

The Impact of Annotation Design in English Teaching Resources on Vocabulary Learning Efficiency

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ABSTRACT

This research is intended to explore an approach to solve the problems of incidental vocabulary learning during L2 extensive reading and at same time emphasize the importance of instructional intervention to the development of vocabulary knowledge for L2 learners. In this research, experiments including reading, translation and vocabulary tests are conducted to explore the differential effect of two modes of glossing on learner's reading comprehension, vocabulary pickup and its retention in learner's long-term memory. The results are the following: 1) the Single glossing group performs better than the Multiple-Choice glossing in comprehending English test; 2) there is no significance difference on vocabulary learning between the Single glossing group and the Multiple-Choice glossing group; 3) the Multiple-Choice group is credited with some lexical retention advantage over the Single group. Based on the results, several suggestions on annotation design in English education are made. Further studies can be done to explore ways to prevent, reduce or delay vocabulary attrition and strengthen the application of vocabulary attrition theory in foreign language teaching.

Keywords: *Glossing, Annotation design, Working memory, Incidental learning, Foreign Language Teaching.*

1. INTRODUCTION

Input enhancement is one of these instructive intervening approaches. Glossing, as one of Input Enhancement tools, is singled out as the independent variable of this experiment. The former studies in this domain seldom yield consensus results and many fields have been left unexplored.

Previous studies on annotation design fall into two directions: one is about the position of the gloss in the input text and the other, which is the focus of this experiment, is about the annotation mode of glossing. The past studies in this field are meager and less fruitful. They seldom yield consensus results and many fields have been left unexplored.

Motivated by this state of affairs, this research is conducted to

1) explore the differential effect of two modes of glossing on learner's reading comprehension, vocabulary pickup and its retention in learner's long-term memory;

2) experiment with a new unresearched annotating method. The two modes of glossing are Single glossing (S glossing) and Multiple-Choice glossing (MC glossing).

Glossing refers to add gloss for the new lexical items to the learning input and generally these items are followed each by one explanation (S glossing), which furnishes the contextual meaning of the correspondent item while if there are more than one explanations after the lexical item in the gloss and the access to its contextual meaning entails a reasoning and choice making, this type of glossing is the MC glossing. In the previous studies on glossing, two-itemed and four-itemed MC glossing were explored and as an original and ingenious design of this experiment, a three-itemed MC glossing is employed.

To be more specific, the purpose of this study is to explore the differential effect of MC glossing and S glossing on reading comprehension and subsequently on the vocabulary acquisition by Chinese non-English major college freshmen. By doing so, the studies on the establishment of a more practicable glossing typology

are expected to be initiated and the theoretical basis of input enhancement and glossing to be tested and enriched. Based on these harvests, the ultimate goal of this study targets at a well-informed series of convenient and efficient strategies for how to match glossing modes with different types of reading while teaching L2 vocabulary through reading [1].

2. LITERATURE REVIEW

With the continuous development of vocabulary development theory and technology, three vocabulary development paradigms have emerged one after another: “general corpus-driven”, “individual text-driven” and “specific word net-driven” [2].

Previous studies on the effect of MC glossing and S glossing have produced no definite results. In the experiments of Hulstijn’s (1992), three of them found that MC L2 glossing was superior to single L2 glossing, but in one other experiment S glossing turned out to be more effective than the MC glossing. According to Hulstijn, this is because learners were prone to making wrong meaning choices by using MC glossing [3]. In a later study by Watanabe, in which the number of meaning choices was been reduced from four in Hulstijn’s study to two, it was found that both S glossing and MC glossing were much more efficient in promoting learning than if there was no glossing at all but no significant difference between these two glossing modes appeared. And this finding was also confirmed in a delayed test two weeks later [4].

However, in the other studies, S glossing was found more effective than no glossing, but less so than MC glossing in promoting vocabulary learning both in an immediate test after the experiment and the delayed tests one week later [5]. Rott, Williams, and Cameron also found that compared with S glossing, MC glossing could produce immediate positive effect on lexical retention though this effect disappeared five weeks later [6].

