The Use of Online Tools in L2 Writing: A Study of Thai University Students

การใช้เครื่องมือออนไลน์ในการเขียนภาษาที่สอง: ศึกษาจากนักศึกษามหาวิทยาลัยของประเทศไทย

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Abstract

With technological advancement, the Internet plays an important role in English language learning. It can help university students when they are assigned to write an essay. For example, they may search for information from a search engine when they do not have any ideas or they could possibly find a target equivalent to a source item using machine translation or online dictionaries. The purposes of this study were to investigate (1) kinds of online tools used in writing a 200- to 300-word English paragraph by high-proficiency and low-proficiency students and (2) how the two groups used the tools. The subjects were 14 students in the Engineering Faculty at a state university in Thailand. The research instruments were introspective think-aloud, stimulated recall interview, and observation, and a screen capture programme. The findings were that students used seven kinds of online tools. The high-proficiency group used all seven tools whereas the low-proficiency group used only two tools. With the understanding of how students used online tools while

writing, this study may guide teachers and students to use online tools effectively.

Keywords: use, online tools, L2 writing, high-proficiency students, low-proficiency students

บทคัดย่อ

จากความก้าวหน้าทางด้านเทคโนโลยี ทำให้อินเตอร์เน็ตมีบทบาทสำคัญในการเรียนภาษา อินเตอร์เน็ตสามารถช่วยนักศึกษา ระดับมหาวิทยาลัย ในเวลาที่ต้องทำงานเกี่ยวกับการเขียนเรียงความ โดยพวกเขาอาจใช้เซิร์ชเอ็นจินค้นหาข้อมูลเกี่ยวกับหัวข้อที่ให้เขียนเรียงความ หรือพวกเขาอาจใช้เครื่องมือช่วยแปลหรือพจนานุกรมออนไลน์ เวลาไม่รู้จักคำที่เป็นภาษาปลายทาง ด้วยเหตุนี้ วัตถุประสงค์ของงานวิจัยฉบับนี้ คือการศึกษาการใช้เครื่องมือออนไลน์กับการเขียนภาษาอังกฤษระดับย่อหน้า ผู้เข้าร่วม ในงานวิจัยครั้งนี้ คือ นักศึกษาที่กำลังศึกษาอยู่คณะวิศวกรรมศาสตร์ ที่มหาวิทยาลัยรัฐแห่งหนึ่งของไทย จำนวน 14 คน สำหรับเครื่องมือวิจัย คือ การคิดออกเสียง (Think-aloud) การสัมภาษณ์แบบ Stimulated recall interview และ การสังเกตพร้อม โปรแกรมบันทึกหน้าจอคอมพิวเตอร์ ผลการวิจัย พบว่า ผู้เข้าร่วมในงานวิจัยทั้งหมดใช้เครื่องมือออนไลน์ 7 ชนิด โดยกลุ่มที่มีความสามารถทางด้านภาษาอังกฤษสูง ใช้เครื่องมือทั้ง 7 ชนิด แต่ กลุ่มที่มีความสามารถทางด้านภาษาอังกฤษต่ำ ใช้เพียง 2 ชนิด เท่านั้น จากความเข้าใจเรื่องที่นักศึกษาใช้เครื่องมือออนไลน์กับการเขียนอย่างไร ทำให้งานวิจัยฉบับนี้อาจช่วยแนะนำครูอาจารย์และผู้เรียนเกี่ยวกับการใช้เครื่องมือออนไลน์ได้อย่างมีประสิทธิภาพ

คำสำคัญ: การใช้ เครื่องมือออนไลน์ การเขียนโดยใช้ภาษาที่สอง นักศึกษาที่มีความสามารถทางด้านภาษาอังกฤษสูง และ นักศึกษาที่มีความสามารถทางด้านภาษาอังกฤษต่ำ

Introduction

Nowadays, the Internet plays an important role in language learning (Zhong, 2008), and it is very popular among language learners (Muniandy, 2010) because it is easily accessible through any mobile devices such as laptops, mobile phones, and tablets. The benefits of the Internet are improving learners' motivation and independent learning (Isisac, 2013; Pratibha, 2010; Sudartini, 2010). It also promotes the use of L1 to develop L2 learning through Internet translation tools (Pratibha, 2010), and it stimulates learners with rich sensory and cognitive skills, and thus effectively encourages language acquisition (Isisac, 2013).

In addition to the many benefits stated above, the Internet has been popularly used in writing because it can help students to search for content (Purcell et al., 2012) and solve language problems (Musk & Cekalte, 2012). They may search for information from search engines such as *Google* and encyclopaedias such as *Wikipedia* when they do not have any ideas about the topics given. Apart from searching for content, they probably solve language problems by translating text into a target language using machine translation (*Google Translate)* or checking the meaning of words in online dictionaries *(Oxford* and *Cambridge)*. Therefore, it is interesting to investigate further how and to what extent these online tools are used to help writers.

Literature review

This section discusses the use of online tools, namely the aspects of language, online tools, purposes of using online tools, and strategies for using online tools.

1. The use of online tools

If we search on the Internet, we will find that the tools such as online dictionaries, machine translation, concordances, and search engines are used to solve language problems with different purposes as summarised in Table 1.

