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The Comparative Impact of Pictorial Annotations and Morphological Instruction on Lexical Inferencing of Iranian Intermediate EFL Learners*

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Abstract

One of the main ways to acquire unfamiliar words is to make guesses about words meaning. This study investigates the comparative effects of pictorial annotations and morphological instructions on Iranian EFL learners lexical inferencing ability. Considering homogeneity issues using PET (Preliminary English Test), the researchers assigned the participants into two experimental and one control groups. All groups took a vocabulary self-report test before the treatment. The treatment contained 6-weeks long reading texts tasks with 40 underlined and boldfaced target words. Groups differed as one experimental group was taught mainly through the annotated pictures technique while the other experimental group through the aid of morphological analysis of unknown words and the control group receiving the traditional root vocabulary learning technique. The results of a one-way analysis of variances (ANOVA) between the self-report vocabulary test and a piloted researcher-made lexical-inferencing post-test revealed no significant difference in performances of morphological instruction group and control group. The results also indicated that the pictorial annotation group significantly outperformed the morphological group on inferring the unfamiliar lexical items. It can be concluded that the outcomes of this study may provide insights to EFL teachers as well as students on how to best approach guessing target words while reading a text.

Key words: lexical inferencing, morphological instruction, pictorial annotation, and vocabulary learning

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Introduction

It has been estimated that every educated native speaker has a recognition vocabulary 17000 words, this is a large bulk of vocabulary that cannot be taught in language classes (Richards, 2001). Inferencing as a psycholinguistic guessing game cannot only enhance students' vocabulary learning but also adds a psychological color to classroom learning as it makes learners more interested and involved in learning.

As EFL learners gradually move to intermediate level, they are challenged by the difficulty of reading texts caused by the presence of unfamiliar words. Because of their failure to infer the meaning of unknown words, readers feel disappointed. As Bensoussan and Laufer (1984, p.27) put it: lexical guessing is a very difficult task either because of the complexity of the text or because of the limitations of the reader, or both. Some words do not have clues in the text in which they appear; when there are clues for such words foreign language learners will not necessarily look for them; and when readers do look for these clues very often they cannot locate or understand them.

Great difficulty some learners have during the guessing the meaning of unfamiliar words, prevent them from handling reading texts. Hence, lexical inferencing is also essential for reading comprehension. When EFL learners encounter unfamiliar words in a text, they may not understand properly what the main purpose of the writer or speaker is. Lexical inferencing can be used as an effective strategy to get to grips with this problem.

Concerning the need felt for an efficient technique of teaching lexical inferencing, it is necessary to offer alternative teaching techniques with more potentiality to convey meaningful learning in EFL context. Therefore, it is a challenge for language teachers to equip the learners with techniques and strategies to boost up their abilities of lexical inferencing.

Review of Literature

As defined by Brown and Yule (1983), inferencing refers to the connections people make when they attempt to interpret texts. It is specifically associated with general knowledge of discourse in which

context may have an impact in facilitating comprehension. Accordingly, both inferencing and lexical inferencing are the outcomes of contextualization. Thus, EFL learners can probably make use of context in which target words are introduced to decipher their meanings correctly. Several studies (Nagy, 1988; Chern, 1993; Rott, 1999; Schmitt, 2004; Walters, 2004; Nassaji, 2006; Kanatlar & Peker, 2009) support the idea that guessing the meaning of unfamiliar words by using contextual clues can help learners with inadequate knowledge of new words.

Kolahi, Alikhademi, and Kehtari (2013) investigated the potential effect of contextual clues as a tool for guessing the meanings of unfamiliar words. The results indicated learners to make more correct inferences. In another research survey, Yanhui (2013) highlighted the role of lexical inferencing strategy in reading of an EFL population and the importance of these strategies in effective vocabulary acquisition. Likewise, Yin (2013) investigated the clue use of Chinese EFL learners in inferring the meaning of unknown word in reading.

