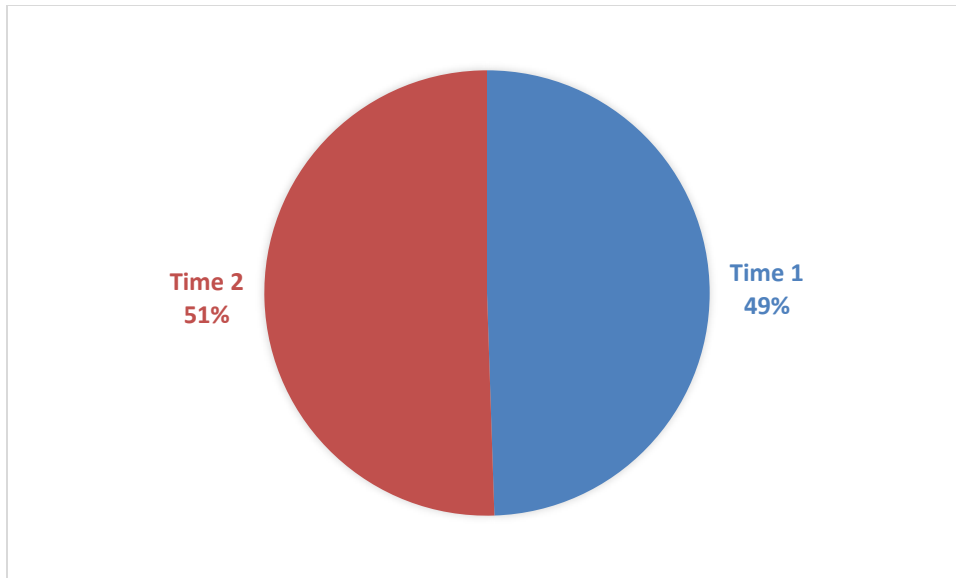


Figure 3 Summary of the third objective

Findings and Discussion

This study focuses on Impacts of electronic glosses on ESL learner's reading comprehension and perceptive vocabulary retention for 8th grade level students in private sector of Pakistan, specifically in Rawalpindi. The primary question for this research is how electronic glossing impacts the second language learner's vocabulary retention and reading comprehension? The hypothesis in this research was that the use of electronic glosses can improve the second language acquisition and smoothen the process of comprehending difficult words in for the target language that is English while leaving a positive trend in second language reading scores and vocabulary scores. To collect the required data for the research, 50 students were included. Among these 25 were girls and 25 were boys. All of these participants were studying in grade 8. Participants were selected from a private school in Rawalpindi with different socio-economic backgrounds but the same learning environment was included. Most of the participants were having Urdu as their primary speaking language, and English was treated as L2. All the participants of this research belonged to the age group of 12 to 14 years with an average of 12.8. For the quantitative statistics in this research, three different analyses of variance (ANCOVA) was conducted for the reading comprehension test, prompt vocabulary test, and deferred vocabulary test. Moreover, to test the hypothesis, four univariate analyses of the covariate (ANCOVAs) were used. The comparison of the results for the series of tests is made to find impacts of electronic glosses on ESL learner's reading and vocabulary retention score;

- i. The very first test is conducted to find out how e-glosses effect the reading scores of ESL learner? For this purpose, Independent Samples t-test was done (having two groups – control and experimental group) in the SPSS (version, 21). Pre-test result exhibited no significant difference in the reading scores of the two groups: Control Group (M= 10.55,

SD= 2.58) and Experimental Group [M= 9.30, SD= 2.15; $t(38)= 1.66$, $p= .105$]. When the Independent Samples t-test was conducted on the post-test, It has shown a significant change. The summarised results in Table 4.2 show that the experimental group students displayed significantly more improvement in their reading scores (M= 16.45, SD= 1.70) than the control group students [M= 9.45, SD= 1.88; $t(38)= -12.36$, $p=.000$]. The calculated magnitude of the difference in the mean scores of the two groups was very high (eta squared= .25). These overall results posit the importance of the electronic glosses to explain ESL learners' reading scores. Thus the results for the above-mentioned test have concluded that, Electronic glossing has facilitated ESL learner's reading score. Furthermore, electronic glossing is helpful for learners to comprehend the text of target language. When the difficult words are comprehended via electronic glossing, the process of reading becomes easier for the reader. In this way, a smooth communication is built between the target language reading draft and the reader. This process is helpful for ESL development and acquisition.