The results of studies on glossing reviewed above show that S glossing and MC glossing are both superior to no glossing, but the studies to contrast the effects of these two glossing modes turn out no consensus results. The qualitative research about glossing discovered that, under the condition of MC glossing, readers were more likely to avail themselves of contextual cues to infer word meanings, while, with no glossing, readers tended to grasp the main ideas of reading materials and process new words in simple phonological terms or ignore them entirely [7]. The study of Rott showed that, on the one hand, readers with S glossing preferred the use of metacognitive strategies during reading while the reader with MC glossing were more in favor of using the gloss, context, and world knowledge synthetically to process the new word knowledge in a deeper extent; on the

other hand, nonetheless, the former group was advantaged to access the word meaning with a simple gloss, whereas the latter one was prone to making wrong meaning choices [8].

To sum up, the relevant empirical studies until now have shown: 1) the distinctive positive effect of both MC glossing and S glossing on vocabulary learning during reading over the non-glossed mode; 2) but not conclusively the superiority of MC glossing to the other as both have their own advantages and disadvantages; 3) the great tendency to make wrong meaning choices with MC glossing; and 4) the absence of study using three choices for MC glossing design.

3. THEORETICAL FRAMEWORK

3.1. Working Memory

In cognitive psychology, memory is viewed as the center of human intellectual functioning and omnipresent in the information processing model [9]. Its importance does not consist so much in the static role of storage as in the dynamic roles it plays in information processing. The working of memory is well illustrated in the following figure.

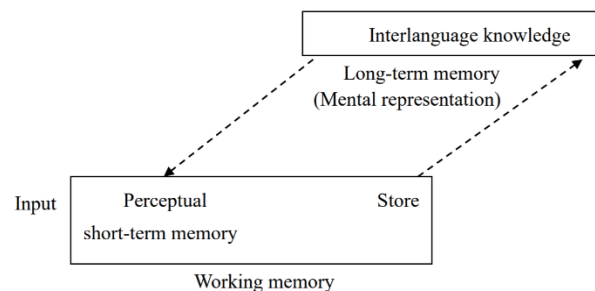


Figure 1 Memory in language processing (adapted from Cowan, 1995) [10]

This figure demonstrates the cognitive approach to the learning process and the interactive relationship among the three memories. In the process of learning, Working Memory (WM) assumes a dynamic role and it is this cognitive mechanism that leads input through Short-term Memory (STM) to its final locus, Long-term Memory (LTM).

Working Memory (WM) is derived from the traditional concept of short-term memory (STM). In contrast with the static role of STM for temporary storage of input, WM has a dynamic role. It serves as a workshop where the input interacts with the activated representation in LTM. The construct WM has three components: the supervisory attentional system (SAS), the phonological loop, and the visuo-spatial sketchpad. The SAS is the central executive of WM, which controls the information flow in input processing and activates or prevents activities under the guidance of schemata or

scripts in LTM [11]. And the phonological loop and visuo-spatial sketchpad are two slave components of SAS and they are respectively specialized for short term memorization of verbally coded information, and visual and spatial input.

3.2. The Depth of Processing Hypothesis

Based on these related cognitive theories, the Depth or Levels of Processing Hypothesis was first advanced by Craik and Lockhart in 1972 [12] and a later version by Craik and Tulving appeared in 1975 [13]. According to this hypothesis, the more cognitive energy a learner expands when manipulating and thinking a new word, the more likely they will be able to retrieve and use it later. In other words, a deeper level of mental processing tends to result in better retention of this knowledge in LTM. Hence, Elaboration Rehearsal, which involves mainly semantic processing and the establishment of more connections between the new knowledge and what has been stored in the LTM, can result in a deeper processing of the new intakes and in turn the better storage of this new information in the learner's LTM. And what's more, this improved storage of the newly acquired knowledge caused by a deeper elaborative rehearsal process can in return fuel more quality cues for its later retrieval when needed for use.