Some researchers turned their attention to study a variety of strategies employed by readers to guess the meanings of unfamiliar words. One of which is annotation. According to Chen (2006), annotation is a note added by way of comment or explanation. Gloss and annotation, as a vocabulary learning aid, have been used interchangeably in L2 research and pedagogy (p.20). Folse and Chien (2003) stated that in many of the popular ESL dictionary programs, clicking on a word brings up an annotation with an illustration that shows the item or the meaning of the item (p.25).

One line of research on vocabulary development and reading comprehension clearly demonstrates the effects of pictorial glosses on vocabulary growth and understanding a text (Kost, Foss, & Lenzini, 1999, Park, 2000, Al-Seghayer, 2001; Yoshii, 2002, 2006; Brown, 2003; Yeh & Wang, 2003).

Various types of multimedia annotations such as textual, auditory, pictorial, and video based annotations were used in Folse and Chien s (2003) research to check whether they had an effect on second language (L2) vocabulary acquisition. One primary issue in a study by Faramarzi,

Elekaei and Koosha (2014) concerned the role of multiple types of multimedia annotations in reading comprehension, vocabulary growth and retention. The results vindicated that EFL learners who were provided with textual-pictorial annotations performed better than other learners with regard to reading comprehension, vocabulary acquisition and vocabulary retention. Similar studies reported the effectiveness of multimedia on reading and writing (Sakar & Ercetin, 2005; Akbulut, 2007; Yanguas, 2009; Huang, 2014).

Morphological awareness is among many other ways of enhancing lexical inferencing. According to Chang, Wagner, Muse and Chow (2005) morphological awareness is "the awareness of and access to the meaning and structure of morphemes" (the smallest units of meaning in a language) in relation to words. A substantial number of studies have looked into the effectiveness of morphological instruction from different perspectives. Sritulanon (2013) has examined the impact of teaching morphology such as, roots, prefixes and suffixes on EFL learners comprehension of vocabulary and reading passage. Low-proficient learners reading abilities were positively influenced by performing reading exercises which included learning morphological features of words and developing skills to read extensively.

A number of studies have investigated the relationship between morphological awareness and reading comprehension in general and vocabulary knowledge in particular (Ku & Anderson, 2003; Asgharzade, Rahimy, & Pour Kalhor, 2012; Kirby, Deacon, Bowers., Izenberg , Wade-Woolley & Parrila, 2012; Curinga, 2014).

A review of relevant literature indicated that, despite the importance of lexical inferencing, enough attention has not been paid to effective teaching. Moreover, there are different techniques for dealing with the meanings of unknown words and one of these techniques is guessing the meanings of unknown words through the morphological analysis which enables students to better understand unknown words encountered in the future. Learners can infer the meaning of unknown word if they analyze it morphologically and know the meaning of its prefixes and suffixes (White, Power & White, 1989).

So far, In spite of the significance of using pictorial annotations in learning and the crucial role that morphological teaching plays in meaningful learning, there has been a considerable gap in the the comparative impact of morphological instruction and pictorial annotation on learners lexical inferencing ability. Hence, there seems to be the capacity for taking advantage of these techniques in EFL context for developing learners lexical inferencing ability.

Following this line of investigation, the present study is aimed at giving learners and teachers some insights into the effectiveness of pictorial annotations and morphological instruction on lexical inferencing. Additionally, it determined if there is a significant difference between these two independent variables. With the same respects the following research questions and hypothesis were set.

1. Does pictorial annotation have any effect on lexical inferencing?
2. Does morphological instruction have any effect on lexical inferencing?
3. Is there any significant difference between the impact of pictorial annotations and morphological instruction on Iranian EFL learners' lexical inferencing?

H01. Pictorial annotation doesn t have any significant effect on Iranian intermediate EFL learners' lexical inferencing.

H02. Morphological instruction doesn t have any significant effect on Iranian intermediate EFL learners' lexical inferencing

H03.There is no significant difference between the impact of using pictorial annotations and morphological instruction on Iranian intermediate EFL learners' lexical inferencing.

Method

Participants

To accomplish the purpose of the study, 88 Iranian female and male intermediate participants were selected according to their scores on PET and all were with age range of 19-26. They were all from Jahad Daneshgahi Center in Karaj. Then, they were assigned into two experimental and one control groups.