Table 1 Aspects of language, online tools, and purposes of using online tools

Aspects of language	Online tools	Purposes of using online tools	Researchers	Years
Meaning	Online dictionaries	- Checking the meaning of words	Chun	2004
	Concordances	- Checking words which are near-synonyms	Jafarpour, Hashermian & Alipour	2013
			Yeh, Liou, & Li	2007
Translating	Online dictionaries	- Translating a word into a target language	Elola, Rodriguez-Garcia , & Winfrey	2008
	Machine translation	- Translating a source text into a target text	Garcia	2010
			Garcia & Pena	2011
			Gaspari	2007
			Kliff	2005
			Shei	2002

Table 1 Aspects of language, online tools, and purposes of using online tools (continued)

Aspects of language	Online tools	Purposes of using online tools	Researchers	Years
Grammar	Online dictionaries	- Correcting grammatical errors	Conroy	2010
	Concordances	- Checking collocations	Yeh et al.	2007
			Yoon	2008
		- Correcting grammatical errors	Conroy	2010
		- Correcting verbs	Hadi	2013
	Search engines	- Checking sentence structures	Stapleton & Radia	2010
		- Checking function words	Park	2010
		- Correcting grammatical errors	Acar, Geluso & Shiki	2010
Mechanics	Online dictionaries	-Checking spelling	Chun	2004
Register	Online dictionaries	-Checking word register	Bishop	2000
Style	Online dictionaries	-Editing style	Chon	2008
			Elola et al.	2008

From the previous studies about the use of online tools in writing, the researchers have analysed and categorised the kinds of online tools and the purposes of using online tools under six aspects of language as illustrated in Table 1. Regarding meaning, online dictionaries are used to check the meaning of words (Chun, 2004) whereas concordances are used to check words which are near-

synonyms (Jafarpour, Hashermian & Alipour, 2013; Yeh, Liou & Li, 2007). In translation, the purpose of using online dictionaries and machine translation is translating a text into a target language (Elola, Garcia & Winfrey, 2008; Garcia, 2010; Garcia & Pena, 2011; Gaspari, 2007; Kliff, 2005; Shei, 2002). Online dictionaries are used to translate at the word level while machine translation is done at the textual level.

Similarly, for grammar, the purpose of using online dictionaries, concordances, and search engines is correcting grammatical errors (Acar, Geluso & Shiki, 2010; Conroy, 2010). Moreover, the students use concordances to check collocations (Conroy, 2010; Yeh et al., 2007; Yoon, 2008) and correct verbs (Hadi, 2013) while search engines are used to check sentence structures (Stapleton & Radia, 2010) and function words (Park, 2010). For the remaining three aspects of language, online dictionaries are used to check spelling (Chun, 2004) and register (Bishop, 2000) and to edit style (Chon, 2008; Elola et al., 2008).

Most previous studies, as stated above, have investigated the use of online dictionaries in writing because they provided several functions for users to tackle meanings, spelling and usage of words or editing style. Machine translation (MT), concordances, and search engines offered specific functions when compared to online dictionaries. For example, MT was mainly used to translate from L1 into L2 whereas the main function of concordances and search engines was checking word usage.

2. Strategies for using online tools in L2 writing

The term *strategy* is defined by researchers as "specific actions taken by the learner to make learning easier, faster, more self-directed, more effective, and more transferrable to the new situations" (Oxford, 1990). Furthermore, it should be consciously employed (Cohen, 1998; Oxford, 1990; Wenden, 1987). If not, it loses the significance of being a strategy (Cohen, 1994). In addition, it should be a mental action and used as strategy clusters for task achievement (Macaro, 2009). Based on the definitions above, *strategies* for using online tools are important because they help the students to use online tools to achieve the purpose efficiently. For example, if they would like to check English word usage, they may use an online dictionary to check the part of speech of a word. In addition, to achieve the goals of using each tool, the user may need to use more than one or two strategies or sometimes he/she may need a 'strategy cluster' (Macaro, 2009) to complete the process of using the tool. In this study, thus, we describe *strategy* as "clusters of steps of conscious mental actions used to achieve the goal."

The studies above reveal that the four online tools, namely online dictionaries, machine translation, concordances, and search engines, are popular choices of users. In the next section, we will discuss strategies for using them.

Tool 1: Online dictionaries

Online dictionaries have been developed continuously from paper-based, CD-ROM, and electronic media to the current online form of content delivery. Online dictionaries are "the tool which

alphabetically lists the words of a language, providing descriptions or equivalents in other languages" (Aalborg University, 2014). Based on several studies, writers use online dictionaries to translate a word into a target language, to check meaning, spelling, and the word register, and to edit style. In order to achieve their purposes, they may use the following strategies: selecting an entry (Min & Shoujing, 2009), and using information provided by the dictionary (Koyama & Takeuchi, 2009). In addition, writers cross-reference with another dictionary (Koyama & Takeuchi, 2009; Okuyama & Igarashi, 2007), cross-check the meaning of the unknown word (Bishop, 2000) or translate back (Tang, 1997). Or, if none of the target words is found, writers try a different entry in the same dictionary (Chon, 2008).

Among the studies conducted by several researchers from many countries, Elola et al. (2008) explored the use of online dictionaries in Spanish writing revision tasks with six intermediate-level undergraduate students. They found five dictionary use strategies including second word strategy (relying on the second or the third word to get the meaning of an expression), online translator dictionary (obtaining feedback on their performance in L2), category strategy (being familiar with dictionary abbreviations and structure), context-based strategy (paying attention to the examples provided for a particular word), and familiarity strategy (being familiar with the form or by the ending of the word).

