



“Should I Submit a Blank Assignment?!!”: The Effect of Machine Translation on the Writing Process and Performance among Thai EFL Students with Low English Proficiency

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<p>Received 12/11/2023</p> <p>Received in revised form 17/12/2023</p> <p>Accepted 09/02/2024</p>	<h3>ABSTRACT</h3> <p>This study explores how machine translation (MT) influences the English writing process and performance of 29 9th-grade EFL students with limited English proficiency. Over 10 writing tasks conducted during the semester, participants had varied accessibility to MT. The research compared their performance when MT was permitted versus when it was not, assessed through evaluations of their assignments. Employing the technology acceptance model (TAM) as the analytical framework, the study utilized teacher notes and retrospective think-aloud interviews to glean insights into participants' MT usage and the influencing factors. Results indicate that MT usage significantly enhances final writing outcomes. A closer examination revealed that participants with MT access predominantly used writing strategies during the planning phase but evaded the drafting and reviewing processes. They tended</p>
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to compose assignments in their native language (L1), which was Thai, and directly translate them into English when utilizing MT. Conversely, when MT was unavailable, many participants abandoned the tasks entirely. Factors like perceived limited linguistic competence, disengagement from the writing process, ease of MT accessibility, perceived effectiveness of MT, and peer influence were critical determinants in their MT usage decisions. This study emphasizes the need for guiding effective integration of MT as a supportive tool, discouraging over-reliance.

Keywords: Machine Translation (MT), writing performance, writing process, students with low English proficiency

Introduction

The national policy in Thailand emphasizes the necessity for English as a Foreign Language (EFL) students to attain proficiency in all four language skills to actively engage in the global economy and enhance the country's international standing (Franco & Roach, 2018). Despite consistent efforts, Thai students continually struggle with writing proficiency, which has been attributed to various factors. Thailand's position at 101st out of 113 countries in the 2023 "EF English Proficiency Index" indicates an alarming deficiency in English proficiency (Bangkok Post, 2023). Students with low English proficiency exhibit an inadequate level of competence and ability in using the English language (Aina et al., 2013). Research validates concerns about Thailand's language competence, with writing identified as a significant challenge among students (Nopmanotham, 2016; Tanmongkol et al., 2020; Wongsothorn et al., 2003). Secondary EFL students in Thailand encounter hurdles in constructing coherent paragraphs or essays. Addressing these multifaceted challenges is essential to bolster Thai students' English writing abilities and ensure their competitiveness on the global stage.

The utilization of MT, which employs algorithms to convert text or speech from one language to another (Hutchins & Somers, 1992), signifies a significant trend in English writing classrooms, marking the evolving landscape of language learning facilitated by technology. Extensive research highlights its advantages for individuals with limited proficiency, enhancing word count, syntactic complexity, and accuracy (Cancino & Panes, 2021; Tsai, 2019). While integrating technology complements traditional teaching methods, it is essential to recognize its limitations in capturing contextual nuances (Namfah, 2023). This underscores the necessity for a comprehensive

exploration to understand how MT influences the writing performance, strategies, and processes of specific students. Although studies have touched upon the use of MT in English writing among Thai secondary students (Tanmongkol et al., 2020; Wonglakorn & Deerajviset, 2023), a research gap remains, specifically concerning the unique challenges faced by students with low English proficiency in MT-assisted writing contexts.

To understand this phenomenon, the technology acceptance model (TAM) (Davis et al., 1989), widely discussed in educational contexts (Lu et al., 2019; Yang & Wang, 2019), offers a framework to comprehend factors influencing how students perceive the usefulness of technology, their intention to use it, and other underlying elements in their English writing processes. Therefore, this research aims to bridge this gap by scrutinizing the specific effect of MT on students with low English proficiency.

To guide the study, the following three research questions were formulated:

1. What is the low English proficiency students' writing performance when MT is allowed and not allowed?
2. What are the low English proficiency students' writing strategies when MT is allowed and not allowed?
3. What factors influence their decision to use MT in their writing?

Literature Review

Writing Process

Crafting a high-quality written piece involves navigating through various essential steps and overcoming inherent writing challenges (Garcia & Pena, 2011). For EFL students, composing written texts in a second language often poses difficulties related to vocabulary and grammar proficiency. According to Kellogg (2001), writing comprises memory, cognitive abilities, and verbal expression. Effective writing strategies encompass several phases, such as planning, drafting or translating, and reviewing. During the planning stage, pre-writing techniques, such as brainstorming for idea generation, freewriting for creativity, and mind mapping for organizing thoughts, lay the groundwork. Brainstorming facilitates diverse perspectives, while revising and editing guarantee clarity. Structuring ideas through brainstorming offers a clear content direction. Visual organization via mind mapping, highlighted by Williams (2003), emphasizes planning and reflecting on prewriting materials for cohesive content. In drafting, freewriting stimulates the natural flow of ideas. Williams (2003) emphasizes this stage as vital for bringing life to the work, encompassing all relevant information while overlooking errors. During reviewing, collaborative brainstorming sparks creativity, while peer

feedback elevates writing quality. Revision and editing refine content, focusing on grammar and structure for coherence. Concluding with self-reflection promotes self-awareness and growth within this comprehensive approach to writing challenges and polished compositions (Harmer, 2004).

Machine Translation (MT) and L2 Writing

MT is the automated process of converting text or speech from one language to another, employing computer algorithms and artificial intelligence techniques (Briggs, 2018; Hutchins & Somers, 1992). Google Translate (GT), a notable MT system, merges statistical and neural machine translation algorithms to automatically translate text or speech. MT, while valuable, might not always ensure precise and contextually suitable translations, particularly in specialized domains. Enhancing MT output quality involves human input and rigorous post-editing, crucial for tasks requiring professional and nuanced translation (Alhaisoni & Alhaysony, 2017). Integrating technological abilities with human expertise acknowledges the complexities of translation, ensuring refined and dependable outcomes tailored to the specific challenges of diverse domains.

The integration of MT in EFL writing classrooms presents both opportunities and challenges, considering the intricate nature of the writing process. Studies underscore the significant assistance MT offers, particularly in terms of benefiting non-native English speakers (Tsai, 2019). For EFL students influenced by their L1, adopting MT for translation allows access to a broader range of lexical items and phrases, enhancing text cohesion, syntactic complexity, and overcoming early language barriers (Alrajhi, 2023; Cohen & Brooks-Carson, 2001; Ducar & Schocket, 2018; Garcia & Pena, 2011; Yang et al., 2023). Research highlights MT's role in error reduction, grammar enhancement, and fostering positive writing strategies (Lee, 2020; Stapleton & Kin, 2019). Nonetheless, concerns persist about students' over-reliance on MT, which is perceived as a shortcut that fosters dependency rather than a supportive tool (Kelly & Bruen, 2014; Namfah, 2023; Prichard, 2008). Such dependency raises worries about hindering language skill development and limiting genuine expression of thoughts (Namfah, 2023). Lee (2014) noted that heavy reliance on MT may lead students to prioritize completing writing tasks over comprehensive revision.

Various factors of students' decisions to use MT in writing have been extensively studied. An instructional factor in this regard involves instructors increasingly allowing the use of online dictionaries and translation tools like Google Translate in writing classrooms (Lee, 2014; Tsai, 2019; Wonglakorn & Deerajviset, 2023). Additionally, students' individual traits play significant roles. Language proficiency has emerged as a pivotal factor (Lee, 2020;

Stapleton & Kin, 2019). Students with lower proficiency levels tend to rely more on MT when composing pieces in their L2. Moreover, despite initial skepticism, students generally hold positive attitudes toward MT, indicating its potential to produce writing comparable to or even better than self-generated content (Alrajhi, 2023). This positive attitude is further reinforced by students' perceptions of MT's ease of use, accessibility, and convenience (Alrajhi, 2023; Cancino & Panes, 2021; Wonglakorn & Deerajviset, 2023).