Instruments

PET (Preliminarily English Test). To decrease the individual differences among the participants to the lowest amount and to make sure the close homogeneity of them, a version of the PET (Preliminarily English Test) was employed as a reliable and standard criterion to help the researcher choose a sample. Therefore, a PET was administered to 80 students studying English as a foreign language at Jahad Daneshgahi Center in Karaj of which a total of 66 students where finally selected.

A sample of PET included four sections: Reading and Writing, Listening and speaking. The PET consisted of 35 reading questions with one hour and thirty minutes time allocation in the form of multiple-choice, matching, and true-false items and seven writing tasks in the form of gap-filling and essays. The writing section consisted of 7 items. Regardless of that, about thirty minutes was allocated to the listening paper which consisted of 25 multiple-choice, gap-filling, and yes/no questions. Since the aim of the study was comparing the impact of the pictorial annotations and morphological instruction on EFL students' lexical inferencing, only the reading section of PET was employed.

Self-report vocabulary test. All the students in three groups took a self-report vocabulary pretest in order to make sure that there was no significant difference among the three groups regarding vocabulary knowledge before the treatment. They were asked to report if they were familiar with the underlined words in six passages. During the pretest, the participants were provided with a list of 40 difficult words selected by two experienced teachers at Jahad Daneshgahi Center in Karaj and were asked to put a check mark by each word they knew and write down a short definition or synonym in English or Farsi. They also marked the selected words as unknown if they didn t know the meaning of word. Only words selected to be unknown by more than half of the participants were chosen to be used in the study. In fact, the participants received a target word list without context in English From the marked unknown words, 7-8 words from each passage were chosen as the targeted words for this study.

Lexical inferencing posttest. A researcher made lexical inferening posttest with 40 items was piloted with 72 students with almost similar characteristics of the representative sample and after ensuring reliability and item functioning concerns, this test with reliability index of 0.927 Cronbach's alpha level was used as the posttest for the main study. The test was composed of 40 items each in the form of vocabulary multiple-choice questions. It comprised choices that present the suitable meaning and three distracters. The distracters included brief explanations of words like the unknown word or of the same part of speech.

Materials and procedure

Before the treatment started, the researchers gave a brief oral introduction to the all groups about the nature of the study and availability of pictorial glosses, morphological features and contextual clues.

In pictorial annotation experimental group, participants were exposed to pictorial annotation of unknown words during reading comprehension. To decrease the possibility of guessing the meaning of unknown words without the need to consult pictorial glosses, forty unfamiliar words judged to be the most difficult ones were underlined by two experienced teachers at the Jahad Daneshgahi Center in Karaj. They verified only the difficult words in the reading passages were of great worth to be annotated with pictures. Every single picture was selected to convey the real meaning of the unknown word as grasped in the reading context. The researcher also made a decision to select appropriate pictures for target words with consultation from other experts, experienced ESL instructors in language learning and teaching Center, and even non-participating ESL learners for confirmations. The pictures were assessed on the criteria of being graphically expressive of the word meanings. Required alterations and modifications were also conducted.

In the other experimental group, morphological features of the underlined target words in the texts were instructed by the researcher in the classroom. In other words, the participants received morphological analysis of unknown words including compound words, affixes (prefix, suffix) and root words. The supplementary examples were introduced besides morphological analysis of unknown words. Hence, it was possible

for the participants to read the texts while being exposed to the morphological features of novel words. The morphemes (roots and affixes) were retrieved from Active Skills for Reading: Book 3 (Anderson, 2007), each of the twelve units of the Oxford Smart Choice 3 textbook (Wilson, 2007) and other sources of teaching morphology prepared by the teacher as to best fit the students level.

Care was taken to make sure that the meaning of these words could not be inferred without either using pictorial annotations or learning morphological features of unknown words. The length of the selected texts was from about 220 to 230 words. The passages were modified slightly to make them more suitable to the participants proficiency level. The Flesch/Flesch˚Kincaid readability tests were used to eliminate the text difficulty. It consists of two parts: Flesch Reading Ease and Flesch˚ Kincaid Grade Level. In the present study, readability of the passages was measured using the Flesch reading ease formula. In this formula, the score between 60 and 70 is desirable (Roozkhoon & Rahmani Samani, 2013). Flesch Reading Ease scores of the texts used in this study ranged from 60 to 65.