Tool 2: Machine translation

Machine translation refers to "computerised systems responsible for the production of translations with or without human

assistance" (Hutchins & Somers, 1992). It has become a reality in the late twentieth century after it was dreamt of in the seventeenth century. Teachers in the language learning area have carried out research by having their students use machine translation to translate a source text into a target language (e.g. Garcia, 2010). The students used strategies such as pre-editing (Belam, 2002; Shei, 2002; Yuste, 2002), post-editing (Allen, 2003; Garcia, 2012; Gasperi, 2002; Kliff, 2005; Somers, 2002; Yuste, 2002), translating back (Cribb, 2000), and word-reordering (Forcada, 2000; Stymne, 2012). Pre-editing is to modify the source text until the target text makes sense whereas post-editing strategy is to modify the target text until it is acceptable in the students' opinions. Furthermore, back translation is used to check whether any inaccuracies occur by translating the source text into the target text, and then translating the target text back into the source text. Finally, word-reordering is to rearrange the words in the source-language sentences.

Shei (2002) had Chinese students translate a Chinese paragraph into English using two machine translations (MTs): SYSTRAN at http://babelfish.altavista.com/translate.dyn and Beijing Golden Bridge Translation Port Network at http://www.netat.net/. The results revealed that the students used six pre-editing strategies: reorganising the source text to "English style" sentence, simplifying by using clear and easy-to-understand words, restoring any omitted subjects or objects, replacing proper nouns with pronouns, pre-translating by translating proper names manually before putting them into the MT, and using proper punctuation in the source text.

Tool 3: Concordances

Concordances are the string in question in context with the search term(s) highlighted from a corpus or a collection of text (Nesselhauf, 2005). The benefit of using concordances is quite limited because they focus on the word level only. Hence, from previous studies, concordances were used to check words which are near-synonyms and collocations, and to correct grammatical errors and verbs. To achieve these purposes, writers use strategies such as observing a grammatical pattern of the language, hypothesising how this grammatical pattern works, and testing to see if the hypothesis is correct (Johns, 1994; Park & Kinginger, 2010; Payne, 2008). Writers also guess the meanings of the difficult words (Sriprichan, 2003).

Ma (2014) explored the Chinese students' learning strategies used with corpora and concordances in the classrooms when they were assigned to write an English essay. He found many strategies including using a wildcard, studying concordance outputs, searching the whole word, studying the context around the search string, counting the frequency of occurrence of words, inferencing, making alternative searches, and narrowing down the search.

Tool 4: Search engines

Search engines such as *Google* are designed to crawl and index the web effectively. *Google* indexes tens to hundreds of millions of web pages involving a number of distinct terms (Brin & Page, 1998). They provide a standard interface to the large amount of information that the web contains (Levene, 2010). Based on these definitions, search engines store information of web pages, so it seems

that it is primarily used for searching content. Nevertheless, when it has been applied to language learning research, it is used to solve language problems such as correcting grammatical errors and checking sentence structures. By means of achieving the purposes, writers use strategies which can be divided into two broad categories: the search term (McGraw-Hill Companies, 2003; Stapleton, 2005) and the search techniques (Dudeney, 2000; Sharp, 2005; University of Otago, 2008). Regarding the search term, strategies are searching by key word, searching a related term or words with similar meaning to the key words, searching from a very specific to a more general noun, or narrowing the search. Moreover, the search techniques include using the asterisk or wildcard (*) to find part of the word and using Boolean operators such as OR and AND to broaden or narrow a search. In case that the target information is not found by using those strategies stated above, changing the search engine is the final strategy.

From the literature review above, it can be seen that several studies have investigated the use of only one or two online tools in writing. For this study, however, we allowed the participants to use any online tools to complete a writing task. We think that it is more natural than restricting them to only one tool. Generally, it is very convenient for users to access several online tools nowadays. As researchers, we may learn more about how several tools can complement each other in helping learners to complete a piece of writing.

Purposes of the study

To provide more insight into the use of online tools in English

writing of EFL learners, this study aimed to find the answers of the two research questions below.

1 What online tools are used in writing an English paragraph by high-proficiency and low-proficiency Thai students?

2 How do the two groups use online tools?

Research methodology

Subjects

The subjects were 14 first-year volunteer students in the Engineering Faculty in one of the public universities in Bangkok, Thailand. Ten of them were female students whereas four were male. They were chosen from a pool of 400 student respondents based on their responses to questionnaires which asked about the frequency of using online tools and their grade obtained in the first English fundamental course. They met the objectives of this study because they frequently used various kinds of online tools in writing English paragraphs. Moreover, seven were high-proficiency students who got an A from the course while the other seven were low-proficiency students who got a C from the course.

The task

The task was writing a 200- to 300- word English paragraph under the topic "One of the technologies that you can't live without." While writing, each subject was asked to type in Microsoft Word and could use any online tools on the Internet. The time was not limited.

Research instruments

The three research instruments used in this study were introspective think-aloud, observation, and stimulated recall interview.

1. Introspective think-aloud

The introspective think-aloud was used as the main instrument to collect the data from the subjects' purposes of and strategies for using online tools while they were doing the task. They were given instruction in Thai and trained to think-aloud before performing the task. While writing, if they were silent for 20-30 seconds, they were prompted. The think-aloud protocol and the computer screen were recorded by the SnagIt programme, which is a computer screen capture programme.

2. Observation

Observation was used to triangulation of the data obtained from the think-aloud protocol. The first researcher acted as an observer writing down the names of tools, items searched, and search results using the structured note, especially the doubtful items. He, then, asked the subjects for more clarification after they performed the task.

3. Stimulated recall interview

Stimulated recall interview was used immediately after the subjects finished the task to clarify any unclear parts. This instrument was also used to ask for information about the reasons of the items searched or chosen. The computer screen video recorded by the SnagIt programme during the task was used as a prompt to stimulate the subjects' memory.

