
Exploring Foreign Language Students' Perceptions of the Guided Use of Machine Translation (GUMT) Model for Korean Writing

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This study examines students' perceptions of the Guided Use of Machine Translation (GUMT) model and their perceptions of GUMT's impact on their foreign language (FL) writing. Adapted from O'Neill (2016, 2019b), GUMT model activities were developed and implemented in an upper-elementary Korean as a FL course at a large southwestern U.S. university. At the beginning of the semester, students received an instructional session on how to use machine translation (MT) effectively as the first step of GUMT. The session included 1) the potential strengths and weaknesses of two online Korean MT platforms, Google Translate and Papago; and 2) the combined use of other online resources (e.g., image and news searches) to enhance students' awareness of pragmatic issues related to MT output. Throughout the semester, students applied the GUMT model to writing assignments and wrote reflections on their GUMT practice. Students also received continuous feedback from instructors on MT use. Analyses of pre- and post-surveys and students' reflections indicate that the GUMT model played an important role in fostering MT use strategies and improving students' confidence and self-perceptions of their fluency in FL writing.

INTRODUCTION

Students' use of machine translation (MT) has been a controversial issue among foreign language (FL) educators because there are both benefits and drawbacks when using MT. MT can work as an alternative to dictionaries and model more advanced use of the FL, whereas overreliance on MT can jeopardize students' learning (Clifford et al., 2013; Jolley & Maimone, 2015; Sohn et al., 2020). Regardless of whether FL instructors approve or disapprove of MT usage, FL students commonly use MT as part of their language learning as well as for many other different purposes (Alhaisoni & Alhasany, 2017; Briggs, 2018; Clifford et al., 2013; Ducar & Schocket, 2018).

Students often use MT in hopes of lessening the cognitive burden of interpretive and presentational tasks (Baraniello et al., 2016). However, MT outputs are not always accurate and FL students are aware of these inaccuracies (Jolley & Maimone, 2015; Tsai, 2019). Thus, effective use of MT for FL writing would depend on its users' ability to selectively adopt MT output. This not only requires students to be able to find out whether the translated results are linguistically and pragmatically appropriate in the given context, but also requires understanding of MT's benefits and drawbacks as well as strategies to effectively use MT. Many lower proficiency level students, however, might not have an advanced enough linguistic and pragmatic knowledge in the FL to utilize MT as effectively as advanced level students.

Strategies for using MT and the features provided by free online MT platforms—such as a list of alternative outputs, frequency of these outputs, and honorific options—could help lower-level students more effectively use MT outputs for their FL writing tasks. Guiding lower-level FL students to take advantage of MTs and MTs' features, coupled with other online resources such as images and news as sociopragmatic and pragmalinguistic examples, could also benefit the students' FL writing. Considering students' frequent reliance on MT and how MT has become a significant part of FL students' language learning (Clifford et al., 2013; Jolley & Maimone, 2015; Niño, 2020; Sohn et al., 2020; Valijärvi & Tarsoly, 2019), it can be beneficial for students to learn how to use MT strategically and evaluate MT results critically instead of outright prohibiting MT and/or limiting it to the vocabulary and grammar provided in textbooks (Bowker, 2020; Ducar & Schocket, 2018; Lee, 2020; O'Neill, 2016, 2019a).

Many researchers suggest structured and guided activities around MT to more effectively integrate it as a method to facilitate FL learning, especially at the lower level (Bahri & Mahadi, 2016; Bowker, 2020; Ducar & Schocket, 2018; Jolley & Maimone, 2015; Lee, 2020; Niño, 2020; O'Neill, 2019b; Valijärvi & Tarsoly, 2019). However, missing from this research are considerations of how to design activities that guide students on effective MT use and how students perceive those activities. Based on the implementation of the Guided Use of MT (GUMT) model in a third-semester Korean language course, we examine high-beginner and low-intermediate level students' perceptions of MT use, GUMT model components, and FL writing. In this article, we first review research on MT in FL classrooms. Next, we provide the context, design, and implementation of our GUMT model sessions throughout the semester. We then present the findings and discussions based on students' writing and reflection samples and pre-/post-surveys. Our conclusion addresses the implications and limitations of the GUMT model in FL classrooms, particularly Less Commonly Taught Languages (LCTLs).