- ii. To assess the influence of electronic glossing on the vocabulary of ESL learners, Independent Samples t-test and One-way Analysis of Variance (ANCOVA) were conducted using SPSS. Independent Samples t-test was run on the pre-test. Table, where the control group students' vocabulary score (M= 14.60, SD= 3.04) was significantly higher than the experimental group students [M= 13.30, SD= 3.41; $t(98)= 2.13$, $p= .035$]. At the second stage, post vocabulary test was analysed while controlling for their pre-existing difference on the pre-test (Pallant, 2020). To this end, t-test was replaced with one-way ANCOVA where the pre-test score was treated as a covariate. At this particular stage, the results were different, and have shown opposite trend against pre-test. Experimental group students' vocabulary score (M= 16.84, SD= .361) was higher than the control group students (M= 13.33, SD= .364), which can be seen in table 4.4. In the post vocab test, the experimental group was provided with electronic glossing intervention, which was revealed to be helpful in terms of vocabulary score as resulted from the analysis of post-vocabulary test (shown in Figure 4.2). Thus, finding concluded that, if the students were provided the facility of electronic glossing to comprehend the difficult words in the target language (English), he/she may be able to comprehend the targeted words of the second language. In this way, the complication can be countered by the intervention of e-glosses and ESL learner's Vocabulary learning process can be improved.
- iii. To find how electronic glosses-based intervention facilitates students when it comes to vocabulary retention in an ESL classroom. To answer this question, the post-test vocabulary test and the deferred vocabulary test was analysed using paired-samples t-test. In this regard, results of post vocabulary test and the delayed vocabulary test was analysed at time 1 and time 2. Experimental group students did not exhibit any statistically significant change in vocabulary score from time 1 (M= 16.84, SD= 2.92) to Time 2 [M=

17.20, SD=2.94; $t(49)= 1.97, p>.05]$. The findings of the research concluded that, no slight change was observed in both the tests because, experimental group was intervened with e-glossing facility. By doing so, the students have retained the meanings of targeted words and it was revealed with the results of delayed vocabulary test at time 2. No major change in the results of both the tests was observed and it proves that, electronic glosses intervention has surely helped the students in vocabulary retention in an ESL classroom. Thus, the third research question is answered and the intervention of electronic glossing has shown positive trend in receptive vocabulary learning.

Recommendation

It is advisable to introduce e-glossing facilities in ESL classrooms, as they bolster reading comprehension and vocabulary retention among ESL learners. Additionally, they afford second language students the opportunity to acquire the desired language subconsciously or incidentally. Such an approach can serve as a facilitator for learning and positively impact L2 learners.

Nevertheless, the incidental acquisition of vocabulary through reading may proceed at a slower pace, with only marginal increases in word knowledge observed. Even with supportive tools like glosses, substantial progress cannot be anticipated unless learners are consistently exposed to target vocabulary. This perspective warrants serious consideration, given the technological landscape in which students and educators operate. Technology is not static; it continually advances, shaping both foreign language learning and broader societal dynamics. In summary, glosses enhance the vocabulary learning environment, leading to improved retention. Moreover, hypertext glosses can foster a more comfortable learning atmosphere and offer additional guidance to readers, resulting in positive outcomes for reading comprehension and retention.

Conclusion

Upon reviewing the outcomes of utilizing electronic glossing for ESL learners' reading comprehension and vocabulary retention, it can be affirmed that L2 glossing enhances the reading comprehension skills and improves vocabulary retention among students in private schools in Pakistan. These significant findings of the hypertext glossing can be suggested because of the reason that all the series of tests are stated above. Therefore, it is recommended that, E-glossing facility must be introduced in ESL classroom because it enhances the ESL learner's reading comprehension and vocabulary retention and provides the student of second language, an opportunity to learn the desired language subconsciously or incidentally. To enhance and polish the reading comprehension skills, glossing plays the role of facilitator.

Furthermore, the present study claims through its results that glossing proves the benefits of the electronic glossing in ESL classroom. It is also stated that glossing fortifies the ability to understand the text effectively. (Jacobs, 1994, p. 115). The use of Electronic glossing should not be neglected while learning English as second language in the private education sector of Pakistan, where

direct method is used for teaching English as second language. Such traditional method can be made more effective in the process of ESL in Pakistani educational sectors. By doing so, most of the barriers in the language process can be dealt effectively. Moreover, internet has become the most important tool when it comes to getting ideas or learning practical application of the learnings.

It is not only beneficial for the students, but for the preachers as well. It's features like easy accessibility and hassle free instructional materials makes it preferable for the teachers to aid in their preparing/ planning and lesson execution.

It is affirmed that "technology-based annotated texts present us with new opportunities to assist our students in getting beyond the 'mechanical' aspects of the reading process and to provide them with a means of developing good reading strategies" (Martínez-Lage & Herren, 1998, p. 146-147). In line with Rouhi and Mohebbi (2012) and Lomicka (1998), "reading on a computer with glosses promotes a deeper level of textual comprehension." It can be concluded from the study that students can access a lot of opportunity when they read the assigned material on a computer screen. The application of the above mentioned technique is not only limited to comprehension, but it also abets the students in their vocabulary recognition. Conclusively, it can be summarized that glosses aid and enhance the vocabulary learning environment, thereby leading to more robust retention. Nevertheless, glossing has positive impacts upon learning process as it provides opportunity for learners to comprehend and infer the text easily. Moreover, it supports the learner's autonomy in more flexible environment. Nevertheless, the result of the study shows that retention of the vocabulary through hypertext glossing may be limit as there is no remarkable difference is observed in the learning vocabulary. Even though, if the learners are being given chances where they can interact and use these words to get familiar, no matter these learners would show considerate improvement in their vocabulary retention. In order to keep the pace in the modern digital world, it has become a significant need of every learner to be exposed with advanced technology rather than using the traditional methodology. Subsequently, glossing promotes reading comprehension and makes the process simple to deduce the meaning of the unknown words and proves beneficial in the retention of the vocabulary. Hence, electronic glossing creates a progressive learning atmosphere for the foreign language learners.

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