Data analysis

For this study, the data from the think-aloud protocol was the

main data, and it was supported by the data from observation, stimulated recall interview, and SnagIt. The data from introspective think-aloud and stimulated recall interview was transcribed while the data from observation and SnagIt was described. Then, the data from the three instruments and the screen capture was chunked, coded, and triangulated. The data from introspective think-aloud and stimulated recall interviews revealed the subjects' purposes of and strategies for using online tools. In terms of the data from observation and SnagIt, the kinds of online tools were identified. Even though the data obtained was qualitative data, it should be quantified into frequencies, so that the number of searches, kinds of tools, purposes and strategies could be clearly seen. Finally, the frequencies were converted into percentage. The data analysis of this study is summarised in Figure 1.

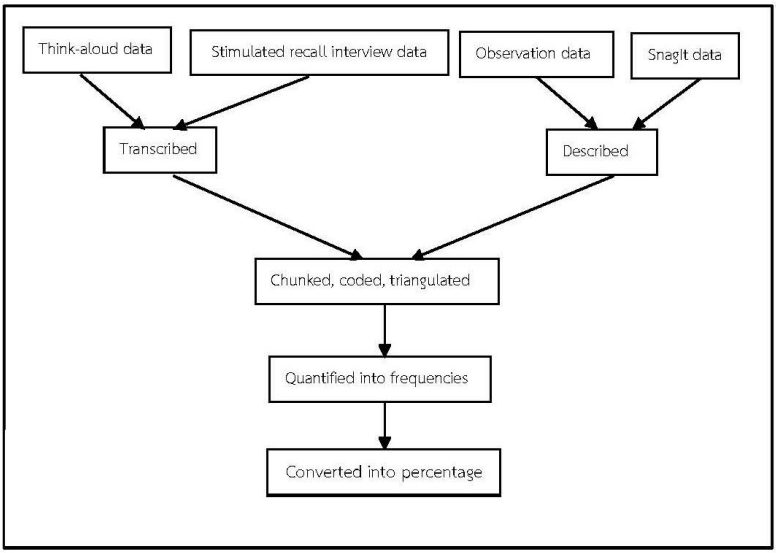

Figure 1 Summary of data analysis

Findings

This section reports the overview of the use of online tools in L2 writing, the high-proficiency students' and low-proficiency students' strategies for using online tools in L2 writing, and strategies without the use of tools.

The overview of the use of online tools in L2 writing

This part demonstrates the overall percentage of the high-proficiency students' and low-proficiency students' kinds of tools and purposes of using tools. Before presenting the data, the acronyms are summarised in the following tables.

Table 2 The acronyms used in the following tables are described as follows:

Acronyms	Descriptions
H	High-proficiency students
L	Low-proficiency students
MT	Machine translation (*Google Translate*)
BD	An online bilingual dictionary (*Longdo*, available at http://dict.longdo.org)
MD	An online monolingual dictionary (*Cambridge*)
W	Websites for language learning such as *Trueplookpunya.com*
SE	A search engine (*Google*)
E	An encyclopaedia (*Wikipedia*)
T	A thesaurus (*Thesaurus.com*, available at http://www.thesaurus.com)

Table 3 presents the use of seven kinds of online tools to serve the four purposes of using online tools (finding English equivalents for Thai items, finding word usage, checking mechanics, and avoiding word repetition). Machine translation (*Google Translate*) was used most frequently (74.91%) for finding English equivalents for Thai items and avoiding a repetitious word.

Table 3 The overview of the use of online tools in L2 writing

Kinds of online tools	Percentage	Purposes of using online tools											
		Finding English equivalents for Thai items						Finding word usage		Checking mechanics		Avoiding word repetition	
		Word level		Phrase level		Sentence level							
		H(%)	L(%)	H(%)	L(%)	H(%)	L(%)	H(%)	L(%)	H(%)	L(%)	H(%)	L(%)
1. Machine translation	74.91	7.74	22.86	0.35	9.14	-	33.06	-	-	-	-	1.76	-
2. Bilingual dictionary	16.25	7.58	1.08	0.72	-	-	4.69	1.81	-	0.36	-	0.36	-
3. Monolingual dictionary	4.24	1.51	-	0.30	-	-	-	1.51	-	0.91	-	-	-
4. Websites for language learning	2.83	-	-	-	-	-	-	2.83	-	-	-	-	-
5. Search engine	0.70	-	-	-	-	-	-	0.35	-	-	-	0.35	-
6. Encyclopaedia	0.70	0.35	-	0.35	-	-	-	-	-	-	-	-	-
7. Thesaurus	0.35	-	-	-	-	-	-	-	-	-	-	0.35	-
Total	**100**	**16.25**	**24.03**	**1.77**	**9.14**	**-**	**37.81**	**6.71**	**-**	**1.27**	**-**	**2.82**	**-**

As for online dictionaries, an online bilingual dictionary (*Longdo*) was used to serve all four purposes (16.25%), but an online monolingual dictionary (*Cambridge*) was used 4.24% by only high-proficiency students for the purpose of finding English equivalents for Thai items at the word and phrase levels (1.51% and 0.30% respectively), finding word usage (1.51%), and checking mechanics (0.91%). The remaining four tools were used by the high-proficiency students only. Websites for language learning (2.83%) and a search engine, *Google* (0.70%), were used to find word usage, but *Google* was also used for avoiding a repetitious word (0.35%). An encyclopaedia (*Wikipedia* at 0.70%) was used for the purpose of finding English equivalents of Thai items, and the least frequently used tool, a thesaurus (*Thesaurus.com*), was used 0.35% to find synonyms to avoid repeating words. However, concordances were not used in this study.

