Using Glosses for Vocabulary Assistance in Thai EFL Reading Classes: An Investigation of Preferences, Effective Types and Elements

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Abstract

This mixed-method research study investigates the most preferred type of glossing that is able to assist Thai EFL students to accurately interpret new English words and to explore the elements that will make glossing most effective. The participants were 80 undergraduate EFL students in a government university in Thailand. Quantitative data was collected through three vocabulary tests, while the qualitative data was collected from a cross-analysis of glossed items and interviews with carefully selected participants. Data analysis includes statistical analysis and thematic analysis. The results of the study indicate an incongruity between the students' preference of gloss types and the effectiveness of the glosses. Thai EFL students tend to use glosses that either have pictures or combine both text and pictures, while textual-only glosses are the least chosen. However, despite the low frequency of being chosen, textual-only gloss users were surprisingly successful at interpreting the unknown vocabulary in tests. The study further identifies the elements that make each gloss type more successful and suggests that Thai lecturers create glosses that bring out the best features of its type and combine both pictures and texts. Findings of the study provide baseline information for EFL reading lecturers in designing glosses that are suitable and efficient for their students. The findings also highlight the importance of seeking tools to assist students during the reading process.

1 Introduction

Thailand is an EFL country where Thai is the first language (L1) and the sole official and national language of the country, while English is considered a foreign language that is not used prevalently. Thai students encounter numerous difficulties in their English learning, particularly in their EFL reading classes. Many studies conducted in the Thai context claim that the root of the problems Thai students encounter in comprehending what is being read is their limited English vocabulary and the inability to interpret the meaning of new, unknown words. When encountering an unknown word, Thai students often use Google translation or look up the word in dictionaries. This technique slows or interrupts the flow of reading, and dictionary usage, on the other hand, is complex, requiring multiple skills such as decoding, choosing the correct definition, and so on (Nagy & Stahl, 2000). The interruption of the reading flow makes the total reading time significantly longer than it is supposed to be. One challenge facing Thai lecturers who teach EFL reading, therefore, is reducing the nearly exclusive reliance on dictionaries and empowering students to be able to understand the unknown words without interruption of the reading process. Numerous approaches have been adopted by EFL lecturers to help their students read faster, but, as Carney (2016) suggests, the decision of which strategy to adopt must be thought through carefully

as reading fast, or reading with no interruptions, does not ensure that the reader is able to comprehend the text. Research on strategy instructions shows that glossing is one of numerous approaches that has been adopted to assist EFL students to interpret the meanings of unknown words during their reading, and to minimize reading interruptions (e.g. Alharbi, 2018; Barabadi, Aftab, Panahi & Lu, 2018; Kazerouni & Rassaei, 2016; Kongtawee & Sappapan, 2018; Nagata, 1999; Taylor, 2014; Yoshii, 2014). Glossing is a well-known assistive technique that is commonly used to assist students' reading comprehension and minimize interruptions caused by looking up words in dictionaries. Glossing has been proven to be one of many ways to modify the textual input to make comprehension of the text easier (Ko, 2012). The integral aim of input modification is to boost the text's comprehensibility. In other words, the provision of brief explanations of words within the reading text boosts readers' vocabulary knowledge and, therefore, text comprehension.

The study presented in this article was conducted to investigate the use of glossing as an approach to assist students' vocabulary interpretation during their reading. A number of studies conducted in Thai and overseas contexts have proven the benefits of employing glossing to assist EFL learners (e.g. Alharbi, 2018; Kazerouni & Rassaei, 2016; Kongtawee & Sappapan, 2018; Taylor, 2014; Yoshii, 2014); however, no study has offered a conclusive answer for the type of gloss that is most effective for Thai students. This study, therefore, specifically investigates the type of glossing that is most preferred by Thai EFL learners and is most able to assist them in accurately interpreting new English lexicon and to explore the elements that will make glossing most effective.

2   Literature review

2.1   Definition of glossing

Glossing lists definitions, or explanations, of unknown words (Yoshii, 2014), which can be in either in the L1 or L2 of the reader (Nation, 2001). Glosses serve as an intervention implemented to enhance the textual input and, thus, improve the reading comprehension of EFL/ESL learners. Furthermore, glossing can be regarded as an explicit presentation of a word's meaning that serves as a direct method for handling unknown vocabulary. Even though a number of researchers advocate implicit vocabulary teaching for EFL learners and maintain that vocabulary should be learned and acquired incidentally, explicit teaching of vocabulary has proven to provide a faster and more direct track for EFL learners to acquire new vocabulary (Tang, 2012). A similar study of English vocabulary instruction in Hong Kong by Yeung, Ng, and King (2016) suggests that in environments where English is regarded as a foreign language and is decontextualized, the instruction related to new words for EFL learners, particularly those with low proficiency, needs to be more direct and giving detailed explanations of the target words to the learners has been proven to be more effective. The findings from these two studies suggest that the explicit instruction of vocabulary is suitable for learners who have limited exposure to authentic English daily communication.