The Technology Acceptance Model (TAM) as a Theoretical Framework

The technology acceptance model (TAM) stands as a widely recognized theoretical framework used in educational research to clarify and forecast individuals' acceptance and use of technology (Davis et al., 1989; Lu et al., 2019; Yang & Wang, 2019). In the context of this study, focusing on the utilization of MT by low English proficiency students in English writing, TAM serves as a guiding framework. TAM primarily revolves around four key factors explaining user acceptance of technology (Davis et al., 1989): 1) perceived usefulness, which concerns participants' beliefs regarding how MT enhances their performance or simplifies English writing tasks; 2) perceived ease of use, which explores how easily participants navigate MT while writing in English; 3) intention to use, which reflects participants' plans to use MT for their writing tasks, considering factors like perceived usefulness, ease of use, attitudes toward MT, and external influences; and 4) usage behavior, which involves observing the actual application of MT. Observing how participants apply MT in their English writing helps validate intentions and evaluate practical applications. Integrating intention to use and usage behavior into the TAM framework provides a comprehensive understanding of how low English proficiency students perceive, adopt, and utilize MT in their writing process.

Methodology

Research Context

The research was conducted within a secondary school situated in the eastern region of Thailand operating in accordance with the Thai Basic Education Core Curriculum. The student cohort enrolled in this school was characterized as low-proficiency based on the outcomes of the Ordinary National Educational Test (O-NET).

Participants

The participants of the study, who were 29 Thai EFL students aged 14 to 18 and enrolled in the 9th grade of public school in Thailand, had exhibited low English proficiency levels. They had opted to take this specific course as an elective in English, aiming to enhance their English skills beyond the core fundamental English subjects. Despite their initial classification, they voluntarily joined an elective English writing course, revealing their keen interest in improving writing skills. The participants, who had struggled in previous attempts with grades such as "D", "F", or "Incomplete," had undertaken the course multiple times, highlighting persistent challenges in learning English. This academic background, marked by repeated enrollments and lower grades, served as crucial context for analyzing their writing performance.

Research Instruments

Writing Prompts

Derived from an elective English writing classroom curriculum, the 10 writing tasks, aligned with the curriculum of an English writing classroom, played a vital role in evaluating participants' writing skills and exploring their use of MT tools across diverse task types. The prompts were designed to elicit expressive responses, emphasizing the development of narrative, descriptive, and comparative writing skills in an EFL context.

- Four narrative writing prompts: Participants constructed and narrated stories or personal experiences through prompts used to elicit creative and expressive responses.
- Four descriptive writing prompts: Participants created detailed and vivid descriptions of various subjects, places, or scenarios.
- Two comparative writing prompts: Participants made comparisons between two or more elements, subjects, or concepts.

Teacher's Notes

These notes served as a record of the teacher's observations while the participants were engaged in the writing tasks with varying degrees of access to MT. These observations were conducted during class time, providing insights into how participants interacted with MT and how it affected their writing processes and performance. The photos were captured during the research sessions with the informed consent of the participants, offering a multimedia dimension to the data collection process. They provided a visual

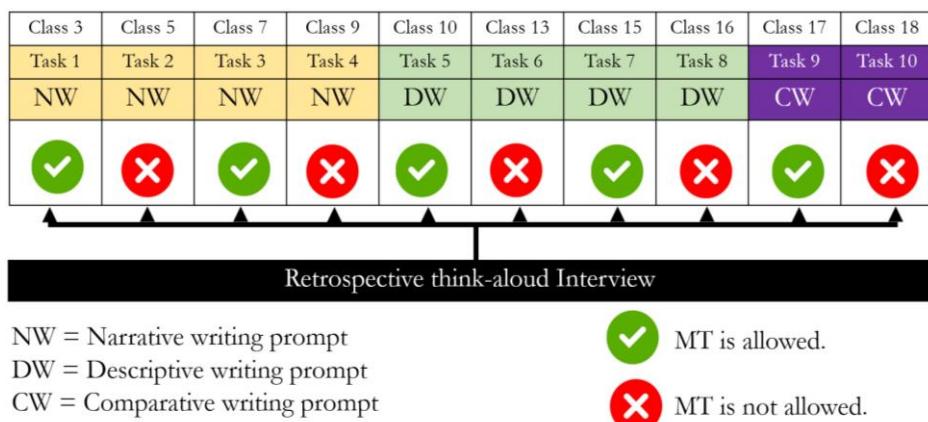
record of participants' engagement with the writing tasks and their interaction with MT tools.

Retrospective Think-aloud Interview

After class, a retrospective think-aloud interview was conducted, prompting participants to reflect on their writing experiences using their own writings and photos. The verbalization training sessions were conducted within the initial two weeks of the semester, spanning the first two classes and totaling approximately 3 hours. These sessions were introduced to help students acclimate to verbalizing their thoughts while completing tasks. Additionally, practice sessions or exercises were conducted before implementing the protocol in the actual research activities to familiarize students with the process. Despite prior verbalization training, some participants faced challenges expressing thoughts, often resorting to visual aids, such as drawings, to articulate their decision-making processes regarding MT use. These drawings became tangible representations of their cognitive strategies, revealing insights into their navigation of MT tools and writing decisions. With participant consent, photos of these drawings were captured, adding a visual dimension to the research data and offering a unique perspective on decision-making in L2 writing.

Data Collection

During the second semester of the 2022 academic year, participants engaged in writing tasks distributed as hard copies. The researcher also served as a teacher in this class. Writing prompts were introduced after structured content delivery. These prompts were presented during specific class sessions, namely, class 3, class 5, class 7, class 9, class 10, class 13, class 15, class 16, class 17, and class 18, respectively. Participant access to MT tools varied, as illustrated in Figure 1. The researcher refrained from intervening or suggesting the use of MT to observe the natural occurrence of participants' utilization of MT. From the outset, the participants predominantly employed the Google Translate application on their mobile phones and tablets.

Figure 1*Procedure of Data Collection*

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A total of 155 writing samples from individual assignments served as the primary data for analysis. Completed during designated class time, these in-class assignments had no effect on participants' final grades. Instead, they functioned only as research activities, ensuring participants engaged without academic consequences. Throughout class sessions, the researcher observed participants and documented their activities by taking photographs. Post-class, participants had individual meetings to discuss completed tasks. They were encouraged to verbalize thoughts or share insights in their native language about their writing experiences, using pen and paper if preferred. This comprehensive approach facilitated a detailed exploration of participants' interactions with MT and their writing strategies.

Data Analysis

The evaluation of the participants' writing was conducted using a 10-point scoring rubric, encompassing criteria such as writing organization (2 points), comprehension (2 points), vocabulary (3 points), and grammar (3 points). Regarding the rubric's origins, it was adapted from the school's existing writing rubrics to ensure alignment with their specific requirements and assessment standards. As for the assessment process, the researcher and one qualified co-rater, a university English lecturer, were tasked with collaboratively evaluating the writing samples. The teacher's notes provided behavioral insights, while photos added context to interactions with writing tasks and MT. Content analysis, employed with teacher's notes and retrospective think-aloud interviews, was used to extract themes and insights, enabling a systematic exploration of participants' experiences with MT integration. The analysis was based on the lens of the TAM, which encompasses perceived usefulness, perceived ease-of-use, intention to use, actual use, and external variables. To ensure consistency and reliability between the two coders, an intercoder reliability analysis was performed using Cohen's kappa statistic, and it revealed a substantial level of consistency between the two raters ($\kappa = 0.81$, $p < 0.001$, 95% CI [0.736, 0.875]).