To serve the students' four purposes of using online tools, different kinds of tools were used. In order to find English equivalents for Thai items, four tools were used. *Google Translate*

was used at all levels (7.74%, 22.86%, 0.35%, 9.14%, and 33.06% respectively) whereas *Longdo* (7.58%, 1.08%, 0.72%, and 4.69% respectively), *Cambridge* (1.51% and 0.30% respectively), and *Wikipedia* (0.35% and 0.35%) were used at the word and phrase levels only. *Google Translate* and *Longdo* were mainly used to translate from Thai into English. If the students were uncertain about the meanings of English words/phrases/sentences, *Google Translate*, *Longdo*, *Cambridge* and *Wikipedia* were used to cross-check the meanings. *Cambridge*, moreover, was used to check word usage. The remaining three purposes of using online tools were utilised by the high-proficiency students only.

Regarding finding word usage, *Longdo* (1.81%), *Cambridge* (1.51%), websites for language learning (2.83%), and *Google* (0.35%) were used to check the part of speech of words, collocations, and word positions. To check mechanics, only online dictionaries (*Longdo* (0.36%) and *Cambridge* (0.91%)) were used because the students thought the tools were suitable for checking spelling. For avoiding repeating words, the students used *Google Translate* (1.76%) to translate words from Thai into English and *Longdo* (0.36%) to re-check the meanings of words. When they were uncertain about the meanings of English words in the search results, they searched for thesaurus websites in *Google* (0.35%) and chose synonyms in *Thesaurus.com* (0.35%).

High-proficiency students' use of online tools

This part reports high-proficiency students' use of online tools, namely kinds of tools, and the purposes of and strategies for

using tools as summarised in Table 4.

Table 4 High-proficiency students' use of online tools

Purposes of using tools	List of strategies	Percentage	Kinds of tools						
			MT (%)	BD (%)	MD (%)	W (%)	SE (%)	E (%)	T (%)
Finding English equivalents for Thai words	1. Translating from Thai into English	73.91	43.48	30.43	-	-	-	-	-
	2. Translating back from English into Thai	10.87	-	10.87	-	-	-	-	-
	3. Cross-checking the meaning of English words/phrases	8.70	1.45	1.45	4.35	-	-	1.45	-
	4. Checking word usage	6.52	-	2.17	4.35	-	-		-
	Total	**100**	**45.65**	**45.65**	**6.52**	-	-	**2.18**	-
Finding English equivalents for Thai phrases	1. Translating from Thai into English	60.00	20.00	40.00		-	-		-
	2. Cross-checking the meaning of English words/phrases	40.00	-	-	20.00	-	-	20.00	-
	Total	**100**	**20.00**	**40.00**	**20.00**	**-**	**-**	**20.00**	**-**
Finding word usage	1. Checking the word usage in websites for language learning	36.84	-	-	-	36.84	-	-	-
	2. Checking part of speech of the word in a bilingual dictionary	10.53	-	10.53	-	-	-	-	-
	3. Checking part of speech of the word in a monolingual dictionary	21.05	-	-	21.05	-	-	-	-
	4. Checking the word order in the sentence in a bilingual dictionary	10.53	-	10.53	-	-	-	-	-

	5. Checking collocations by seeing concordance lines	5.26	-	-	-	-	5.26	-	-
	6. Checking collocations in a monolingual dictionary	5.26	-	-	5.26	-	-	-	-
	7. Comparing the description of word usage from two websites	10.53	-	5.26	-	5.26	-	-	-
	Total	**100**	-	**26.31**	**26.31**	**42.11**	**5.26**	-	-
Checking mechanics	1. Checking spelling in a monolingual dictionary	75.00	-	-	75.00	-	-	-	-
	2. Checking spelling by clicking the hyperlink function	25.00	-	25.00	-	-	-	-	-
	Total	**100**	**-**	**25.00**	**75.00**	**-**	**-**	**-**	-
Avoiding word repetition	1. Translating from Thai into English	37.50	25.00	12.50	-	-	-	-	-
	2. Cross-checking the meaning of English words/phrases	12.50	12.50	-	-	-	-	-	-
	3. Checking the unfamiliar word for the meaning of Thai equivalents by clicking the highlighted word	12.50	12.50	-	-	-	-	-	-
	4. Editing the English language by choosing the word from the dropdown menu	12.50	12.50	-	-	-	-	-	-
	5. Searching thesaurus websites by using key words	12.50	-	-	-	-	12.50	-	-
	6. Choosing the synonym from a thesaurus website	12.50	-	-	-	-	-	-	12.50
	Total	**100**	**62.50**	**12.50**	-	-	**12.50**	**-**	**12.50**

Table 4 shows high-proficiency subjects' strategies for using online tools to find English equivalents for Thai items (at the word and phrase levels), find word usage, check mechanics, and avoid word repetition.

To find English equivalents for Thai items, at the word level the students translated from Thai into English using machine translation (*Google Translate*) at 43.48% or an online bilingual dictionary (*Longdo*) at 30.43%. When they were uncertain about the meanings of English words, they used two strategies (translating back from English into Thai (10.87%) or cross-checking the meaning of English words/phrases (8.70%)). Furthermore, they checked word usage (6.52%) if they were uncertain about the grammatical aspect of the English words in online dictionaries. At the phrase level, the students translated from Thai into English (60.00%) in *Google Translate* (20.00%) or *Longdo* (40.00%), but when they were uncertain about the meanings of English words, they cross-checked the meanings of those English words/phrases (40.00%).

For finding word usage, they checked word usage in websites for language learning (36.84%) because this kind of website provided Thai description for word usage. If they were uncertain about the description in one website, they compared the description of word usage from two websites (10.53%). Moreover, they checked the part of speech of words in a bilingual dictionary (*Longdo*) at 10.53%, or a monolingual dictionary (*Cambridge*) (21.05%) and checked word order in sentences in *Longdo* (10.53%). When they sought to check a collocation, they checked it by seeing concordance lines in *Google*

(5.26%) or in *Cambridge* (5.26%).