The integral character of glossing is that it must be brief and integrated in the reading text, which can be "typically located in the side or bottom margins" (Lomicka, 1998, 41). The location of the gloss makes it easier to use than the dictionary, while supplying the definitions, or explanations, in the text being read is believed to minimize students looking up word meanings in a dictionary, thus reducing reading interruptions (Nagata, 1999). Glossing gives the students more control of the text, as they can move back and forth between the unknown words and glosses, and, thus, enables them to read autonomously (Ko, 2012). Glossing can be regarded as during-reading vocabulary assistance. A study by Alessi and Dwyer (2008) uses hypertext glosses as during-reading vocabulary assistance. Their contrast of During- and Pre- Reading vocabulary assistance indicates

that the during-reading technique has more benefits for intermediate readers as it tailors and contextualizes the meaning of words and maximizes overall efficiency significantly. Plus, the students prefer to use it more than pre-reading techniques. Although the during-reading technique seems to make total reading time longer, if both time for the pre-reading activity and actual reading are combined, the pre-reading assistance significantly increases the time, thus lowering overall efficiency. Alharbi (2018) elaborates on the viability of textual glosses in enhancing EFL learners' reading comprehension. He points out the fact that the provision of a gloss just after the reading texts enables learners to understand texts in a more easy and timely manner. Therefore, reading will then be less interrupted and time is saved by not having to search for unknown words in a dictionary. However, the current study did not investigate the location of the gloss relative to main text nor the timing of the glossing i.e. pre- or during- reading. The study specifically investigated the type of glossing. Types of glossing are elaborated in the sections below.

2.2   Types of glosses

Glosses can be categorized into three groups: Textual-only, Picture-only, and Picto-Textual.

2.2.1   Textual-only

Textual glosses can be in the first (L1) language, the second (L2) language, or a mix of both. The effectiveness of L1 and L2 glosses have been compared in various contexts, but the conclusion of which language gloss is more effective is still controversial. The findings of a study by Taylor (2014) supports the benefits L1 glosses, as it claims that L1 glossing is "amenable" to the different learning styles of learners as glossing in their L1 allows the learners to have more control; they can choose to pay attention to a particular glossed item and can control "the amount of attention allocated to the input" (p.376). An earlier study by Ko (2012) stipulates that items that are glossed in L1 are more suitable for low-proficiency learners as they can process the meaning of the unknown words very quickly. Similarly, Kazerouni and Rassaei (2016) compared the effects of L1 and L2 glosses on L2 vocabulary retention in Iranian learners and found that L1 glossing was more effective than L2 glossing for L2 vocabulary learning. Although the study recommend the integration of L1 glosses in the English reading texts, the study does not explain what makes L1 glosses more beneficial to the learners than L2 glosses. An early study by Miyasako (2002), on the other hand, suggests the advantages of L2 glosses over L1 glosses. Results of the study showed that students who were given L2 glosses outperform those provided with L1 glosses. However, the better performance was shown only on the immediate post-test; the results of the study did not indicate the effectiveness of L2 glosses on long-term vocabulary retention or learning. Like Ko (2012), Miyasako (2002) seems to suggest that L2 glosses can be more beneficial only for higher-proficiency learners. Interestingly, results of a study by Yoshii (2006) did not show any significant differences between L1 and L2 glosses and, therefore, could not conclude whether L1 or L2 glosses were more beneficial. According to Ko (2012), L2 glosses are more beneficial to learners than L1 glosses if they are highly-proficient learners. Barabadi, Aftab, Panahi and Lu (2018) explained that L1 glosses are particularly useful for learners who have limited proficiency in the target language, as it is too hard for them to comprehend items that are glossed in the L2. From all the aforementioned studies it can be concluded that L1 glosses suit the low-proficiency learners while L2 glosses are more beneficial only for higher-proficiency learners.

2.2.2   Picture-only

Pictorial glosses, also referred to as visual glosses in this paper, use visual images as glosses. Pictures and photographs that match unknown words offer visuals that language learners can use to decipher the meaning of new words (Sibold, 2011). When there are no visuals present in the

denotations the learners are left with the text alone, leaving them to decipher the meaning simply through words, which, as texts become more complex, may be more confusing. The positive effects of pictures on reading comprehension in a foreign language has been claimed by a number of studies. Omaggio's (1979) study was one of the first studies on the effect of three types of glosses. Results of the study indicated that the pictures served as a measure that assisted leaners to recognize and recall the word's meaning in a second language. A later study by Terrell (1986) strongly supported the visual representations as the most effective way to facilitate learners in comprehending a foreign language text because, as Terrell explained, the picture are the analog representation of information which gives a direct and concrete map onto the mind of learners. Lomicka's study in 1998 highlighted the quality of pictures in reducing learners' translating the texts while reading. The study explained that the learners do not need to translate the text because they associated the meaning of the words with the pictures provided. In line with Terrell (1986) and Lomicka (1998), Carpenter and Olson (2012) pointed that that as pictures can be categorized faster than words, they can effectively help readers to interpret the meaning of a new unknown word in ways that text alone cannot do. With all these qualities, it is not surprised to see that pictures have been employed as a means of vocabulary instruction in foreign language education.