LITERATURE REVIEW

These days there is no shortage of online resources that FL students can access, and MT is one of the most widely used online resources by students. It is reported that significant portions of FL learners use MT for their language learning (Clifford et al., 2013; Jolley & Maimone, 2015; O'Neill, 2019a; Niño, 2020) and students learning LCTLs are no exception. Sohn et al. (2020) state that 93% of Korean as a Foreign Language (KFL) students used MT for their daily language learning. Most of the Finnish and Hungarian language learners in Valijärvi and Tarsoly's (2019) study also used MT on a regular basis.

Researchers have explored the effects and roles of MT in FL students' writing in diverse ways (Lee, 2020; Lee & Briggs, 2020; Niño, 2020; O'Neill, 2016, 2019b; Tsai, 2019, 2020; Valijärvi & Tarsoly, 2019). The following three findings were typically highlighted: 1) MT helps students improve overall writing quality (García and Pena, 2011; Lee, 2020; Lee & Briggs, 2020; Tsai, 2020); 2) MT has the potential to allow students to pay more attention to macro-level revision with less anxiety about micro-level mistakes and to view writing as a process (Bahri & Mahadi, 2016; Groves & Mundt, 2015; Lee, 2020, Tsai, 2020); and 3) MT helps students foster meta-level awareness of Target Languages (TLs) (García & Pena, 2011; Lee, 2020; Lee & Briggs, 2020; O'Neill, 2016, 2019b; Tsai, 2019, 2020; Valijärvi & Tarsoly, 2019). In what follows, we will summarize the major trends for each of these three findings.

In terms of overall improvements in FL writing, researchers examined and compared students' drafts, one without the help of MT and the other with the use of MT, focusing on vocabulary, grammar, expressions, and other factors such as writing length (García & Pena, 2011; Lee, 2020; Lee & Briggs, 2020; Tsai, 2020). Lee (2020), Lee and Briggs (2020), and Tsai (2020) demonstrated that when English as a Foreign Language (EFL) students with intermediate-level English proficiency revised their FL writing with the aid of Google Translate, their writing had fewer lexico-grammatical errors and improved word/expression choices compared to their first drafts. García and Pena (2011) also examined length of writing as another measure of writing quality, arguing that length can be a valuable measure for lower-level FL students considering their limited FL lexicon. This study demonstrated that beginning-level Spanish as a Foreign Language (SFL) students were able to compose longer passages in Spanish with the aid of MT than when they wrote their drafts in Spanish without MT. The students also expressed their preference for the use of MT, claiming that they can expand their limited FL vocabulary while writing in Spanish. Other studies also reported that the length of students' drafts is longer when using MT (Lee, 2020; Lee & Briggs, 2020; Tsai, 2020).

Regarding macro-level revisions, MT has the potential to allow FL students to spend more time focusing on macro-level revisions, such as organization, content, flow, and themes on their own rather than focusing too much on micro-level revisions, such as spelling and grammar (Bahri & Mahadi, 2016; Groves & Mundt, 2015; Lee, 2020; Tsai, 2020). Using time more efficiently is possible because students can receive help from MT with micro-level issues (e.g., lexical and grammatical accuracy) in the revision process (Groves & Mundt, 2015; Lee, 2020). Students can deal with their writing tasks with less stress and anxiety, especially for beginning-level FL students (Bahri & Mahadi, 2016; García & Pena, 2011; Lee, 2020). In addition, as discussed in both Lee (2020) and Tsai (2020), the revision process with MT output helped students recognize writing as a process rather than a final product. As for the meta-level awareness of TLs, it is argued that students' metalinguistic awareness can be developed while analytically and critically reviewing MT output in FL in order to figure out how to adopt it in their revisions (García & Pena, 2011; Lee, 2020; Tsai, 2020; Valijärvi & Tarsoly, 2019).