Findings and Discussion

Research Question 1: What is the Low English Proficiency Students' Writing Performance When MT is Allowed and Not Allowed?

Table 1 presents the writing scores for each participant according to each writing prompt, comparing writing when MT was allowed and when it was not. Notably, when MT was permitted, participants achieved higher average scores (mean = 4.70) compared to when it was restricted (mean = 1.16). When MT was not allowed, many of them received scores of 0 due to submitting blank pages, resulting in a much lower average score of 1.16. The data reveals a range of individual scores, from 1.95 (P12) to 4.65 (P18), highlighting diversity in writing abilities. Scores under the MT-allowed condition demonstrated consistency, falling within a range of 3.24 (Task 5 DW) to 4.62 (Task 3 NW). In contrast, scores of writings without MT varied widely, from 0.22 (Task 4 NW) to 1.97 (Task 8 DW).

Table 1

The Writing Scores of Each Participant According to Each Writing Prompt, Based on When MT was Allowed and When It was Not Allowed (n = 29)

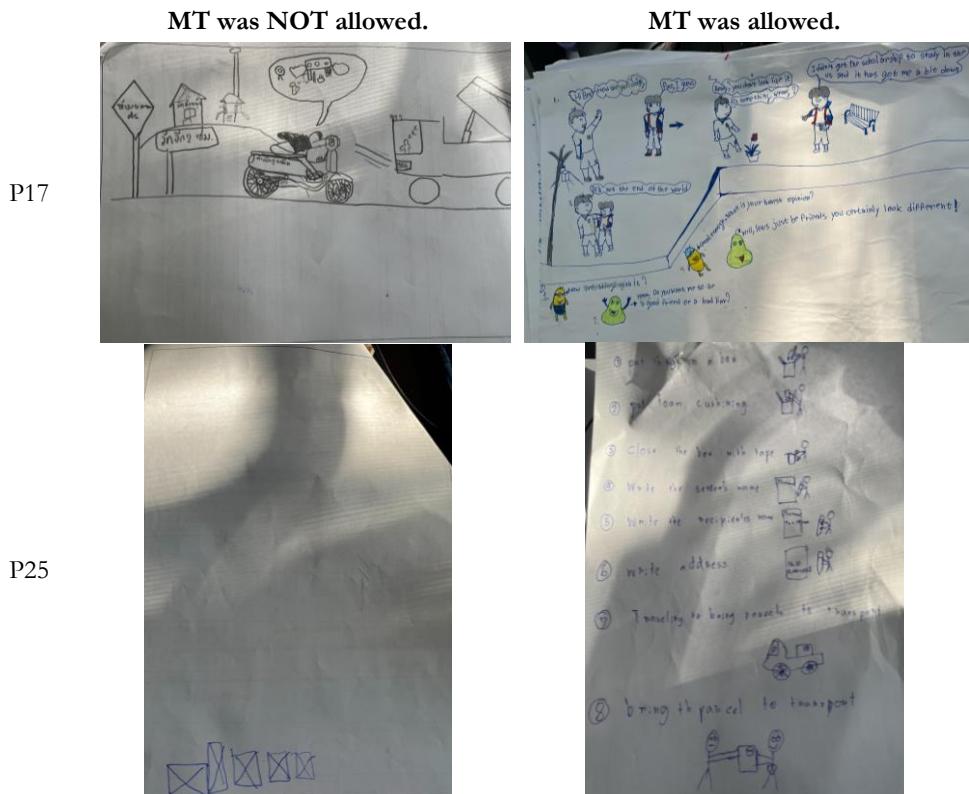
MT was allowed.										MT was NOT allowed.										Average per participant
Task 1 NW	Task 3 NW	Task 5 DW	Task 7 DW	Task 9 CW	Task 2 NW	Task 4 NW	Task 6 DW	Task 8 DW	Task 10 CW	Task 1 NW	Task 3 NW	Task 5 DW	Task 7 DW	Task 9 CW	Task 2 NW	Task 4 DW	Task 6 DW	Task 8 CW	Task 10 NW	
P1	2	3	2	8.5	4	0	0	0	1	1	1	0	0	0	0	0	0	0	0	2.15
P2	5	3	3	8	4	2	0	2	1	0	0	0	0	0	0	0	0	0	0	2.80
P3	5	3	3	8	3	1	0	3	1	0	0	0	0	0	0	0	0	0	0	2.70
P4	5	4	3	8	5	0	0	4	2	0	0	0	0	0	0	0	0	0	0	3.10
P5	4	5	4	9.5	5	1	0.5	2	3	0	0	0	0	0	0	0	0	0	0	3.60
P6	3	6	2	7	5	0	0	3	2	0	0	0	0	0	0	0	0	0	0	2.80
P7	2	4	5	7.5	4	0	0	1	1	1	1	0	0	0	0	0	0	0	0	2.55
P8	3	5	3	9.5	4	1	0	0	2	1	1	0	0	0	0	0	0	0	0	2.85
P9	4	6	3	8	3	2	0	0	3	1	1	0	0	0	0	0	0	0	0	3.00
P10	2	4	2	6.5	3.5	2	0	0	1	1	1	0	0	0	0	0	0	0	0	2.20
P11	3	3	5	7	4	2	0	2	2	1	1	0	0	0	0	0	0	0	0	2.90
P12	2	4	3	6.5	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1.95
P13	2	2	4	8	5	3	0	0	4	2	1	0	0	0	0	0	0	0	0	3.00
P14	2	5	6	8	3	1.5	0	2	5	1	1	0	0	0	0	0	0	0	0	3.35
P15	4	4	3	7	6	2	0.5	0	2	0	0	0	0	0	0	0	0	0	0	2.85
P16	3	5	5	6.5	3	3	0.5	2	1	0	0	0	0	0	0	0	0	0	0	2.90
P17	7	5	2	8	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0	3.20
P18	8	5	3	9.5	6	4	2	3	4	2	1	0	0	0	0	0	0	0	0	4.65
P19	2	5	3	8	4	0	0	0	1	3	0	0	0	0	0	0	0	0	0	2.60
P20	3	3	2	7	5	0	0	0	2	1	0	0	0	0	0	0	0	0	0	2.30
MT was allowed.										MT was NOT allowed.										Average per participant
Task 1 NW	Task 3 NW	Task 5 DW	Task 7 DW	Task 9 CW	Task 2 NW	Task 4 NW	Task 6 DW	Task 8 DW	Task 10 CW	Task 1 NW	Task 3 NW	Task 5 DW	Task 7 DW	Task 9 CW	Task 2 NW	Task 4 DW	Task 6 DW	Task 8 CW	Task 10 NW	
P21	4	5	2	9.5	3	3	0	0	5	2	0	0	0	0	0	0	0	0	0	3.35
P22	2	5	2	7.5	2	0	0	2	2	1	0	0	0	0	0	0	0	0	0	2.35
P23	5	6	3	6.5	3	1	0	3	2	2	0	0	0	0	0	0	0	0	0	3.15
P24	6	6	4	6	4	0	0	1	1	2	0	0	0	0	0	0	0	0	0	3.00
P25	5	7	5	8	5	2	0	1	2	1	0	0	0	0	0	0	0	0	0	3.60
P26	5	7	3	6.5	6	2	1	1	2	2	0	0	0	0	0	0	0	0	0	3.55
P27	4	6	5	9.5	6	2	1	2	1	1	0	0	0	0	0	0	0	0	0	3.75
P28	3	4	2	8	5	0	0	0	1	2	0	0	0	0	0	0	0	0	0	2.50
P29	3	4	2	8	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2.20
Average per task	3.72	4.62	3.24	7.78	4.12	1.29	0.22	1.21	1.97	1.10	0	0	0	0	0	0	0	0	0	2.92
			4.70																	

Note: NW = narrative writing prompt, DW = descriptive writing prompt, and CW = comparative writing prompt

Figure 2 displays writing samples, exhibiting a distinct contrast in participants' task completion with and without MT. When MT was allowed, participants not only successfully finished the assignments, but their work was also in contrast to that produced when MT use was restricted, which led to submission of nearly blank pages. Due to numerous blank page submissions, many participants received scores of 0, resulting in the lower average assignment scores when MT was not allowed. One participant, P17, attempted to draw their ideas when MT was prohibited but eventually failed to produce any written content.