The control group received none of these, but instead Taxonomy of Context Clues proposed by Bengeleil & Paribakht (2004) was presented to the students. At the end of each session the participants of experimental groups were presented with additional activities, supplementary exercises and vocabulary questions in the form of matching and fill in the blank exercises.

Two weeks later after finishing the treatment, all the participants in each class took a the piloted lexical inferencing post test that was designed so as to measure the changes, if any, in the performance of both experimental and control groups after receiving their own particular trainings. The posttest for lexical inferencing test including 40 items was piloted with a group of 30 participants. The Cronbach salpha reliability index for the items was .75. The results of Cronbach salpha if item deleted indicated that the exclusion of none of the items changed the reliability index of .75 to a great extent.

Data collection and analysis procedures

The data collected from the PET, self-report vocabulary test and lexical inferencing posttest were analyzed quantitatively to see the significant differences in the participants lexical inferencing ability before and after the treatment. Data analysis for this study was performed by employing Statistical Package for the Social Sciences (SPSS) Version 20.0.

The current study involved mainly quantitative analysis including descriptive statistics. Specifically, the participant s answers on the pretest and lexical inferencing posttest were objectively scored and analyzed. The statistical analyses conducted were as follow:

A one-way ANOVA was run to compare the three groups means on PET in order to homogenize them in terms of the general language proficiency level. A one-way ANOVA was also conducted to compare the three groups means on posttest in order to probe the three research questions. The results of post-hoc Scheffe tests was run to compare (1) the pictorial annotation group with the control group in order to probe the first research question, (2) the morphological instruction with the control group in order to probe the second research question, and (3) the pictorial annotation with the morphological instruction group in order to probe the third research question.

The Results of the Data Analysis

Testing normality assumption

The one-way analysis of variances (one-way ANOVA) was run to probe the research questions posed in this study. One-way ANOVA has two main assumptions; homogeneity of variances and normality. As displayed in Table 1 the ratios of skewness and kurtosis over their standard errors were lower than +/- 1.96. Thus it can be claimed that the present data enjoyed normal distribution.

Table 1 *Testing Normality Assumption*

Groups		N	Skewness			Kurtosis		
		Statistic	Statistic	Std. Error	Ratio	Statistic	Std. Error	Ratio
Morphology Instruction	PET	22	.352	.491	0.72	-.607	.953	0.64
	Posttest	22	.484	.491	0.99	-1.086	.953	1.14
Pictorial Annotation	PET	22	.564	.491	1.15	-.731	.953	0.77
	Posttest	22	.104	.491	0.21	-1.613	.953	1.69
Control	PET	22	.523	.491	1.07	-.464	.953	0.49
	Posttest	22	-.226	.491	-0.46	-.401	.953	0.42

The assumption of homogeneity of variances was discussed below when presenting the main results.

PET (Preliminarily English Test)

The PET (Preliminarily English Test) was administered to 80 participants. Based on the mean plus and minus one standard deviation, 66 students were selected to participate in the main study. The PET enjoyed a KR-21 reliability index of .84.

Table 2 Descriptive Statistics; PET

	N	Mean	Std. Deviation	Variance	KR-21
PET	80	18.25	4.99	24.92	.84

A one-way analysis of variance was run to compare the morphological instruction, pictorial annotation and control groups means on the PET test in order to check whether they enjoyed the same level of general language proficiency. Before discussing the results it should be

mentioned that the assumption of homogeneity of variances was successfully met (Levene's F (2, 63) = .251, P = .779) (Table 3).

Table 3 Levene's Test of Equality of Error Variances

F	df1	df2	Sig.
.251	2	63	.779

As displayed in Table 4 the morphological instruction (M = 18.86, SD = 5.18), pictorial annotation (M = 19.68, SD = 4.62) and control (M = 20.50, SD = 4.46) groups had almost the same means on the PET.