2.2.3 Picto-textual

The picto-textual type is theoretically based on the Dual Coding theory (DCT), which is a theory of recognition proposed by a psychologist Allan Paivio of the University of Western Ontario (1925–2016). Paivio (1986) states that "human cognition" (p.53) is unique as it can simultaneously process non-verbal and verbal objects, giving equal weight to verbal and non-verbal processing. DCT embraces the use of imagery as a memory aid, which accelerates human's acquisition of knowledge. The theory explains that language, i.e. the verbal form alone, is complicated, but that it can become more explicit with the aid of imagery or non-verbal elements (Paivio, 2006). This highlights the "dual functionality" of human language systems in that they are comprised of two cognitive subsystems: one serves as a symbolic function dealing directly with imagery/visual elements (i.e. nonverbal objects/events), and the other with verbal elements or linguistic input and output. The theory claims that the dual use of verbal and non-verbal forms is better for human recall/recognition than the sole use of either one.

The benefits of both modes (text and picture) are in the belief that the combination will produce better results than the sole use of one single mode. The advantage of the picto-textual glosses for vocabulary learning has been confirmed by a number of studies. In an early study by Chun and Plass in 1996, for example, the participants who utilized the combined text-and-picture glosses outperformed those who utilized the text-only or the picture-only glosses. The study by Kost, Foss, and Lenzini (1999) indicated the combination of picture and text as the most effective gloss type as the users of this type got better reading test scores than those who used either text- or picture-only glosses. A more recent study by Vahedi, Ghonsooly and Pishghadam (2016) attempted to investigate learners' vocabulary acquisition under two types of gloss. The results indicated that the combination of text and visuals had a larger, positive effect on learners' vocabulary acquisition than text-only gloss. Interestingly the study further suggested that training sessions on the use of glosses should be provided to students so that they acquire skills to select the correct type of glosses and use them to interpret new unknown lexis.

Attempts to compare the effectiveness of three types of glosses have brought mixed results; there are no conclusive findings to point out which gloss type is most effective. Some studies suggest the advantage of one single mode gloss over the others while many other studies confirm the benefit of the combination of both texts and pictures (Chun & Plass, 1996; Kazerouni &Rassaei, 2016; Terrell, 1986; Vahedi, Ghonsooly, & Pishghadam, 2016). It can be stated that the effectiveness of glosses

might be context-dependent; that is one gloss type may produce better results in one context but not in another. In Thailand in particular, there is no report of studies attempting to investigate glossing in EFL reading classes. There is no study specifically investigating the preference of Thai EFL students as well as the elements that will make glossing most effective in Thailand's EFL context either. This is the gap in the existing literature that serves to be addressed by the current study.

3 Research questions

To address the gap identified in the existing literature, the current study, therefore, sought to specifically answer the following research questions:

1. Which gloss type do Thai EFL learners tend to use?
2. Which gloss type is most likely to assist Thai EFL learners to accurately interpret vocabulary?
3. Which elements make glossing most effective?

4 Methodology

4.1 Research design

The current study employed the mixed-method approach. The approach involves an integration of quantitative and qualitative data, thus blending the best of both paradigms – QUANTI and QUALI (Guba & Lincoln, 2005). The mixed-method approach has become the "third paradigm choice that often provides the most informative, complete, balanced, and useful research result[s]" (Johnson, Onwuegbuzie, & Turner, 2007, p.129). From the variety of mixed-methods models, Creswell and Plano-Clark's (2011) *Sequential Explanatory Design* was adopted for this study. The study started with the collection of quantitative data collected from three vocabulary tests which was followed by the collection of qualitative data collected from interviews and cross-analysis of purposefully selected glossed items. The qualitative data was used to examine the results from the quantitative test scores in more detail. The combination of quantitative and qualitative methodologies is intended to offset the weaknesses of each method and to provide "multiple viewpoints, perspectives, positions, and standpoints" (Johnson et al., 2007, p.113).

4.2 Participants

The participants were 80 Thai undergraduate students taking an intermediate English reading class at a university in Thailand. Thirty-two of them were male and 48 were female. They were in Years Two or Three and aged between 19 to 22 years. All of them were non-English majors; the majority of them were majoring in Accounting, Marketing, and Political Sciences. Based on available documentation on their university's English Proficiency Test (EPT), the students in this study had a below average score.

4.3 Research instruments

4.3.1 Vocabulary tests
The participants took three vocabulary tests. The tests were designed by the researcher to collect data to assess Thai students' preference for gloss type and the most effective gloss type for Thai EFL students. Each test comprised of 10 vocabulary items from three reading passages. The passage for Test 1 was about digital banking, for Test 2 it was about freebie marketing and the oil business for Test 3. The passages were selected purposively: they were passages that have been used for reading exercises for other groups of students in the previous semester and the average of reading comprehension test score of that batch of students was low i.e. 29 (the reading comprehension in the

previous semester had 100 items and was measured by recall, sentence completion, and multiple-choice items). In addition, the topic of each passage was not familiar to the participants in order to minimize the participants' prior knowledge on which they could draw.