Figure 2

The Samples of Writing from the Participants When Machine Translation (MT) was Allowed Versus When It Was Not



This study underscores the significance of MT in assisting students with low English proficiency in developing essential vocabulary and grammar skills necessary for task completion. Throughout the study, participants were required to produce narrative, descriptive, and comparative writings. It

became evident that when MT was permitted, participants showed a greater capacity to surmount language barriers. This was achieved through the translation process from their native, linguistically richer L1 language, Thai, into their L2 language, English, enabling them to generate coherent written content. This contributes to the literature on the role of MT in EFL writing. Previous studies exploring MT usage in English writing among Thai secondary students (Nopmanotham, 2016; Tanmongkol et al., 2020; Wonglakorn & Deerajviset, 2023) have suggested that students utilize MT as a supportive tool in their writing performance. Also, these findings are consistent with prior research which similarly concluded that MT usage positively impacted students' performance by expanding their repertoire of lexical items and phrases (Cancino & Panes, 2021; Cohen & Brooks-Carson, 2001; Garcia & Pena, 2011; Tsai, 2019). This positive impact was reflected in higher average scores and a more consistent range of performance in terms of task completion.

However, the absence of MT, leading to lower scores and even absolute zeros in some participants' submissions, raises significant concerns. When MT use was prohibited, participants frequently submitted blank pages, rendering raters unable to assign scores. This lack of MT resulted in a broader range of scores, predominantly lower overall. Moreover, this study sheds light on the heavy reliance of students with low English proficiency on MT for language translation. The feeling of uncertainty or incapability to generate content without the assistance of MT could potentially discourage them from attempting tasks, resulting in blank submissions. Therefore, when understanding the effect of MT on Thai EFL students with low English proficiency, it is essential to consider both task completion and the students' attempts on tasks as crucial considerations.

Research Question 2: What are the Low English Proficiency Students' Writing Strategies When MT is Allowed and Not Allowed?

The teacher's notes and retrospective interviews provided a comprehensive insight into the participants' utilization of MT during their writing tasks, as demonstrated in Table 2. When MT was allowed, the writing process encompassed multiple stages. During the planning phase, participants brainstormed writing prompts, gathered information, and outlined their plans, initially conducting most planning in English before translating into Thai. Subsequently, during outlining and drafting, they shifted entirely to Thai, crafting descriptive, narrative, and comparative writing in their L1. In the drafting and reviewing phases, participants translated their 'L1' Thai

writing' into 'L2 English writing' using MT, considering their writing task completed after transcribing MT-generated English translations onto paper. Conversely, when MT was prohibited, participants solely sought assistance from peers or the teacher, relying on their L1 Thai. However, their attempts to create content with limited language skills were abruptly halted, resulting in many submitting blank pages. This contrasted sharply with their writing approach when MT was permitted, highlighting the significant impact of MT on their writing process and content creation.

Table 2

Writing Strategies and Language Use when MT was Allowed and NOT Allowed

Access to MT	Writing stages	Language use
Writing strategies when MT was allowed	During planning	
	- Brainstorming	English into Thai
	- Gathering information	English into Thai
	- Outlining	Thai only
	During drafting	
	- Composing	Thai only
	- Translating	Thai into English
	- Back translating	English into Thai
	During reviewing	-
	- (No observation of writing strategies)	
Writing strategies when MT was NOT allowed	During planning	
	- Seeking assistance from peers or the teacher	Thai only
	During drafting	-
	- (No observation of writing strategies)	
	During reviewing	-
	- (No observation of writing strategies)	

Participants' Writing Strategies When MT Was Allowed

When MT was allowed, the participants extensively integrated MT with writing strategies across the various stages of writing. For example, P17, when MT was allowed, reused an idea from a previous descriptive task and supplemented it with MT. Consequently, he was able to construct a sentence with the idea he intended to convey (Figure 2).

During Planning

The participants formed collaborative groups, translating prompts from English to Thai with MT to ensure comprehension (Figure 3).

Figure 3

The Image Shows the Participants Translating the English Prompts into Thai During Planning.



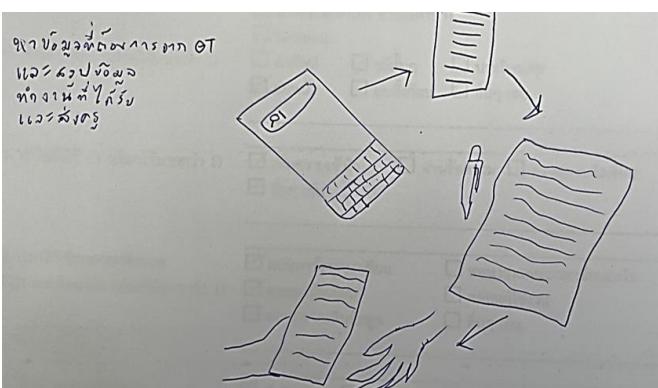
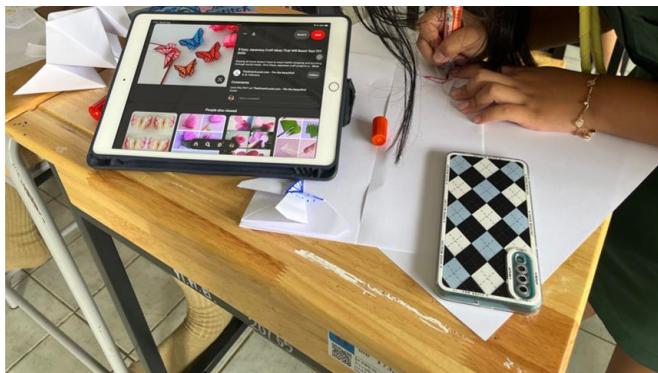
They brainstormed ideas related to the directions of the writing prompts. This dynamic and resourceful approach highlights participants' collective effort, shared responsibility, and a dedication to obtaining a thorough understanding of the writing prompts.

P11 [CW-MT-A]	ก็แปลก่อนว่าครูจะให้เขียนอะไร ทำอะไรมั่ง "Just translate first what the teacher asks us to write or do."
P20 [CW-MT-A]	ก็(ชื่อเพื่อน) ก็ลองเอาของค้าม้าแสกน ออกมากล้าบๆกัน "(Friend's name) also tried scanning his/her stuff, and it came out similar."

When permitted to use MT, participants systematically gathered information by browsing English websites such as Pinterest and Wikipedia (Figure 4). They sought relevant content for their writing tasks and then employed Google Translate add-ons to seamlessly translate the English text into Thai.

Figure 4

A Participant's Illustration Produced during the Retrospective Think-aloud Interview to Show How They Gathered Information from English Websites Using Google Translate Add-ons.