In this study, glossing mode is singled out as the independent variable of this experiment. The former studies in this domain seldom yield consensus results and many fields have been left unexplored. Informed by the cognitive theories on Working Memory and the Depth of Processing Hypothesis in particular, this study is to explore the differential effect of MC glossing and S glossing on reading comprehension and subsequently on the vocabulary acquisition by Chinese non-English major college freshmen. The major difference between S glossing and MC glossing is that the reading materials using the latter can impose choice on readers; that is to say, in order to access the meaning of new vocabulary while reading, readers have to decide on among the various definitions the exact meaning which explains the correct contextual sense of that new lexical item. According to the Depth of Processing Hypothesis, since this decision-making process involves a deeper processing of the new lexical item, MC glossing may result in better retention of this new vocabulary knowledge. Though, compared with MC glossing, S glossing is superior in word meaning access because it involves a more direct annotating mode, as an amendment for the S glossing, MC glossing combines the advantages of glossing and meaning inferring. On the one hand, by providing a cue for word meaning to readers, this approach may minimize the chances of incorrect meaning inferring caused by unfavorable contexts or the negative influence of some learner factors on word recognition; on the other hand, as well

explained in the Depth of Processing Hypothesis, because of this extra amount of processing while making meaning choices and the consequent better lexical retention, this glossing mode may also simultaneously ameliorate the vocabulary acquisition situation for language learners.

In short, though the Depth of Processing Hypothesis is well grounded on cognitive theories, as a hypothesis, it needs further researches to test its validity in different regions and among different populations. That constitutes a good theoretical reason to make this study. Accordingly, the MC gloss, the origination of which is well supported by the Depth of Processing Hypothesis, can also form a workable tool to further test this hypothesis. And the research questions, which target at the differential effect of S glossing and MC glossing, are expected to perform this task as well as other pedagogic ones.

4. RESEARCH METHODOLOGY

4.1. Research questions

This experiment aims at finding out empirically the differential effect of S glossing and MC glossing on English reading comprehension, vocabulary pickup and its retention by Chinese less proficient non-English major college students in an incidental learning environment. Three research questions are posed for being answered.

- 1) Given adequate and equal time limits for experimental tasks, which group performs better in translation test for reading comprehension, the S glossing group or the MC group?
- 2) Under the same condition with question 1, which group performs better in vocabulary tests to pick up more new words incidentally, the S glossing group or the MC group?
- 3) Given equal intervals after lexical encounter and the vocabulary tests thereafter, does the MC glossing team retain the newly acquired vocabulary knowledge more effectively than the S glossing team?

4.2. Subjects

63 experiment subjects are selected. They are freshmen and non-English majors. These 63 subjects are divided into two experimental groups: 31 qualified subjects left for the S glossing group and 32 ones for the MC glossing group.

Independent sample test for the College Entrance Examination scores of subjects in the two experimental teams is conducted to ensure there is no significant difference between the English proficiency of the subjects in the two groups.

4.3. Research Procedures

The whole experiment will last one week during which, each of the 63 students, are required to take one reading test, one translation test, two vocabulary tests, and a questionnaire survey respectively.

1) Reading task: a reading of 251 running words is selected from the students' textbook. 24 words in the original reading are substituted with pseudo-words. The only difference of S glossing paper and MC glossing paper lies in their different Chinese annotations for the pseudo-words which are the independent variable of this vocabulary learning experiment. In the former situation, pseudo-words are glossed right below the reading material on the same paper with each word attached by a Chinese annotation which is the correct contextual meaning of the annotated word in the reading material. In the latter MC glossing situation, the Chinese annotation is furnished in a multiple-choice mode, with three alternative annotations for each pseudo-word.

2) Translation test: A E-C translation task is used to test the subjects' reading comprehension. The choice of a translation rather than a multiple-choice reading comprehension task is because this arrangement can prevent subjects' ignorance of the nonsense words caused by a casual attitude while reading, for translation task can ensure a thorough reading of the experimental text and the adequate employment of vocabulary list by the participants.