Each item in the tests comprised of one of the three types of glosses: picture-only, text-only and picture-and-text glosses. Glosses are only included in the vocabulary test and not within passage. The pictures or images that were used as the glosses were retrieved from the Internet. The tests were paper-based. Before the tests were carried out, the researcher assessed the content validity of the tests using Index of Item Objective Congruence (IOC). The tests were checked by three experts in the field of teaching English as a Foreign Language. Items that had scores lower than 0.5 were revised while those that had scores higher than or equal to 0.5 were reserved. After the IOC, a pilot trial of the tests were administered to 10 students from the participants' university. This pilot trial aimed to identify possible deficits existing in the tests and procedures, which can be addressed and resolved before the actual study took place (Cohen, Manion, & Morrison, 2007). The pilot students wrote comments on the test drafts and the tests were revised accordingly. Finally the three tests were administered to the participants; they were asked to choose the gloss that helped them to understand the given word and write (in Thai) their interpretation of the given words.

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1. Brick-and-mortar banks
1. ขีด ✓ หน้าช่องที่ทำทำให้คุณเข้าใจคำนิยามของคำศัพท์นี้มากที่สุด
2. เมื่อดูจากตัวช่วยที่คุณเลือกในข้อ 1 แล้ว คุณคิดว่าคำศัพท์ในข้อนี้ ใช้ภาษาไทยว่าอย่างไร (จงเขียนสั้นๆ) _____
❑   ❑   ❑

A bank that customers can visit

to conduct business

Fig.1.Sample Test Item

4.3.2 Interviews

After the administration of the tests, interviews of the participants were conducted. The interviews were semi-structured and included questions that sought to identify elements in the glossed items that lead to an accurate interpretation of the unknown words as well as elements that appeal for selection. In addition, qualitative data from the interviews can ensure triangulation of the data. The use of multiple-methods in the data collection enhances the credibility of a research project and leads to a comprehensive understanding of a phenomena (Patton, 1999). In the current study, ten students out of eighty were selected to participate the interviews. The selection was based on the students' responses in the tests, i.e. five students who got the top five highest total scores from three tests and another five students who got the lowest total scores. The students with the highest scores were expected to give information on elements of the glossed items that lead to an accurate interpretation of the unknown words, while those with the lowest scores gave information that could explain why the glosses they selected failed to help them interpret the unknown lexis.

4.3.3 Cross-analysis of glossed items

Glossed items of all three types were selected for cross-examination. The selection was purposeful and categorized items into 4 groups by using the numbers 100, 75, 50, and 5 as the pragmatic cut-off points. Glossed items were grouped as follows: 1) Frequently-chosen glosses (for

glosses chosen over 75% of the time); 2) Least-chosen glosses (for glosses chosen less than 5% of the time); 3) Successful glosses (glosses that yielded 100% correct answers); and 4) Unsuccessful glosses (for glosses that yielded less than 50% correct answers).

5   Data collection and analysis

The tests were aimed at identifying the gloss type that was most preferred and displayed the potential to help Thai EFL students correctly interpret unknown words. The first test was administered to the participants during the third week of the 1st semester of the Academic Year 2018. The participants were given 30 minutes to complete the test. The second and the third tests were administered during the 4th and 5th week of the same semester. The participants were given 30 minutes to complete each test.   One week after the administration of the third test, the qualitative data was collected through interviews. One interview of around 30 minutes was conducted with each of the selected student participants. All interviews were recorded and transcribed later, with the permission of the students.

The data collected from test scores was analyzed by the percentage method. The average percentage of the student's selection of glosses, as well as correct answers on the tests, were used as the indicators of the students' preferences and of the effectiveness of the gloss type, respectively. To answer Research Question 3, glossed items that fall into one of the four categories listed in Cross-analysis of Glossed Items section were examined in depth. After the statistical analysis of the test scores were done, ten students were selected for interviews. The interviews were done in Thai. The transcript was first produced in Thai and then translated into English by the researcher. It was ensured that the transcripts captured the primary messages of the participants' responses, with the removal of unclear sounds or grammatical mistakes. The audio recordings and the transcripts were double-checked. The analysis of the data from the interviews were based upon the Grounded Theory (GT). Geertz (1973) defined Grounded Theory as "the systematic discovery of theory from the data of social research" (p.24). In contrast to a traditional model of research, where researchers choose the existing theory or construct a hypothesis and collect data in order to prove whether the theory or the hypothesis does or does not apply to the phenomena being investigated, a study using grounded theory seeks to discover a theory. Glaser and Strauss (1967) remarks that the theory that emerges and is grounded in the empirical data will be able to explain "the situation being researched and work when put into use" (p.3) better than the theory chosen before a study begins. A study using grounded theory begins with research questions, collect data and use coding procedures to derive a theory or principles to understand the phenomena being studied (Orlikowski, 1993).

The Grounded Theory (GT) can be the approach either for the data collection or for the thematic analysis (Corbin & Strauss, 1998). The current study adopted the grounded approach in the coding procedures during the data analysis. The researcher used Holton's (2010) substantive coding procedures, which involve line-by-line open coding of data and constant comparison of data. The constant comparison was done to ensure the data support emerging categories, and proceeded until a core category began to emerge. Core categories were then selected and theoretically connected to other relevant categories; this step formulates the basis of the emerging theory (Holton, 2010). Once that relevant categories were saturated, the theoretical saturation occurred. It is at this stage that the "theoretical completeness is achieved for the particular research" (Glaser, 2001, p.192).