Translation:

Finding the information needed using the Google Translate application, summarizing the information, working on the assignments, and submitting the assignments to the teacher

This translation step was vital for complete comprehension and enabled them to understand and utilize the gathered information effectively. Using the translated information, participants organized their thoughts on paper in their L1 Thai, structuring ideas and planning coherent narratives to respond to prompts (Figure 4). Their systematic process, from information search to translation to organization, was greatly facilitated by MT, enabling easy access to, comprehension of, and utilization of English content for supporting their writing tasks.

P27
[DW-MT-A]

ใน pinterest มันมีอยู่ว่าต้องมีอะไรบ้าง...ก็ถูบ้างเป็นแนวทาง
"On Pinterest, there was information. Just take a look as a sample."

During Drafting

After completing their planning, the participants turned to MT to bridge the linguistic gap between Thai and English. They wrote in their L1 Thai. To finalize their responses, the participants physically transferred MT-generated English translations onto paper, transitioning from a digital format to a tangible one for submission (Figure 5).

P27

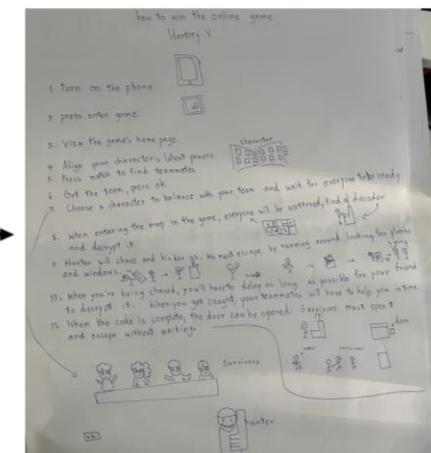
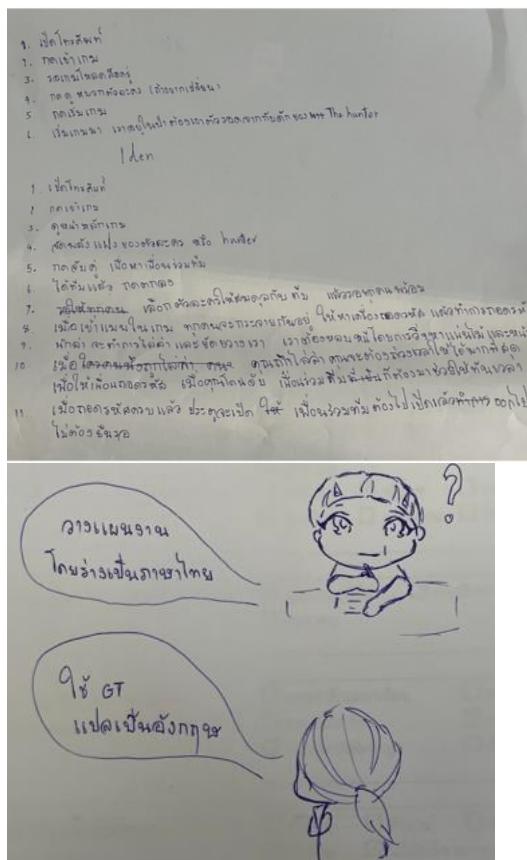
[DW-MT-A]

พอกดออคอมแล้วก็ถูกส่งครู

"Once it's typed out, just copy it and submit it to the teacher."

Figure 5

The Images Show That Participants Translated Thai into English and Transferred It onto Paper for Submission.



Translation:

Planning what to write in the Thai language

Using the Google Translate application to translate [from Thai language] into English.

Moreover, the participants distinguished themselves through their meticulous attention to translation quality in their process. They took measures to ensure accuracy by exchanging mobile phones with friends, and comparing translations and back translations from different MT applications. This approach aimed to identify disparities and inconsistencies in translation output.

P28 [DW-MT-A] ก็ [ชื่อเพื่อน] ลองกดคิวบ์ว่าใช้ google ในมือถือกับในหน้าจอ มันจะออกมาเหมือนกันมั้ย แล้วก็บางทีไม่เหมือน "Then, [friend's name] tried searching it to see if using Google on the phone and on the desktop would show the same thing. Sometimes, it doesn't match."

They even considered using multiple MT applications simultaneously to enhance verification.

P28 [DW-MT-A] มันจะมีเว็บของไทย [สำหรับแปลง] ถ้าคล้ายๆก็พอโอเค "There's a Thai website [for translation]. If it's similar, then it's okay."

During Reviewing

The findings revealed that participants extensively used MT during the planning and drafting stages when its use was allowed. However, they refrained from using it during the reviewing stage. Samples of their submissions demonstrated numerous grammatical errors, including fragments and run-on sentences, highlighting the influence of their native language, Thai, being translated into English (Figure 6). Additionally, some participants submitted their writing in French (Figure 6), mistakenly believing it was in the English language.

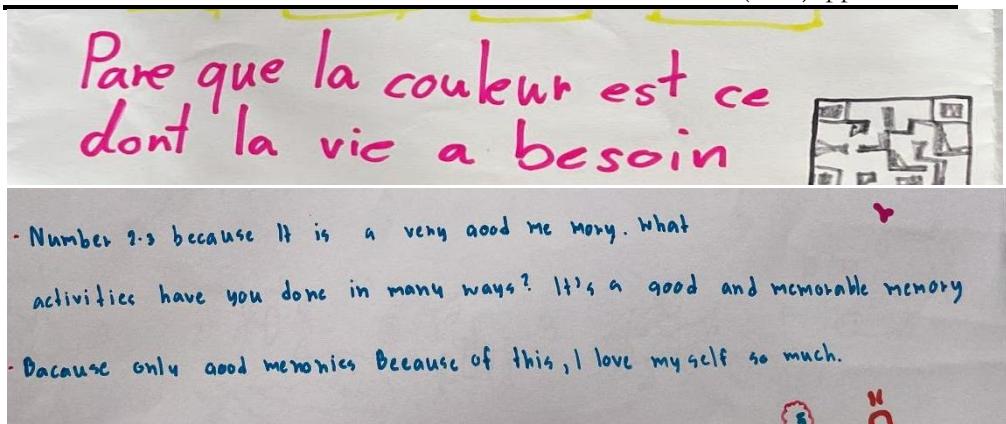


Figure 6

Sample of Participants' Submissions

Some participants mentioned that although they reviewed their own writing, they struggled to determine if the language was appropriate.

P2 [NW-MT-A)	ເຫັນກ່ອນສ່າງໄປ ຈະຮູ່ມີຍຳດ່ວ່າໃໝ່ຫົວໜ້າ "Should I check it before submitting? I don't know whether it's correct or not."
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This behavior might be linked to their perception that once they had transferred the translated English text into the submission, the writing process had concluded. This inclination was reflected and implied in their depiction of the writing process in Figures 4 and 8.

Participants' Writing Strategies When MT Was Not Allowed

P13 [NW-MT-NA) ผมรู้ว่าต้องเกี่ยนอะไร แต่แค่นึกคำไม่ออกเลยๆ ก็ที่ถูกครู
ไข่ว่าคำว่า “ท่ออยู่” ภาษาอังกฤษมันว่าอะไร

"I knew what I had to write, but I just couldn't think of the word. It's like asking the teacher what the word 'ନୋୟ' is in English."