Regarding strategies for using online tools to check mechanics, the students checked spelling in *Cambridge* (75.00%). In addition, they clicked the hyperlink function as suggested by *Longdo* when they misspelt words (25.00%).

In order to avoid a repetitious word, the subjects started the process with translating from Thai into English (37.50%) in *Google Translate* (25.00%) and *Longdo* (12.50%). When the subjects were uncertain about the results, they checked the unfamiliar word for the meaning of the Thai equivalent by clicking the highlighted word (12.50%). Besides, they edited the English language by choosing a word from the dropdown menu (12.50%) or cross-checked the meaning of English words/phrases (12.50%). However, they searched websites by using key words (12.50%) when the results from the Thai-English translation were not satisfactory. They then chose a synonym from a thesaurus website (12.50%).

Low-proficiency students' use of online tools

Low-proficiency students' use of online tools includes kinds of tools, and the purposes of and strategies for using tools as summarised in Table 5.

Table 5 Low-proficiency students' use of online tools

List of Strategies	Percentage	Purpose (Finding English equivalents for Thai items)					
		Word level		Phrase level		Sentence level	
		Machine Translation	Bilingual Dictionary	Machine Translation	Bilingual Dictionary	Machine Translation	Bilingual Dictionary
		Percentage	Percentage	Percentage	Percentage	Percentage	Percentage
1. Translating from Thai into English	44.28	19.90	1.49	7.96	-	14.93	-
2. Translating back from English into Thai	3.48	1.49	-	0.99	-	0.99	-
3. Cross-checking the meaning of English words/phrases	6.47	-	-	-	-	-	6.47
4. Checking the unfamiliar word for the meaning of Thai equivalents by clicking the highlighted word	16.92	0.50	-	2.49	-	13.93	-
5. Editing searched Thai words/phrases by replacing them with Thai synonyms	9.42	8.92	-	0.50	-	-	-
6. Editing searched Thai sentences by deleting words/phrases	5.47	-	-	-	-	5.47	-
7. Editing searched Thai sentences by adding words/phrases	1.49	-	-	-	-	1.49	-
8. Editing searched Thai sentences by changing words/phrases	3.48	-	-	-	-	3.48	-
9. Editing the English language by choosing the words/phrases from the dropdown menu	8.96	1.49	-	1.00	-	6.47	-
Total	**100**	**32.24**	**1.49**	**12.94**	**0.00**	**46.77**	**6.47**

Table 5 illustrates that the subjects used two types of online tools: machine translation (*Google Translate*) and an online bilingual dictionary (*Longdo*) to find English equivalents for Thai items at the word, phrase, and sentence levels. Using the two tools to complete the task, the subjects employed nine strategies. The highest-frequency strategy was translating from Thai into English (44.28%). If the search results were unsatisfactory, they used strategies 5-8 to edit Thai words/phrases/sentences searched (9.42%, 5.47%, 1.49% and 3.48% respectively) until the search results were satisfactory. When they were uncertain about the meaning of the English language translated, they checked the unfamiliar word for the meaning of Thai equivalents by clicking the highlighted word (16.92%). Moreover, they translated back from English into Thai (3.48%) or cross-checked the meaning of English words/phrases (6.47%). If they were unfamiliar with some English words/phrases, they edited the English language by choosing words/phrases from a dropdown menu (8.96%).

Strategies without the use of tools

This part reports strategies without the use of tools from high-proficiency students and low-proficiency students as summarised in Table 6.

Table 6 Strategies without the use of tools

List of strategies	Percentage	Purposes of using online tools											
		Finding English equivalents for Thai items						Finding word usage		Checking mechanics		Avoiding a repetitious word	
		Word level		Phrase level		Sentence level							
		H (%)	L(%)	H (%)	L(%)	H (%)	L(%)	H (%)	L(%)	H (%)	L (%)	H (%)	L(%)
1. Selecting a word based on background knowledge	42.86	28.57	14.28	-	-	-	-	-	-	-	-	-	-
2. Finding the English word which does not appear in the translated sentence	21.43	-	-	-	-	-	21.43	-	-	-	-	-	-
3. Editing English grammatical structure	28.57	-	-	-	9.52	-	19.05	-	-	-	-	-	-
4. Editing the English language by deleting words	7.14	7.14	-	-	-	-	-	-	-	-	-	-	-
Total	**100**	**35.14**	**14.28**	**-**	**9.52**	**-**	**42.86**	**-**	**-**	**-**	**-**	**-**	**-**

Apart from strategies using tools, the subjects used four strategies without the use of any tools as shown by the data from stimulated recall interviews. When they could not obtain help from any tools, they selected a word based on background knowledge because *Longdo* provided more than one English equivalent for Thai words (42.86%). The low-proficiency group edited English grammatical structure (21.43%) because they thought *Google Translate* provided results which contained wrong grammar or structure. They also found the English word which did not appear in the translated sentence (28.57%) because *Google Translate* did not provide some English

equivalents for Thai sentences. In contrast, the high-proficiency subjects edited the English language by deleting words (7.14%) because they thought *Google Translate* provided redundant English words.

Discussion

This section discusses the use of online tools, and the purposes of and strategies for using online tools by the high-proficiency and low-proficiency subjects, and provides pedagogical implications for effectively using online tools in L2 writing.