6   Findings and discussions

6.1   Quantitative results

The amount of selection per each glossed item from all three tests was displayed in Table 1. Table 1 shows that almost the same number of Thai learners used Picture-only and Picture-and-Text glosses to interpret the unknown vocabulary in Tests 1 and 2 (42.4% and 41.5% in Test 1, and 36.7

and 35.9 in Test 2). Only six items were used 75% of the time, or more, which included Items 1(1), 2(1) 3(1) 10(1), 4(3), and 5(3). The first number indicate Item no.; the number in the parenthesis indicates the Test e.g. 5(1) is Item 5 from Test 1. Note that the first three items are picture-only glosses and the others are picture-and-text glosses. Surprisingly, on three tests, only approximately 10% of the participants used Textual-only glosses to assist their interpretation of the vocabulary. All seven items that were used less than 5% of the time were textual-only glosses (Item 4 from Test 1; Items 2, 7, and 9 from Test 2; and Items 1, 4, and 9 from Test 3).

Table 1. Test results: Amount of selection per gloss type

Test	Gloss Types	% of Participants Selective Respective Gloss (N = 80)										Selecting Mean%
		Gloss Items										
		1	2	3	4	5	6	7	8	9	10	
Test 1	Picture -only	77	79	80	33	15	15	30	43	43	9	42.4
	Textual -only	10	6	9	0	9	21	16	10	21	8	11.0
	Picture-and-Text	10	13	10	44	71	63	49	43	31	81	41.5
Test 2	Picture -only	41	63	36	26	30	28	58	30	35	20	36.7
	Textual-only	9	5	13	20	20	18	5	19	3	38	15.0
	Picture-and-Text	33	21	35	30	40	41	36	35	53	35	35.9
Test 3	Picture -only	54	45	19	10	10	30	35	38	35	23	29.9
	Textual -only	0	6	15	0	8	15	28	18	0	24	11.4
	Picture-and-Text	41	34	21	86	79	40	15	25	59	40	44.0

Surprisingly, Table 1 indicates no participants selected items 4(1), 1(3), 4(3), and 9(3). All the items mentioned in this section were then studied in-depth. As seen in table 1, there is no clear cut preference of the Thai learners' between the picture-only (selecting means %: 42.4, 36.7 and 29.9 in Tests 1, 2 and 3 respectively) and the mixture of both picture and text glosses (selecting means %: 41.5, 35.9 and 44.0 in Tests 1, 2 and 3 respectively). However, it is clear that the textual-only gloss is the least preferred type among these Thai EFL learners (selecting means %: 11.0, 15.0 and 11.4 in Tests 1, 2 and 3 respectively).

Table 2 illustrates results of vocabulary tests from all three tests. As seen in Table 2, users of the textual-only glosses on all three tests scored a higher average than the other two types of glosses on the same tests. Eight items yielded 100% correct answers and all of them were textual-only glosses (Items 1, 5, 8 and 10 from Test 1 and Items 3, 6, 7 and 9 from Test 2). Therefore, they were selected for in-depth study in order to identify the common elements of the type that enabled the users to correctly interpret the meaning of the unknown vocabulary.

Table 2. Vocabulary test results: Correct answers by each gloss type

Test	Gloss Types	% of Accurate Answers (N = 80)										Accuracy
		Gloss Items										Mean %
		1	2	3	4	5	6	7	8	9	10	
Test 1	Picture - only	81	67	78	62	17	50	83	94	53	86	67.1
	Textual - only	*100*	60	86	0 *	*100*	53	92	*100*	53	*100*	74.4
	Picture-and-Text	25	80	75	66	32	56	82	91	40	95	64.2
Test 2	Picture - only	61	68	62	76	71	45	63	67	79	25	61.7
	Textual - only	71	50	*100*	94	81	*100*	*100*	93	*100*	70	85.9
	Picture-and-Text	15	71	43	25	38	67	59	36	57	36	44.7
Test 3	Picture - only	65	44	40	0	0	88	75	87	64	94	55.7
	Textual - only	0 *	60	33	0*	50	42	86	36	0 *	89	56.6
	Picture-and-Text	61	48	12	26	78	69	17	35	21	31	39.8

Notes: As the textual-only glosses in Item 4 of Test 1 and Items 1, 4 and 9 of Test 3 were not selected by any participants, yielding 0% correct answers, they were, therefore, not included in the calculation of the mean percentage of that type of gloss.

Gloss types that yielded a mean percentage of less than 50% correct answers were also studied in depth. Across the examination of all the gloss items in all three tests, there were 24 items that were chosen for further study. Interestingly, the picture-only glosses in Items 4 and 5 of Test 3 displayed 0% correct answers, which means that out of all the participants who selected this type of gloss, not one of them could correctly interpret the meaning of the vocabulary items. Table 2 further indicates that while two picture-only glosses in Test 3 produced 0% correct responses from students, only three of the textual-gloss items in Test 3 (items 3. 6 and 8) generated less than 50% correct responses except in Test 3. Table 3 presents all of the items that were selected for in-depth study.