MT was NOT allowed. **MT was allowed.**

P13

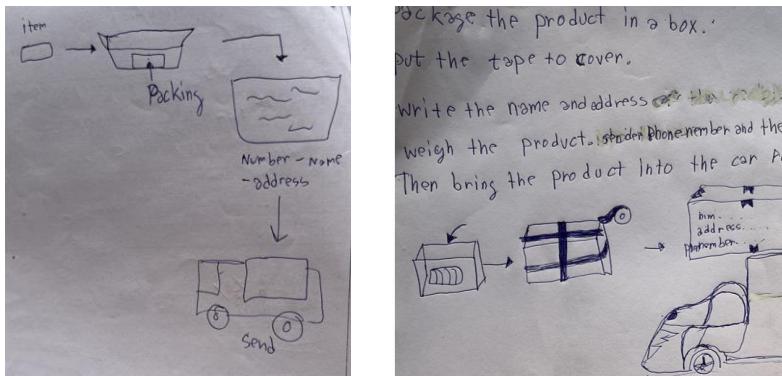


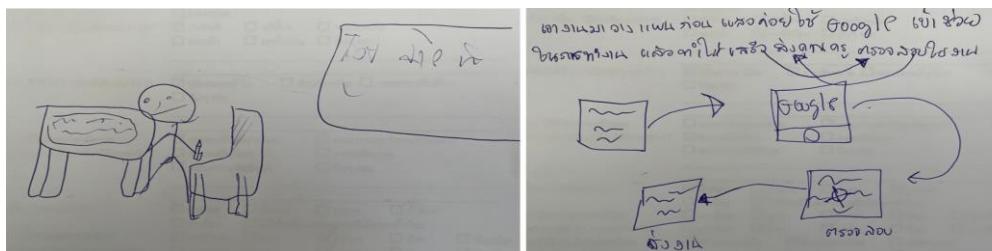
Figure 7

The Samples of Writing from the Participants When MT was Not Allowed Versus When It Was.

The participants faced challenges when MT was not allowed, expressing uncertainty despite the fact that other resources, like teacher and peer assistance, were available. This uncertainty led to a feeling of being "stuck" (Figure 8), vividly described as sitting in front of blank pages, unable to initiate responses.

Figure 8

The Image on the Left Shows How Participants Expressed Feelings of Being 'Stuck' When They were NOT Allowed to Use MT, Whereas the Image on the Right Describes How They Employed MT in Their Writing Process.



Translation -----	Beginning with planning, then using Google Translate to assist in completing the assignments, finalizing them, reviewing them, and submitting them to the teacher
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It is worth noting that a hard copy Thai-English dictionary was available at the front of the classroom. Only a few participants made use of it, and they stopped using it because they felt it was 'too slow' and difficult to use.

P19
[DW-MT-NA] ลองแล้ว [ใช้พจนานุกรมหน้าห้อง] แต่หนูปิดไม่ค่อย
เป็น กลายเป็นช้าเกินแล้วก็ไม่รู้
“I tried [using the dictionary in front of the classroom], but I couldn't really use it. It became too slow, and I didn't know.”

During a writing assignment without MT, one participant exclaimed, '*Give me my phone. I am 'clueless' and 'hopeless' now. Should I submit a blank assignment?*' This reflects frustration and a heavy reliance on MT. "Clueless" suggests feeling lost without the MT for guidance, and "hopeless" indicates despair or helplessness without its support. The participant conveys the idea that without access to the phone or its assistance, completing the assignment might be challenging, expressing a willingness to submit it as a blank or unfinished piece of work.

This finding shows that there is a range of opportunities and challenges in EFL writing classrooms following the integration of MT. The opportunities emerged as EFL secondary students (Tsai, 2019; Wonglakorn & Deerajviset, 2023; Yang et al., 2023) demonstrated the application of writing strategies across the writing process, in stark contrast to the almost absent use of writing strategies when MT was not permitted. The analysis indicated that when MT was allowed, participants primarily utilized MT during the planning and drafting stages. MT played a pivotal role by facilitating the translation of their content, a necessary step for completing the writing tasks. The participants' dedication to translation evaluation, involving cross-checking and contemplating various MT applications, demonstrated their commitment to delivering accurate and contextually appropriate translations. Previous studies on writing strategies encompass various techniques and approaches individuals can use to plan, compose, revise, and edit written texts (Garcia & Pena, 2011; Williams, 2003). Similarly, they involve employing diverse linguistic structures, vocabulary, and sentence

formations to effectively convey ideas and concepts in writing (Kellogg, 2001).

However, this finding primarily emphasizes a drawback of MT in terms of shaping the writing strategies of low English proficiency participants throughout the writing process. Although MT offers potential improvements in accuracy and relevance, its efficacy should be maximized by human review and post-editing processes, leveraging human expertise (Ducar & Schocket, 2018) and nuanced translation (Alhaisoni & Alhaysony, 2017). In this study, participants abstained from using machine translation during the reviewing process, which differs from Wonglakorn and Deerajviset's (2023) observations that found students were capable of completing all stages of writing. Harmer (2004) emphasizes the pivotal role of the reviewing stage for self-reflection and peer feedback. Participants in this study overlooked this stage, considering their work complete and feeling no necessity to revisit or review their writing. The use of MT among students with low English proficiency raised concerns as it seemed to foster dependency rather than being used as a supportive tool (Namfah, 2023; Prichard, 2008). Therefore, this study highlighted that the use of MT, combined with students' low English proficiency, hindered the completion of the loop involving human review and post-editing stages, thereby impeding the development of L2 writing skills, consistent with Stapleton and Kin (2019). These challenges necessitate additional measures and instructional approaches in writing among students with low English proficiency to advance their writing development.

Research Question 3: What Factors Influence Their Decision to Use MT in Their Writing?

The choice to use of MT in writing processes is influenced by several significant factors. These identified factors, such as perceived limited linguistic competence, disengagement from the writing process, accessibility and ease of MT use, perceived effectiveness of MT, and peer influence, play crucial roles in determining whether individuals decide to utilize MT tools during their writing tasks.

Perceived Limited Linguistic Competence

Despite receiving instruction from their teacher, they found challenges in applying this knowledge. This was due to their own beliefs about their limited linguistic competence. Questions regarding English grammar, including questions on verb-form formation and construction of grammatically correct sentences, also arose. Uncertainties, such as

questioning the "-ed" form of the verb "go," highlighted participants' struggles with grammar concepts.

P10 [DW-MT-NA)	ພມກີ່ຽນເຄີ່ພຣສເຫັນຈົນ ຄຣູ C ສອນນາແລ້ວແລະເນື່ອວານ ແຕ່ລື່ມ ແລ້ວ “Just simple tense...that I know. Teacher C. taught me something yesterday but I can't remember now.”
P18 [DW-MT-NA)	ໜູ້ເພີ້ນ ແບນວ່າ I am going to go to send package to go at Bangkok ໄດ້ມີຂະ ໄນແນ່ໃຈທ່າໄໝ ຂອເຊີກອີກຮອບໄດ້ມີຂະ “Can I write – I am going to go to send package to go at Bangkok.”? I am not sure. Can I check again now?”
P1 [DW-MT-NA)	ເຕີມ ed ໃຫ້ go ແລ້ວເພີ້ນຍັງໄໝ “What is the –ed form of go?”

The participants turned to MT due to perceived limited linguistic competence, relying on it as a tool to compensate for deficiencies in vocabulary, grammar, and language proficiency. The vocabulary gaps made it difficult to articulate thoughts effectively in English. Hence, they resorted to using MT.