3) Vocabulary tests: Following the translation task are two vocabulary tests, which are given continually at an interval of two days. The reason to choose a two-day interval is to avoid the effect of short-term memory. A testing table is designed on the basis of the Vocabulary Knowledge Scale (VKS) [14]. At the end of term, vocabulary test 3 has been conducted to check whether the students retain the newly acquired vocabulary knowledge.

4.4. Instrument

All the quantitative data have been processed with SPSS 19.0.

5. RESULTS AND DISCUSSION

5.1. S Glossing Group better than MC Glossing Group in Translation Test for Reading Comprehension

Table 1 shows that the S glossing group is significantly different from the MC glossing group on translation test score ($t(94) = 2.776, p < 0.05$). Inspections of the two group means indicate that the average translation test score of the S glossing group (58.33) is significantly higher than the score of the MC

glossing group (51.75). The difference between the means is 6.58 points on a 100-point test.

Table 1. Comparison of S glossing group and MC glossing group in translation test

Translation Test	S Glossing		MC Glossing		MD	t (94)
	M	SD	M	SD		
	58.33	9.27	51.75	13.57	6.58	2.776*

* $p < 0.05$

This result well conforms to the commonsense view that because of efficiency of word meaning access, the S gloss is superior to the MC gloss in facilitating meaning-seeking or content-centered L2 reading. The reason is easy to locate. As mentioned in the introductory section, word recognition is regarded as an essential skill for fluent readers. In other words, if a learner is able to retrieve word meaning more efficiently, his/her reading effect will be greatly augmented.

5.2. No Significant Difference between S Glossing Group and MC Glossing Group in Vocabulary Pickup

Table 2 shows that that there is no significant between the S glossing group and the MC glossing group on the score of vocabulary test 1.

Table 2. Comparison of S glossing group and MC glossing group in vocabulary test1

Vocabulary Test1	S Glossing		MC Glossing		MD	t (76)
	M	SD	M	SD		
	9.54	7.90	9.15	7.12	.39	.226*

* $p > 0.05$

Table 3 shows that that there is no significant between the S glossing group and the MC glossing group on the score of vocabulary test 2.

Table 3. Comparison of S glossing group and MC glossing group in vocabulary test2

Vocabulary Test2	S Glossing		MC Glossing		MD	t (76)
	M	SD	M	SD		
	8.77	4.65	9.38	4.03	-.62	-.525*

* $p > 0.05$

In spite of the possible problems of the experiment, compared with the S gloss, the current findings fuel no substantial and convincing evidence that can account for the superior facilitative effect on vocabulary learning caused by using MC gloss over using S gloss though MC group offers more mental processing and elaboration to new lexical knowledge because of a more complicated annotation mode. Compared with the S gloss, the current findings fuel no substantial and convincing evidence that can account for the superior

facilitative effect on vocabulary learning caused by using MC gloss over using S gloss though MC Glossing group offers more mental processing and elaboration to new lexical knowledge because of a more complicated annotation mode.

There are some suspicious factors which invite some consideration before the final conclusion of this paper is arrived at. These factors are from a variety of sources and may invalidate the experiment-informed inference that the MC gloss is of no superiority over the SC gloss in facilitating vocabulary learning and therefore entail further studies.

First, the sample is a convenient one. Though the subjects of this experiment are an important constituent portion of the whole population, they are of the minority group. A much more general conclusion needs inducing from a much larger and diverse sample including students of median and high proficiency.

Second, as mentioned in the section of questionnaire, these subjects are least motivated and examination-oriented for English learning activities.

As a result, their cooperation and effort for a task like those in this experiment are precarious and their attitude to it indifferent.

Although some efforts have been made to amend, such as the selection of interesting and short reading, the administration of some special treat for their effort in the experiment, their absence from the experiment, spelling mistakes and careless handwriting bespeak something unfavourable to the validity of their test and survey results. Finally, though the subjects are of the same B level for English, which is a result of university streaming test for non-English majors, their English proficiency is diverse in light of their scores in CEE, which is well acknowledged as credible. If English proficiency mediates the effect of using different annotation modes, the result of this experiment is questionable.