Table 3. Summary of items to be studied in-depth

Study Category	Items (Test)	Gloss Type
Frequently-chosen *(75% up)*	1(1), 2(1) 3(1) 10(1), 4(3), 5(3)	Picture-only Picture-and-text
Least chosen *(Less than 5%)*	4(1). 2(2), 7(2), 9(2) 1(3), 4(3), 9(3)	*Text-only*
Successful gloss *(100% correct)*	1(1), 5(1), 8(1), 10(1), 3(2), 6(2), 7(2) and 9(2)	*Text-only*
Unsuccessful gloss *(Less than 50% correct)*	5(1), 6(2), 10(2), 2(3), 3(3), 4(3), 5(3) 3(3), 6(3), 8(3)	Picture-only Text-only
	1(1), 5(1), 9(1), 1(2), 3(2), 4(2), 5(2), 8(2), 10(2), 2(3), 3(3), 4(3), 7(3), 8(3), 9(3), 10(3)	Picture-and-text

Notes: The first number indicates Item no.; the number in the parenthesis indicates the Test e.g. 5(1) is Item 5 from Test 1.

Interestingly, as shown in Table 3, the text-only glosses, which were the least popular gloss type, turned out to be the most promising gloss type: all the eight of the items that yielded 100% correct answers were textual-only. In contrast, the picture-and-text glosses, which were the type of glosses that in numerous studies were claimed to be the most effective, and thus the most recommended, turned out to be the gloss type that is most likely to lead to misinterpretation in this study. As can be seen in Table 3, of the twenty six glosses that are regarded as unsuccessful, more than half of them were picture-and-text glosses. Thus, the findings of this study do not align with several studies that claim that the combination of both modes (texts and images) will produce better results than the sole use of one single mode (Chun & Plass, 1996; Kazerouni &Rassaei, 2016; Terrell, 1986; Vahedi, Ghonsooly, & Pishghadam, 2016). An analysis of qualitative data from the interviews and the cross examination of glossed items sought to obtain an explanation of this phenomenon.

6.2   Qualitative results

Examples of glossed items that are selected for cross examination are displayed in Table 4.

Table 4. Sample of glossed items for cross-examination

Frequently-chosen items (75% up)	Least-chosen items (Less than 5%)	Successful items (100% correct)	Unsuccessful items (Less than 50% correct)
Picture-only **Brick-and-mortar banks** **Bank Teller** 	*Note: Only textual-only glossed items were chosen less than 5%* **Bank Teller** An employee of a bank who deals directly with customers. In some places, this employee is known as a cashier or customer representative **Competitor** In business, a company in the same industry or a similar industry which offers a similar product or service. **Obfuscation**	*Note: Only textual-only glossed items yield 100 % correction* **Brick and mortar bank** A bank that customers can visit to conduct business. **Teller Transactions** Transactions for which tellers assist customers **Digital Banking** Online/internet banking **Obfuscation** Making the message difficult to understand **Non-disposable items**	**Picture-only** **Teller Transactions** **Master Products** **Oil depletion** **Obfuscation**

Textual-only *No glossed items in this category were chosen more than 80%.* **Picture-and-text** **Online payment** **Renewable resources** 	The obscuring of the intended meaning of communication by making the message difficult to understand, usually with confusing and ambiguous language **Non-renewable resource** Nonrenewable resources include coal, oil, and natural gas. These fossil fuels took millions of years to form and we are using them up much faster than nature can replace them. Once the supply of coal, oil, and natural gas are depleted (used up), they are gone for good. **Reservoir** A natural or artificial place where water is collected and stored for use, especially water for supplying a community, irrigating land, furnishing power, etc.	not designed to throw away after use e.g. Non-disposable coffee cup **Grim** Worrying, hopeless	 **Textual-only** **Obfuscation** The obscuring of the intended meaning of communication by making the message difficult to understand, usually with confusing and ambiguous language **Reservoir** A natural or artificial place where water is collected and stored for use, especially water for supplying a community, irrigating land, furnishing power, etc. **Geologist** A scientist who studies the solid, liquid, and gaseous matter that constitutes the Earth and other terrestrial planets **Picture-and-text** **Brick-and-mortarbanks** **Corked Bottle Cap** **Obfuscation**

The first prominent feature of the successful type of glosses that can be easily observed from Table 4 is the length of the text that is used in the gloss. When compared to the unsuccessful textual-only glosses in Column 4 of the table, it is obvious that the texts that resulted in 100% correct interpretations were short and used simple language/vocabulary. One student who chose the textual-only glosses revealed in the interviews that:

> *I chose only textual glosses that were short and looked simple to me. I don't think I can understand lengthy texts.*

Another student described:

> *Glosses that provide lengthy [textual] explanation made me confused. I want to read something short and simple. Just a simple version of the tested vocabulary is enough.*

This finding signifies that textual glosses in L2 need to be user-friendly in both their physical appearance, as well as their level of language. It explains why textual glosses are, ironically, regarded as the least chosen gloss, or least popular among Thai students. As clearly seen in the second column of Table 4, all of the gloss items that were chosen less than 5% were text-based and lengthy. The length of the gloss makes it look "unfriendly" to the students and thus the students did not want to risk using it. In addition, if comparing the least chosen textual glosses with the successful textual glosses in Colum 3, it is obvious that what makes them different is the simplicity of the words used. In addition, the physical appearance of the textual glosses needs to look concise and simple. Interviews with the users who chose these textual-glossed items and correctly interpreted the meaning of the unknown words indicated that the textual gloss they chose contained the "right" keywords. One student elaborated about the idea of the "right keywords".