P1 [DW-MT-NA)	ພມກີ່ຽ້ສັບຖື [ກາຍາອັງກຸມ] ອູ້ໄນ້ກີ່ຄໍາ ໃຫ້ໄປຫາເອງມັນຍາກນະຄຣູ “I know only a few pieces of English vocabulary. It is very hard for me to find the English words.”
P20 [DW-MT-NA)	...ສັບຖື [ກາຍາອັງກຸມ] ນ້ອຍ ນີກສັບຖືອັງກຸມ ໄນ ອັນໄດ້ວິທີ “...Limited vocabulary...always cannot figure out what it is in English.”

Disengagement from the Writing Process

A lack of motivation or interest in writing tasks leads to disengagement or unwillingness to participate actively. Their choice to use MT reflected a desire for convenience and efficiency in quickly completing assignments without significant effort in engaging in the writing process. They suggested using MT to "get things done" quickly.

P2
ໃຫ້ໃຊ້ຫົ່ວ້ອໄນ້ໃຊ້ຍັງໄງແກໍໄມ້ມີຂຶ້ນຫຮອກ ໃຫ້ມັນເສົ້າຈະມີສ່າງ

[DW-MT-NA) P2 [DW-MT-NA)	<p>“Use it [machine translation] or not, I will not be able to be good in English. Just get things done.”</p> <p>ก็ไม่ใช่ของชอบ ไม่อยากสนใจ ไม่สนับท่าไม่ได้หรือท่าไม่ครูไม่ให้ผมใช้มือถือ แล้วคะแนนจะได้ดีๆล่ะ</p> <p>“[English is] not my type, not my interest, not my aptitude...I cannot do it well. Why don't you just give me back my phone and let me gain a better score?”</p>
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Peer Influence

Observing peers widely using MT in their writing influenced the participants to follow suit. Additionally, recommendations, opinions, or experiences shared by others could motivate an individual's decision to use MT in writing.

P19 [DW-MT-NA)	<p>ครูคุณ ใช้กันทั้งห้อง แล้วจะให้หนูไม่ใช่ ก็ไม่ต้องไปคืนข้าว แล้ว</p> <p>"Teacher, everyone in the class is using it, so why shouldn't I use it? If I don't use it, I won't be able to eat lunch."</p>
P13 [NW-MT-NA)	<p>[ชื่อเพื่อน] เอาให้คุณครัวก่อนได้คะแนนดี ให้ลองเอาใส่ถุง เก็บกลับไปเก็บกลับมา ก็ใช้ดีนะ</p> <p>"[Friend's Name] showed me that she got a good score last time. She tried using Google Translate back and forth, and it worked well."</p>

Accessibility and Ease of MT Use

The individuals valued MT due to its time-saving feature, eliminating the need to spend time considering individual English words or dealing with vocabulary issues. They also appreciated the application's user-friendly interface which encouraged its convenient use.

P2 [NW-MT-A)	ใช้ง่าย แค่จิ๊ก "Easy to use, just a few clicks."
P19	ไวนาก ไวนั้งคิดเหยาะเรื่องสัพน์

[NW-MT-A)	"Save time...I don't need to think about this word [pinning the words in his assignment] at all."
P1	...ສຽງຄຸດຄູ່ເຄົາຈ່າຍກວ່າແລະ...
[DW-MT-NA)	"...it is easier to get it from Google [Translate]..."
Also, the availability of free and accessible Wi-Fi at their school made MT a practical and cost-effective choice without any additional expenses.	
P8	ເຮັດວຽກທີ່ມີການໃຫ້ມີ້ນີ້ກ່າວກຳມີການໃຫ້ມີ້ນີ້ກ່າວກຳມີການໃຫ້ມີ້ນີ້ກ່າວກຳມີການໃຫ້ມີ້ນີ້ກ່າວກຳມີການ
[NW-MT-NA)	"Our school provides free Wi-Fi, right? Why don't we just use it? It is free!"

Perceived Effectiveness of MT

The participants reported having trust in the accuracy and reliability of MT-generated writing assignments. They also believed in the usefulness and effectiveness of MT in improving their writing performance.

P27	ເວລາເພີ້ນ [ດ້ວຍ MT] ມັນໄດ້ປະໂຫຍາວາ ແລ້ວຄູກດ້ວຍ ມີຈານສ່າງມີຄະແນນ
[NW-MT-A)	"When writing [with MT], I can create long and correctly structured sentences, and the assignments I submit get scores."
P19	ແກ່ພິມພີ່ໄທເຊື້ອມນັກ້ໄໝ້ສັກຄຸມມາ...ຄູກດ້ວຍ
[NW-MT-A)	"Just type in Thai. Then! English word is there...it's correct"

Also, the participants expressed confidence in verifying MT-generated translations, showcasing their sense of control and proficiency. They also recognized various shortcuts and techniques which could be used to enhance MT effectiveness, including comparing results from multiple phones for accuracy. This highlights their active engagement and exploration of diverse MT strategies and features.

P18	ຮູ້ອ່າວ່າຕ້ອງຮັບກັບໄງ່ວ່າມັນເວົ້າມີ ແລ້ວມີພາກສ້ອຕັກ ວິທີໃຊ້
[CW-MT-A)	ເກົ່ານີ້ດັ່ງຍ້ອຍໃຫ້ຮັບຕາ ບາງທີ່ເອົາໄປເຖິງກັບຂອງຄົນອື່ນ
	"We know how to recheck if the GT is accurate or not. There are many shortcuts, tricks, and techniques to use GT effectively. Sometimes, we compare results from all phones."

This finding resonates with the TAM principles by emphasizing how perceived ease of use and perceived usefulness influence participants' decisions to accept and adopt MT in their writing processes. These factors resulted from the interaction between MT users and the technology itself, supporting the TAM framework (Davis et al., 1989; Lu et al., 2019; Yang & Wang, 2019). Regarding perceived ease of use, the participants valued MT for its time-saving features and user-friendly interface, which made it accessible and straightforward, thus encouraging its convenient use. Additionally, the accessibility of free Wi-Fi also promoted its perceived ease of use. Moreover, the participants' trust in the accuracy and reliability of MT aligns with perceived usefulness in TAM, as their belief in the technology's effectiveness in improving writing performance contributed to their positive perception of MT. This explanation further contributes to the existing literature on MT acceptance in writing when MT is allowed (e.g., Cancino & Panes, 2021; Wonglakorn & Deerajviset, 2023; Yang et al., 2023).

Furthermore, the participants' reliance on MT was notably influenced by external factors inherent in their behaviors. Specifically, these were perceived limited linguistic competence, disengagement from the writing process, and peer influence. This underscores the significant impact of students' English proficiency levels on their utilization of MT. Previous studies have highlighted various factors influencing students' use of MT, emphasizing its effectiveness in providing lexical items, improving grammar, and enhancing cohesion (Garcia & Pena, 2011). This study extends this perspective by exploring personal factors such as perceived limited linguistic competence, which may contribute to disengagement from the writing process. This disengagement, in turn, can be amplified by peer influence, leading participants to overly rely on MT. Thus, it emphasizes the critical role of perceived limited linguistic competence, demonstrating that participants turned to MT as a last resort due to their own limited English proficiency.

Implications

Addressing Writing Challenges Among Students with Low English Proficiency

Recognizing the writing challenges faced by participants, such as limited English vocabulary and grammar uncertainties, teachers can tailor language learning interventions to address these specific challenges. Targeted vocabulary building and grammar instruction can complement the use of MT. Additionally, the use of MT can be complemented by targeted language learning strategies, aiming to enhance overall writing proficiency by addressing specific linguistic challenges.