The use of online tools and purposes of using online tools

In terms of finding English equivalents for Thai items, four tools were used, including machine translation (*Google Translate*), an online bilingual dictionary (*Longdo*), an online monolingual dictionary (*Cambridge)*, and an encyclopaedia (*Wikipedia*). *Google Translate* and *Longdo* are suitable for starting the processes because they can translate from Thai into English. *Google Translate* can translate at any levels whereas *Longdo* primarily translates at the word level. The MT was used at all levels, especially the sentence level, by the low-proficiency students only because they lacked sentence structures stored while the MT was used at the word and phrase levels by the high-proficiency students only. However, the quality of the two tools casts some doubt because the websites have been developed by "bottom-up" editing (Carr, 1997). The users insert words/phrases/ sentences in the search box, and then the editor collects the words/ phrases/sentences searched. Apart from the MT and the BD,

Wikipedia was used to cross-check the meanings of words/phrases when the students were uncertain about the English words. This tool can possibly be used to cross-check the meanings, but its quality may not be high because anyone can write an article and submit it to the website. In contrast to the MT, the BD, and the encyclopaedia, the quality of the MD, *Cambridge*, is considered high when it is used to cross-check the meanings or check the word usage because it is monitored by native speakers. However, without the MT and the BD, *Cambridge* only cannot be used to find English equivalents for Thai items.

To find word usage, four tools were used: an online bilingual dictionary (*Longdo*), an online monolingual dictionary (*Cambridge*), websites for language learning, and a search engine (*Google*). This result is somewhat similar to Conroy (2010) because his research revealed that students used an online monolingual dictionary to check collocations. All four tools can be used to serve this purpose, but their quality remains doubtful, except *Cambridge*, which is monitored by native speakers. For *Longdo*, the sentence examples for the target words are in Thai, and for websites for language learning, descriptions of the word usage which are written in Thai might not show the same sense as descriptions written by native speakers. Regarding the websites sourced in *Google,* the quality is doubtful because some websites are written by non-native speakers, so they might not be reliable enough.

When the students wished to check mechanics, they used two tools (an online bilingual dictionary (*Longdo*) and an online

monolingual dictionary (*Cambridge*) in the same way as Chun's (2004) result. They are suitable for serving this purpose because a dictionary is composed of words, and spelling is an aspect of a word. Thus, using a dictionary to check spelling is proper. Nonetheless, the quality of few bilingual dictionaries can be favorably compared to a monolingual one of major publishers (Scholfield, 2002), so it would be prudent for the students to check spelling in a monolingual dictionary.

In order to avoid a repetitious word, the students used four tools such as machine translation (*Google Translate*), an online bilingual dictionary (*Longdo*), a search engine (*Google*), and a thesaurus (*Thesaurus.com*). *Google Translate* and *Longdo* are suitable to serve this purpose when students do not know English synonyms, so they may translate from Thai into English. However, the quality of these two tools remains doubtful because they are developed by non-linguists; the developers are expert in computer science. If students do not use a monolingual dictionary to check the meaning of an English synonym, its meaning might be inappropriate.

Apart from *Google Translate* and *Longdo, Google* can be used to search websites which include thesaurus websites, and then students can choose a synonym from *Thesaurus.com*, which is in English, so the quality of the website is high, and it provides many synonyms for one English word. Thus, *Thesaurus.com* is the most suitable tool used for this purpose. Nonetheless, avoiding repetition is not found in the results of the previous studies.

The use of online tools and strategies for using online tools

Regarding Tables 4 and 5, it can be seen that the high-

proficiency students' and the low-proficiency students' use of online tools and strategies for using online tools are different. The main factor is due to the students' different levels of linguistic competence. Therefore, the high-proficiency students used fewer strategies with online tools than the low-proficiency students because the low-proficiency students compensated for their lower linguistic competence with strategic competence and the use of online tools. For strategies without any online tools, both groups used their own background knowledge when they thought that they could not rely on the tools (Table 6).

In terms of finding English equivalents for Thai items, these patterns are based on the level of the search because their complexities are different in terms of strategy used. The two groups always thought in Thai and started the processes by translating from Thai into English. This result is quite similar to the results of previous studies (Elola et al., 2008; Garcia, 2010; Garcia & Pena, 2011; Gaspari, 2007; Kliff, 2005; Shei, 2002). It might be because both groups had limited vocabulary size, so they could not find the English items as they would like. Nonetheless, the high-proficiency students searched at the word and phrase levels only while the low-proficiency students searched at the word, phrase, and sentence levels. This can suggest that the low-proficiency students had insufficient English sentence structures, so they tried to translate from Thai sentences into English in order to see English sentence structures with the use of *Google Translate*.

As for finding English equivalents for Thai words, the two

groups were primarily concerned about the strategies which are related to the meanings between the two languages including translating from Thai into English, translating back from English into Thai, and editing Thai words/phrases searched by replacing them with Thai synonyms. The translating back strategy was also found in Tang's (1997) and Cribb's (2000) studies. However, both groups used some different strategies when they were uncertain about the search results. The high-proficiency students cross-checked the meaning of English words/phrases with different types of tools to check the reliability of the meaning of English words/phrases. The low-proficiency students, on the other hand, checked the unfamiliar word for the meaning of Thai equivalents by clicking the highlighted word.

To find English equivalents for Thai phrases, the two groups started the processes by translating from Thai into English. Similarly, the result achieved was in accordance with the results of previous studies (Garcia, 2010; Gaspari, 2007; Kliff, 2005). However, both groups used different strategies to check the meaning between the two languages. The high-proficiency students used one more strategy (cross-checking the meaning of English words/phrases) with different types of tools to re-check the meaning of English words/phrases. The low-proficiency students used three more strategies (translating back from English into Thai, checking an unfamiliar word for the meaning of Thai equivalents by clicking the highlighted word, and editing Thai words/phrases searched by replacing them with Thai synonyms) with the use of *Google Translate*.