> *....the keywords that remind me of a past experience...For example,   the phase "...which tellers assist customers" in the glossed text reminded me of my own experience when I went to the bank for banking transactions.*

Another easy way to make textual glosses more efficient is by providing a synonym, or another simpler term, for the unknown word. As can be seen in Table 4, the tested word "grim" could be easily understood when replaced with the simpler terms "worrying" or "hopeless". Similarly, the students could more easily understand the term "Digital Banking" when seeing simpler, more familiar terms provided in the glossed text i.e. "online/internet banking". In contrast, a student who used the picture-only gloss for the term "teller transaction" said that:

> *When I saw the picture, I thought it was a check-in process at a hotel reception. To be honest, the bank teller [in the picture] just looks like a receptionist in a hotel.*

Another student who used the picture for the same term explained that:

> *I am not really sure what the picture is really about. You see there are two women doing   something at the counter.*

Fig.2. Picture used for picture-only gloss for " Teller Transaction" in Test 1
(Photo by Keith Brofsky, Getty Images)

Similarly, the glossed picture for the term "oil depletion" was incorrectly interpreted by a number of students.

Fig.3. Picture used for picture-only gloss for " Oil Depletion" in Test 2 (Crude Oil Barrels, 2015)

One student explained in the interview:

> *….the wavy arrow above the oil barrels reminded me of the wavy arrow of the stock price. So I thought the term in this picture must be something relevant to price or money.*

The student then wrote the meaning of "oil depletion" as "the reduction in oil price" as shown in Figure 4. This finding indicates the trap that a picture-only gloss may create.
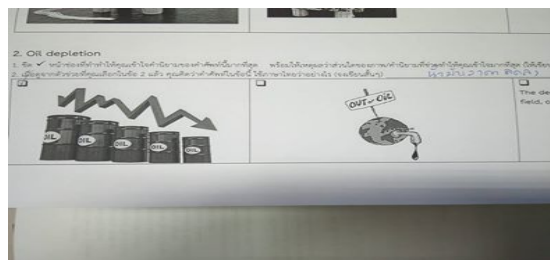
Fig.4. Sample student's wrong interpretation of "Oil Depletion" using picture-only gloss

Interestingly, the juxtaposition of text with a picture is found in the current study to be a feature that is able to complement the effectiveness of the gloss. A student suggested the following in their interview.

> *For example the term "master product" can be placed side by side with the term "consumable products". [.....] If "renewable products" and "non-renewable products" are placed together I can then easily make a comparison and contrast.*

The student believed that if certain words, or concepts, are grouped or paired together they will complement each other's meaning. This suggestion resonates with the importance of the gloss's location, which, according to Ko (2012), can aid the reader in becoming an autonomous reader so that they have more control of the text. Another important feature was reported by the students that can harm or benefit the use of pictures as glosses is the quality of the picture. For example, a student reported that:

> *Some pictures are poorly printed and some details of the pictures were unclear.*

Another student pointed out that the picture size was also significant:

> *I feel like many of the pictures that were used as glosses on the tests were too small to be comprehensible to me.*

In addition to the image size, the font size of the texts that accompanied the image in picture-and-text glosses was no less significant. A student explained in the interviews that:

> *Some of the picture-and-text glosses were obscure. I could not read the text that was provided with the pictures.*

Another student gave a comment on the picture-and-text gloss for the term "Obfuscation" as shown in Figure 5, stating:

> *I think even if you have some textual explanation next to the picture, that gloss is still not helpful to me. The font of the text is too small and the picture is too blurry!*

Fig.5. Sample Picture-and-Text Gloss from Test 3 (An image by Bacall, n.d.)

The above response from the student offers an explanation as to why the picture-and-text glosses do not work well and also suggests the elements that need to exist in the picture and the text, namely, the clarity of the pictures and the text fonts.