Balanced and Healthy Use of MT in the EFL Writing Process

Recognizing students' reliance on MT due to perceived language limitations emphasizes it is imperative to enhance writing instruction in the EFL classroom, particularly for those with limited English proficiency. By delving deeper into the learning journey, teachers can grasp the significance of each step, the challenges encountered, and the insights gained, thereby enriching the educational experience. MT can be strategically integrated into instruction, with comprehensive guidance on its effective use provided throughout the various stages of writing, including drafting, revising, and editing. This strategic approach enables students to leverage MT as a supplementary tool to enhance their writing skills rather than merely relying on it as a replacement, thereby fostering improved learning outcomes. Moreover, encouraging collaborative writing projects enables students to collaborate, exchange ideas, and offer feedback to one another. Through collaborative efforts, students are motivated to actively develop their writing abilities, reducing their over-reliance on translation tools and enhancing their overall writing proficiency.

Limitations and Suggestions for Future Studies

The study's context-specific nature, influenced by factors such as the educational setting and participant demographics, might limit the broader application of its findings. The exclusive focus on students with low L2 proficiency constrains the generalizability of the conclusions drawn. Future research endeavors should aim to explore the effectiveness of integrating MT across diverse language proficiency levels to gain a more comprehensive understanding. Additionally, while this study captured the students' use of MT within a specific timeframe, it did not follow up on the long-term effects of MT on their writing development. Subsequent investigations should delve into the prolonged impact of MT integration on students' language proficiency development and consider practical challenges in implementing interventions, such as time constraints and resource availability. Moreover, there is a need to design writing instruction that advocates for balanced and healthy use of MT in the EFL writing process. Assessing the effectiveness of such instruction in enhancing the writing process itself, rather than solely focusing on performance improvement, should be a key consideration for future studies.

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References

Aina, J. K., Ogundele, A. G., & Olanipekun, S. S. (2013). Students' proficiency in English language relationship with academic performance in science and technical education. *American Journal of Education Research*, 1(9), 355–358.
<https://doi.org/10.12691/education-1-9-2>

Alhaisoni, E., & Alhaysony, M. (2017). An investigation of Saudi EFL university students' attitudes towards the use of Google Translate. *International Journal of English Language Education*, 5(1), 72–82.
<https://doi:10.5296/ijele.v5i1.10696>

Alrajhi, A. S. (2023). Genre effect on Google Translate–assisted L2 writing output quality. *ReCALL*, 35(3), 305-320.

Bangkok Post. (2023, December 3). *Poor English is holding Thais back*.
<https://www.bangkokpost.com/opinion/opinion/2697054/poor-english-is-holding-thais-back>.

Briggs, N. (2018). Neural machine translation tools in the language learning classroom: Students' use, perceptions, and analyses. *JALT CALL Journal*, 14(1), 3-24. <https://doi.org/10.29140/jaltcall.v14n1.221>

Cancino, M., & Panes, J. (2021). The impact of Google Translate on L2 writing quality measures: Evidence from Chilean EFL high school learners. *System*, 98, Article 102464.
<https://doi.org/10.1016/j.system.2021.102464>

Cohen, A. D., & Brooks-Carson, A. (2001). Research on direct versus translated writing: Students' strategies and their results. *The Modern LEARN Journal*: Vol. 17, No. 2 (2024)

Language Journal, 85(2), 169–188. <https://doi.org/10.1111/0026-7902.00103>

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35, 982–1003.
<https://doi.org/10.1287/mnsc.35.8.982>

Ducar, C., & Schocket, D. H. (2018). Machine translation and the L2 classroom: Pedagogical solutions for making peace with Google translate. *Foreign Language Annals*, 51(4), 779– 795.
<https://doi.org/10.1111/flan.12366>

Franco, A., & Roach, S. (2018). An assessment of the English proficiency of the Thai workforce and its implication for the ASEAN economic community: An empirical inquiry. *Open Journal of Business and Management*, 6, 658-677. <https://doi:10.4236/ojbm.2018.63050>.

Garcia, I., & Pena, M. I. (2011). Machine translation-assisted language learning: writing for beginners. *Computer Assisted Language Learning*, 24(5), 471–487.
<https://doi.org/10.1080/09588221.2011.582687>

Harmer, J. (2004). *How to teach writing*. Pearson Longman.

Hutchins, J., & Somers, H. (1992). *An introduction to machine translation*. Academic Press Limited.

Kellogg, R. (2001). Competition for working memory among writing processes. *The American Journal of Psychology*, 114, 175–191.
<https://doi.org/10.2307/1423513>

Kelly, N. & Bruen, J. (2014). Translation as a pedagogical tool in the foreign language classroom: A qualitative study of attitudes and behaviours. *Language Teaching Research*, 19(2), 150- 168.
<https://doi:10.1177/1362168814541720>

Lee, S. M. (2014). Grammatical error patterns in EFL students' writing across different language proficiency levels. *Foreign Languages Education*, 21(2), 1–28. <https://doi:10.15334/FLE.2014.21.2.1>

Lee, S. M. (2020). The impact of using machine translation on EFL students' writing. *Computer Assisted Language Learning*, 33(3), 157–175.
<https://doi.org/10.1080/09588221.2018.1553186>

Lu, Y., Papagiannidis, S., & Alamanos, E. (2019). Exploring the emotional antecedents and outcomes of technology acceptance. *Computers in Human Behavior*, 90, 153–169.
<https://doi.org/10.1016/j.chb.2018.08.056>

Namfah, N. (2023, January 27 - 28). Effect of students' dependency on machine translation on their writing process and writing

performance [Paper presentation]. The 42nd Thailand TESOL International Conference 2023, Bangkok. Thailand.

Nopmanotham, N. (2016). A study of writing strategies used by Thai EFL high school students [Unpublished Master Thesis]. Thammasat University.

Prichard, C. (2008). Evaluating L2 readers' vocabulary strategies and dictionary use. *Reading in a Foreign Language*, 20(2), 216-231.

Stapleton, P., & Kin, B. L. K. (2019). Assessing the accuracy and teachers' impressions of Google translate: A study of primary L2 writers in Hong Kong. *English for Specific Purposes*, 56, 18 - 34. <https://doi.org/10.1016/j.esp.2019.07.001>

Tanmongkol, N., Moonpim, R., Vimontvattaraveete, S., Suteerapornchai, T., & Kaniyo, W. (2020). The main reason that Thailand's high school students are not adapting in the English language. *International Journal of Research and Review*, 7(6), 247-253.

Tsai, S.-C. (2019). Using Google Translate in EFL drafts: A preliminary investigation. *Computer Assisted Language Learning*, 32(5–6), 510–526. <https://doi.org/10.1080/09588221.2018.1527361>

Williams, J. D. (2003). *Preparing to teach writing: Research, theory, and practice*. Lawrence Erlbaum Associates.

Wonglakorn, P., & Deerajviset, P. (2023). The effects of collaborative process writing approach on Thai EFL secondary school students' writing skills. *LEARN Journal: Language Education and Acquisition Research Network*, 16(1), 495–522. <https://so04.tcithaijo.org/index.php/LEARN/article/view/263454>

Wongsothorn, A., Hiranburana, K., & Chinnawong, S. (2003). English language teaching in Thailand today. In W.K. Ho & R.L. Wong (Eds.), *English language teaching in East Asia today: Changing policies and practices* (pp. 441-453). Eastern University Press.

Yang, Y., Liu, R., Qian, X., & Ni, J. (2023). Performance and perception: Machine translation post-editing in Chinese-English news translation by novice translators. *Humanities and Social Sciences Communications*, 10(798). <https://doi.org/10.1057/s41599-023-02285-7>

Yang, Y., & Wang, X. (2019). Modeling the intention to use machine translation for student translators: An extension of Technology Acceptance Model. *Computers & Education*, 133, 116–126.