Strategies for finding English equivalents for Thai items at the

sentence level were used by the low-proficiency students only as mentioned earlier. The strategies with the use of *Google Translate* (Table 5) show that the students were mainly concerned about meaning rather than grammar, and this result is similar to those of previous studies (Luoma & Tarnanen, 2003; Luton, 2003; O'Neill, 2012). Different strategies of editing the Thai language searched were employed after the students translated from Thai into English. The result obtained is similar to pre-editing strategies from previous studies (Belam, 2002; Shei, 2002). The students frequently edited Thai sentences searched by deleting, changing or adding words. It might be because the students did not understand how the MT works, so they used several and repetitive editing strategies until they were satisfied with the results.

Pedagogical Implications

The results from this study may help teachers understand the purposes of and strategies for using online tools by high-proficiency and low-proficiency students. Both teachers and students may realise what kinds of online tools should be used to serve the purposes of and strategies for using online tools. Each online tool has its own particular functions and purposes; therefore, providing guidelines of how to use online tools as an aid in English writing is essential. The guidelines in this paper are divided into two sub-sections: suggestions for teachers and suggestions for students.

For teachers, when teaching writing, in order to use *Google Translate* effectively, teachers should provide suggestions (Wongkaewphothong, 2014) such as breaking a long sentence into

shorter sentences, being aware of technical terms, being aware of words which have several meanings, comparing the sentence before and after translation, checking and editing some words, typing a simple sentence before making it more complex, and especially for Thai-English translation, deleting redundant Thai words or particles. Moreover, teachers should advise students that there are other machine translations available such as *Altavista, SYSTRAN*, and *Yahoo Babel Fish*, so the students may compare the results from *Google Translate* and another tool to choose the best result.

In order to use a bilingual dictionary efficiently, teachers should tell students to read the English sentence examples in which the target words or phrase searched are included (Pipat, 2014). The sentence examples are short and simple. Moreover, as mentioned by Scholfield (2002), the quality of most bilingual dictionaries is lower than that of monolingual dictionaries which belong to major publishers such as *Longman, Oxford,* and *Cambridge*. Hence, teachers

should encourage students to re-check any aspects of language such as meaning, grammar or spelling in those monolingual dictionaries to ensure the high quality of the target items searched. In addition, there are other bilingual dictionaries available such as *Lexitron*, *Sanook.com*, and *Bing* that teachers can recommend the students to use to compare the results.

In terms of the effectiveness of strategies for using online tools, as stated in the discussion section, the low-proficiency students repetitively used editing strategies after translating from Thai sentences into English. This pattern occurs because *Google Translate*

may not recognise the sentence structures searched, so the editing strategies might not be effective. Because machine translation cannot understand all the complexities of language produced by people, teaching students how machine translation works seems to increase the effectiveness of using this tool, by re-organising the word order, generating target-language sentences, and substituting words.

From the results, the low-proficiency students' strategies and tools used are fewer than those used by the high-proficiency students. Therefore, the low-proficiency students should learn more strategies and tools from the high-proficiency students. For example, the low-proficiency students should learn the high-proficiency students' strategy for using online tools such as cross-checking the meaning of English words/phrases with different types of tools. They should be encouraged to cross-check the target information with at least two online tools because the quality of some tools on the Internet, e.g. bilingual dictionaries, is quite low. With some websites, users can add information without being screened by an editor. The information added is examined by an editor only every three or six months. Therefore, before the information is examined, it may not be reliable. With other websites, the editor may not be a linguist; she may be knowledgeable in another discipline such as computer science, so she may not be fully capable of editing languages. As a result, cross-referencing is suggested.

The low-proficiency students, furthermore, should check word usage as the high-proficiency students do when they find English equivalents for Thai words. Meaning is one aspect of language

properties, but there are other aspects such as form and word usage (Nation, 2001) that the low-proficiency students should be aware of. Increasing language awareness might help them produce a better piece of writing.

Apart from machine translation and bilingual dictionaries, the low-proficiency students should use other kinds of online tools such as monolingual dictionaries, search engines, and grammar checkers. Because machine translation and bilingual dictionaries are mainly used to find target equivalents or check meanings, students should be made aware of other aspects of language such as word usage or sentence structure. Monolingual dictionaries can be used to check the part of speech of a word; search engines can be used to check collocations by providing a concordance line or linking to a website for language learning; and grammar checkers can be used to check sentence structures such as subject-verb agreement.

Finally, both the low- and the high-proficiency groups should be encouraged to think in English and increase their vocabulary by getting more exposure to the English language such as by reading books or listening to news. Thinking in Thai and then translating into English may cause inaccuracies because the two languages belong to different families. Besides, as suggested by Scholfield (2002), students should 'think in the target language' to be efficient users of English because it is inefficient to perform the extra step of translating from the source language into the target language.

Conclusion

The aims of this paper were to explore types of online tools, purposes of, and strategies for using those tools in English writing by high-proficiency and low-proficiency students. The results showed that the students used seven kinds of tools to serve four purposes. To achieve each purpose, the students used different strategies. Regarding online tools, at the word level all seven kinds of tools were used, whereas at the phrase and sentence levels *Google Translate* was mainly used. In terms of proficiency, high-proficiency students used all seven kinds of tools while low-proficiency students used only two kinds of tools, namely *Google Translate* and *Longdo*. This study could suggest that Thai students used online tools when they wrote in English. However, teachers should recommend to students how to use online tools efficiently. Particularly, low-proficiency students should be guided to learn how to use several kinds of tools such as monolingual dictionaries, search engines and encyclopaedias. They, moreover, should be trained to use various strategies apart from translating and checking meanings of words/phrases/sentences.

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