7   Pedagogical implications

7.1   *Incongruity between gloss selection and correct interpretation*

Over all, the results of the study indicate the incongruity between the students' preferences of gloss types and the effectiveness of the glosses. Thai EFL students tend to use glosses that either have pictures or combine both texts and pictures, while textual-only glosses were chosen significantly less, as an aid to interpret unknown vocabulary. However, despite the low frequency of being chosen, textual-only gloss users were surprisingly successful at interpreting the unknown vocabularies on tests, and their ability to interpret new words better than students using other types of glosses shows some promising results. It can be stated that even though it turned out that the textual-gloss was not the most favored among this group of Thai EFL learners, this type of gloss has more potential to produce the correct interpretation of unknown words than the other two types of glosses. The in-depth examination of glossed items indicates that textual explanations are likely to contain words or phrases that match the users' prior knowledge, which they can draw upon. Textual glosses, as provided in the current study, contain synonyms or offer other words or phrases, which are simpler and more familiar to Thai students. Furthermore, textual explanations do not require further visual interpretation, which may be risky for correct interpretation; pictures may lead to different interpretations by different users. Furthermore, it is difficult to source a good picture that encapsulates the meaning of the word. This is in line with the findings of Tang (2012) and Yeung et al. (2016), which claim that explicit teaching and direct explanation of vocabulary is more suitable for EFL learners.

7.2   *Elements of effective glossing*

Although the text-only gloss is reported in this study as the most promising gloss type for Thai students that leads to correct interpretation for unknown words, the study still maintains that the dual use of verbal and non-verbal forms is helpful for students if the elements of the image and the text

are pragmatic. Results of the study suggest that Thai lecturers include the following elements when preparing glossary for their students.

7.2.1 Text length

The findings show that it is easier for Thai students to comprehend textual-only glosses that are concise and comprised of key words that are in their domain of knowledge. The findings illustrate that the shorter text makes the text looks less complex for Thai students; the length of textual gloss that is suitable for Thai students, according to the results of the cross-examination of glossed items, is approximately 1-5 words. The textual gloss can be simply a word or a noun phrase, and is not necessary to be a full sentence.

7.2.2 Word frequency

Even though research has shown that items that are glosses in L1 are more suitable for low-proficiency learners, as they can process the meanings of the unknown words much quicker (Ko, 2012), the results of the current study suggest that lecturers create textual-glosses in students' L2 so that the students get more exposure to L2 usage. When creating L2 textual-gloss, lecturers need to take into account the frequency of the words to be used, i.e. the words to include in the glosses need to be well-known and widely used. In light of this, lecturers are highly recommended to consult the Lexical Frequency Profile (LFP; Laufer & Nation, 1995), which divides words into four different frequency layers. The words to be selected for the glosses must be words that are frequently used and within the students' domain of knowledge as they will make the textual glossing more comprehensible.

7.2.3 Quality of pictures in pictorial glosses

As for picture-glosses, the findings revealed that pictures can either convey the meaning of the terms or concepts or tap the prior schema of the learner. However, the use of images or photos as a pure aid has some risks. The image used might mislead the student to an incorrect meaning. Moreover, the quality of pictures that are used as glosses is significant. The findings of the current study indicate that the print quality of images or photographs, as well as their physical size, are significant factors that influence the users' interpretation and their ability to comprehend the content of the images. Original photos or pictures may be clear, but, when they are included within the texts and photocopied in large volumes, the images may get darker, or lighter, causing important details to be lost, and they can no longer convey the implicit meaning.

8 Conclusion

The findings presented in this paper can serve as the baseline data which lecturers can follow to develop the glosses suitable and promising for the learners in their EFL reading classes. The challenge for Thai EFL lecturers is that Thai learners are more likely to choose glosses that contain pictures, whereas their potential for correct interpretation is not guaranteed because relying on a mere picture contains some risks which may lead to misinterpretation. The study seems to suggest that Thai lecturers create glosses that bring out the best features of its type and combine both pictures and texts so that the glossing can both suit the preference of users and promote correct interpretation. Furthermore, it is difficult for the lecturer to source a good picture that encapsulates the meaning of the vocabulary word. However, although the text-only gloss has more potential for Thai learners to interpret unknown words correctly, the value of pictures cannot be overlooked. The pictures with good print quality and of a proper size can still convey the meaning of terms or concepts, or tap the prior schema of the learner, and therefore should be intertwined with text glosses to complement the

comprehension of the glossed texts. In addition to this, the picture can break the monotony of constantly using text glosses, making the glossing appear friendlier to users, particularly to EFL students with low English proficiencies. In this situation, the lecturers should create glosses that bring out the best aspects of each type and combine both pictures and texts.

In conclusion, this study represents a first step in providing baseline information for EFL reading lecturers for designing glosses that are suitable and efficient for their students. The study also highlights the significant role of EFL lecturers in creating tools to assist their students during the reading process which will help them to become more autonomous readers. However, the study does have some limitations. One of the main potential limitations of the present study is the instruments. As there are no established tests for assessing gloss preference and gloss efficiency, the tests were created by the researcher. In addition, the tests merely tested the participants' ability to interpret unknown words using the provided glossed items; the study did not investigate the effect of glosses on their overall reading comprehension. Therefore, future research might need to validate the tests that were used in the current study and examine the holistic reading dimensions by including the assessment of gloss effects on the participants' reading comprehension. Furthermore, results of the study were based on the students' perspectives and would need to use a more rigorous statistical procedure, rather than the using the percentage method for the analysis of the quantitative data. Finally, future studies might need to investigate this from the perspectives and practices of Thai lecturers who teach classes relevant to EFL reading or vocabulary as well.

Acknowledgement

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