Table 4 Descriptive Statistics, PET Test by Groups

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Morphology Instruction	22	18.86	5.185	1.105	16.56	21.16
Pictorial Annotation	22	19.68	4.623	.986	17.63	21.73
Control	22	20.50	4.469	.953	18.52	22.48
Total	66	19.68	4.743	.584	18.52	20.85

Based on the results displayed in Table 5 (F (2, 63) = .648, P = .527, η^2= .011 representing a weak effect size) it can be concluded that there were not significant differences between the means of the three groups on the PET test. Thus it can be claimed that they were homogenous in terms of their general language proficiency prior to the main study.

Table 5 One-Way ANOVA, PET by Groups

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	29.455	2	14.727	.648	.527
Within Groups	1432.864	63	22.744		
Total	1462.318	65			

Testing research hypotheses and answering research questions

A one-way analysis of variance (ANOVA) was run to compare the morphological instruction, pictorial annotation and control groups mean scores on the posttest of lexical inferencing in order to probe the research questions posed in this study. Before discussing the results, it should be mentioned that the assumption of homogeneity of variances was met (Levene F (2, 63) = .567, P = .570) (Table 6).

Table 6 Levene's Test of Equality of Error Variances

F	df1	df2	Sig.
.567	2	63	.570

Based on the results displayed in Table 7 it can be claimed that pictorial annotation (M = 25.18, SD = 5.27) had the highest mean on the posttest of lexical inferencing. This was followed by the morphological instruction (M = 20.18, SD = 6.85), and control (M = 17.77, SD = 6.07) groups.

Table 7 Descriptive Statistics, Posttest of Lexical Inferencing by Groups

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Morphology Instruction	22	20.18	6.850	1.460	17.14	23.22
Pictorial Annotation	22	25.18	5.270	1.124	22.85	27.52
Control	22	17.77	6.070	1.294	15.08	20.46
Total	66	21.05	6.761	.832	19.38	22.71

Based on the results displayed in Table 4.18 (F (2, 63) = 8.45, P = .001, 2= .184 representing a large effect size) it can be concluded that there were significant differences between the means of the three groups on the posttest of lexical inferencing.

Table 8 One-Way ANOVA, Posttest of Lexical Inferencing by Groups

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	628.455	2	314.227	8.451	.001
Within Groups	2342.409	63	37.181		
Total	2970.864	65			

The post-hoc Scheffe tests were run in order to compare the groups two by two in order to probe the three research questions. Based on the results displayed in Table 9 it can be claimed that; A: The pictorial annotation group (M = 25.18) significantly outperformed the control group (M = 17.77) on the posttest of lexical inferencing (MD = 7.40, p = .001). Thus the first null-hypothesis was rejected. The pictorial annotation significantly enhanced the Iranian EFL learners knowledge on the lexical inferencing.

Table 9 *Multiple Comparisons; Posttest of Lexical Inferencing by Groups*

(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Morphology Instruction	Control	2.409	1.839	.429	-2.20	7.02
Pictorial Annotation	Morphology Instruction	5.000*	1.839	.030	.39	9.61
	Control	7.409*	1.839	.001	2.80	12.02

*. The mean difference is significant at the 0.05 level.

B: Although the morphological instruction group (M = 20.18) had a higher mean than the control group (M = 17.77), there was no any significant difference between the two groups means on the posttest of lexical inferencing (MD = 2.40, p = .429). Thus the second null-hypothesis was failed to be rejected. The morphological instruction didn t significantly enhance the Iranian EFL learners knowledge on the lexical inferencing, though it was significantly higher than the control group. With a mean comparison between morphological experimental group and control group, the researcher noticed mean differences but the mean differences were not significant enough to reject the second null hypothesis.

C: The pictorial annotation group (M = 25.18) significantly outperformed the morphological instruction group (M = 20.18) on the posttest of lexical inferencing (MD = 5, p = .030). Thus the third null-hypothesis was rejected. The pictorial annotation significantly enhanced the Iranian EFL learners knowledge on the lexical inferencing better than the morphological instruction technique.