5.3. MC Glossing Group better than S Glossing Group in Vocabulary Test for Vocabulary Retention

To further explore the topic the experiment aims at, a new set of data are collected and analyzed by the SPSS. This datum is about the mistakes made by the subjects when they give answers in the vocabulary test 3, which is if the students have seen the tested word but forgotten its meaning. The reason to conduct this analysis is a byproduct of checking the test papers, during which the answer sheets of the S Glossing group seem to exhibit more errors by choosing the confounding choice. In order to clarify this discovery, two t-tests were conducted to analyze the errors found in this way. The following tables are the result from a t-test

for the errors that appear in the answer sheets of the vocabulary test3.

Table 4 shows that the S glossing group is significantly different from the MC glossing group on the score of errors in vocabulary test 3 ($t(70) = 5.038, p < 0.05$). Inspections of the two group means indicate that the average error score in vocabulary test3 of the S glossing group (1.51) is significantly higher than the score of the MC glossing group (.54). The difference between the means is .97 points on a 10-point test.

Table 4. Comparison of S glossing group and MC glossing group in vocabulary test3

Vocabulary Test3	S Glossing		MC Glossing		MD	t (70)
	M	SD	M	SD		
	1.51	.97	.54	.72		

* $p < 0.05$

The possible reason that accounts for this finding lies in the theory about elaboration in working memory and the Depth of Processing Hypothesis. According these theories, the quantity and quality of mental processing contribute to better retention of new vocabulary in the long-term memory.

Retention is the basic process of memory. It means that people form knowledge and experience after they have an impression of things and store them in the human brain [15]. The possible reason that accounts for this finding of retention lies in the theory about elaboration in working memory and the Depth of Processing Hypothesis. According these theories, the quantity and quality of mental processing contribute to better retention of new vocabulary in the long-term memory. That is why MC group errs less than the S group.

6. CONCLUSION

For Chinese less proficient non-English major college freshmen, this study has attained two important conclusions. First, the students using S glossing are endowed with an apparent comprehension superiority over the students using the MC glossing while reading in English; and second, compared with S glossing, MC glossing shows no definite advantage in facilitating the L2 learners' lexical development both in breadth and depth though, to a lesser extent, some results obtained from the final retention test confirm the advantage of the S gloss on lexical retention.

Pedagogic concern fuels momentum for researches, which in return guides teaching practice. As gloss is indispensable to FL learners of low proficiency, its efficiency should be stressed and its variants be well matched with learners' characteristics and task demands. I. S. P. Nation has categorized activities in a language course into four strands: 1) meaning-focused

input, 2) meaning-focused output; 3) language-focused learning; and 4) fluency development. In addition, teachers should give learners a chance to reflect after vocabulary learning [16]. It's always easier to teach deductively through direct presentations, but discovery learning is more meaningful and more permanent [17]. Following these principles, teachers will guide the students to use annotation effectively.

These four types interact with one another and facilitate learners' language development jointly. For Chinese college students of non-English major, meaning- focused input and language-focused learning are primary activities both in and out of class.

For non-English majors, the former refers mainly to extensive reading and the latter to grammar and vocabulary learning. As far as what has been learned from this study, S gloss is a better choice for extensive reading since it is a superior tool to the MC gloss in word meaning retrieval. In spite of the weak conclusion about the advantages of the MC gloss, this tool is recommended to use for language learning purpose in that its designing principles are well based on sound psycholinguistic theories and even tentative endeavors are rewarding both to teaching practice and research. This improvement of annotation design in English teaching resources helps the language learners to enhance their language proficiency [18]. The higher the level of foreign language, the stronger the intercultural communication ability [19]. Therefore, language learners will be a global citizen.

Further studies can be done to explore ways to prevent, reduce or delay vocabulary attrition and strengthen the application of vocabulary attrition theory in foreign language teaching, which can promote the development of vocabulary teaching method research [20], and provide perspective and inspiration for vocabulary acquisition research and foreign language teaching related fields.

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