Discussion

The present study was an attempt to investigate the comparative impact of the pictorial annotation and the morphological instruction on the lexical inferencing of EFL learners and to examine the research questions.

As such, the first research question explored the effectiveness of providing EFL learners with pictorial annotations on their lexical inferencing ability. The results revealed a superiority of the pictorial annotation group over the control group in the posttest of lexical inferencing. In the posttest of lexical inferencing, the pictorial annotation group produced more correct guesses than the control group while reading the passage. Therefore, lexical inferencing ability of learners with pictorial glosses could be enhanced more than the control group. Participants who had access to pictorial glosses were significantly better than the control group.

The findings of the present study strongly and positively support previous studies. For example, Underwood (1989) asserted that we "remember images better than words, hence we remember words better if they are strongly associated with images" (p. 19).

The second research question addressed the role of instructing morphological features on EFL learners lexical inferencing ability. Results indicated that there was no significant difference between the performance of learners in the morphological instruction group and control group in the posttest of lexical inferencing. Therefore, the second experimental group, who received morphological instruction, showed no significant advantage over the control group in lexical inferencing posttest.

In the literature, there is a large number of researches (Nagy & Anderson, 1984; Wysocki & Jenkins, 1987) which underscores utilization of morphological knowledge to derive the meanings of unknown words. Anglin (1993) discovered that the students could break down the complex words morphologically to elicit the meanings. This finding is also in line with the ones resulted from Morin (2003) research which suggested the strategy of using morphological knowledge to guess word meanings, and the necessity to heighten L2 learners morphological awareness The

abundance of research in this area has discovered the correlation between morphological awareness and vocabulary size (Nagy & Anderson, 1984; Singson, Mahony, & Mann, 2000; Sternberg, 1987; White, Power & White, 1989; Wysocki & Jenkins, 1987).

The third raised question explored a significant difference between pictorial annotation and teaching words morphological features regarding their effects on the promotion of lexical inferencing ability of the participants. The results of the study supported the hypothesis of that pictorial annotation had more positive effect on lexical inferencing ability since the students produced more correct guesses while reading the passage. The participants who had access to pictorial annotations rather than morphological features could decipher the meanings of unknown words more successfully. It seems that the effectiveness of picture-based gloss; especially when compared to the learners awareness of affixes and root forms of words is supported.

These results are similar to a large body of previous research on the efficacy of visual imagery and pictures. For example, Oxford and Crookall (1990) supported the positive contribution of visual imagery and stated that, most learners are capable of associating new information to concepts in memory by means of meaningful visual images, and that visual images make learning more efficient (p. 17) and the pictorial-verbal combination involves many parts of the brain, thus providing greater cognitive power (p.17). However, as pointed out by Yoshii (2006), since pictures are less accurate than written meanings and are exposed to interpretation, providing some language learners with picture cues may not be beneficial.

In another research, Brown (2003) designed a study to investigate the relationship between the level of directness of a pictorial aid and the learner s ability to guess a correct definition of an L2 French unfamiliar words met in a reading text. The results revealed a strong relationship between the level of directness of a pictorial aid and the extent to which a learner would employ the pictorial image to guess the meaning of the L2 novel words. Brown (2003) as cited in Hilmo (2006) indicated that the more the pictorial image directly reflects the L2 target item, the more the

learner will rely on the pictorial image to infer the meaning of the L2 target item (p.26).

The results of present study differed in certain respects from previous research. A growing body of research (Morin, 2003; Chang, et al., 2005; and Schiff & Calif, 2007) indicates that application of morphological cues for guessing meaning can enhance L2 learning. Nagy and Anderson (1984, as cited in Asgharzade et al., 2012) stated that 60% of the unfamiliar words a reader encounter in a text have meanings that can be predicted on the basis of their component parts. Therefore, those readers who have deeper understanding of word formation processes will be more successful in guessing the meaning of unknown words and understanding the passage (Nagy, Berninger, Abbott, & Vaughan, 2003).

Conclusion

In a nutshell, the above findings can be interpreted as evidence that providing learners with picture cues is superior to the explicit teaching of the morphology of lexical inferencing. Chen (2006) claimed that foreign language students can benefit from many types of visual material the still or flat picture can prove to be a rich resource in the foreign language classroom (p. 9)

Although the second experimental group which was explicitly instructed in the morphological features of target words had a higher mean than the control group, comparison of the posttest scores of the two groups revealed that the treatment group didn outperform the control group and the difference between their posttest scores was not statistically significant. Students in pictorial annotation group made the most number of lexical inferences. In fact, the frequency of making lexical inferences and the percentage of correct inferences for learners who received pictorial glosses were higher than others. Overall, students in pictorial annotation groups made the most number of correct lexical inferences. The results of this study suggested that incorporating pictures in lexical inferencing instruction brings about a significantly better performance in comparison to providing them with morphological features of novel words.

As a concluding remark, in spite the fact that morphological instruction on the basis of roots (or bases or stems) and affixes didn t have a strong effect on learners ability to tackle the meanings of unknown words, the morphological instruction is still beneficial and must be incorporated in reading classrooms (Nation, 2001, as cited in McCarten, 2007). Based on the Findings of this study, it is obvious that morphological instruction can be accompanied by various reading strategy instruction in order that EFL learners can perceive all aspects of knowledge to develop their reading abilities (Matsuoka and Hirsh, 2010).

Although the current study might provide a good indication of the efficiency of pictorial annotations in making educated inferences of novel words, several limitations are noted as a guide future research. First, the presence of some abstract words with low imagability might cause the meanings of words be less likely inferred from images. Although two experienced teachers rated the selected images as illustrating the intended meaning, some images were less than ideal.

The second limitation was the time constraint. The participants were instructed in pictorial annotations, morphological instruction and regular instruction of lexical inferencing only for six weeks. The quality of the instruction would have been enhanced if there had been more time.

Third, the research investigated the lexical inferencing of small group of EFL learners. Each group consisted of only 22 participants. If there were more learners participating in the study, the results could be more convincing. Next, the current study didn t investigate the participants attitudes towards the whole program, their familiarity with topics and their individual difference factors.

Despite the limitations of the study, noteworthy pedagogical implications can be made from the combined results. First, it can be concluded that outcomes of this study may have implications for foreign language teachers in deepening their understanding concerning the importance of the pictorial glosses and the effectiveness of visual imagery when the focus is guessing the meanings of target words.

Second, syllabus designers and materials developers are more inspired through the findings of this study to incorporate pictorial glosses more

than other annotation types into the textbooks and design more innovative lexical inferencing activities.

Third, it is hoped that the present research has provided some valuable insights into the ways intermediate Iranian learners of English infer the meaning of target words while reading. Providing learners with definitions of all unfamiliar words which they come across in reading or allowing them to consult dictionary for word meanings do not always seem appropriate. Glosses use is more desirable than dictionary use which is time-consuming and interrupts the reading process. It also reduces students excessive reliance on the teacher. The provision of pictorial annotations can increase motivation on the part of the learners, help them understand the reading texts and make more accurate inference for unfamiliar vocabularies.

Considering the findings of this study, several areas are worthy of further investigation. First, future studies should provide information concerning the imagability of pictorial glosses to better verify the effectiveness of the visual representation of the unfamiliar words. Second, the present study used non-fiction texts. A similar study can be carried out with texts of different genres to see whether the results would remain the same or not.

Third, the focus of the present study was exclusively on the effect of pictorial annotation types on inferencing of unknown words. So, further research can be conducted on the result of teaching other types of annotations such as textual, audio-based, or video-based annotations upon a learner s ability to infer the meaning of target words. Furthermore, in this study the whole procedure lasted about two months. It would be advantageous to lengthen the training time to a long term with a larger number of participants to practice more and make the findings more generelizable.

Finally, more thorough investigation of factors such as learner characteristics (e.g., gender, motivation, learning style, language background), pedagogical factors (prior knowledge, and content area reading), social and cultural factors that affect the reading process may be worthy of research. Also, it is implied that learners' familiarity with topics

can enhance reading comprehension and the number of correct inferences made for unfamiliar words.

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