Despite its potential benefits, previous studies have demonstrated that students have mixed perceptions of MT use in FL learning. Although many students believed that MT is helpful in language learning, especially learning vocabulary (Bahri & Mahadi, 2016; Briggs, 2018; Clifford et al., 2013; Jolley & Maimone, 2015; O'Neill, 2019a), some studies reveal that students believe the use of MT may hinder vocabulary learning when students are heavily reliant on MT, taking learning opportunities away (Alhaisoni & Alhaysony, 2017; García & Pena, 2011; O'Neill, 2019a; Valijärvi & Tarsoly, 2019). Also, research has shown that FL students recognized that MT output is not always error-free, and the accuracy rate of MT is questionable. Some students were more skeptical than their instructors about the accuracy of MT output (Jolley & Maimone, 2015). Tsai (2019) also highlighted EFL learners' dissatisfaction with MT's accuracy in grammar and lexical features when comparing students' own English draft with the MT output (English) of their L1 draft, regardless of the difference of actual accuracy between the two drafts. Since students' perception of the effectiveness of MT in their FL learning is still debatable, the current study aims to explore FL students' experiences and perceptions of MT use, especially in their FL writing processes.

Students believe that there are different benefits from the use of MT based on their level of proficiency in the TL. Lee (2020) and Tsai (2020) revealed students' perceptions that lower-level FL learners would benefit more, echoing the findings of García and Pena (2011), while other studies highlighted students' beliefs that MT was more useful for upper-level FL learners (Niño, 2020; Valijärvi & Tarsoly, 2019). In fact, both students and educators debate the question of which proficiency level learners benefit from MT use. In terms of error correction activities based on MT output, some studies reported that they were suitable for advanced FL learners, but not lower-level students (Briggs, 2018; Clifford et al., 2013; Lee, 2020; Lee & Briggs, 2020; Niño, 2020; Valijärvi & Tarsoly, 2019). This was because lower-level students typically do not have enough linguistic knowledge to judge the inaccuracy of, and make error corrections to, the MT output. Specifically, Briggs (2018) found that lower-level FL students evaluated MT output as acceptable when it was not and that they were not able to correct their sentences effectively even when they were capable of evaluating MT output correctly. In Lee and Briggs (2020), lower-level students did not adopt the appropriate alternatives MT generated since they were not confident in making appropriate choices. In contrast, advanced FL learners may benefit more from MT in both formal class and independent language learning settings through error correction due to their ability to judge the level of accuracy of MT based on their accumulated FL knowledge (Niño, 2020; Valijärvi & Tarsoly, 2019).

Considering the possible limitations lower-level students might face, many researchers recommended including structured and guided activities to support lower-level students' use of MT. Studies have suggested that the use of MT combined with appropriate guidance provides positive effects on student achievement in FL writing (Bahri & Mahadi, 2016; Bowker, 2020; Ducar & Schocket, 2018; Jolley & Maimone, 2015; Lee, 2020; Niño, 2020; O'Neill, 2019b; Valijärvi & Tarsoly, 2019). Although the results were limited to intermediate-level EFL, SFL, and French as a Foreign Language (FFL) students, O'Neill (2019b) and Bowker (2020) reported positive results of an instructional session that presented the benefits and drawbacks of MT use strategies. Specifically, O'Neill (2019b) demonstrated the effectiveness of the instructional session where students discussed the uses of MT, practiced them with example sentences, and reviewed various strengths and weaknesses of MT. The students were also asked to critically examine how much to use MT in the process of writing. O'Neill (2019b) and Bowker (2020) argued that such explicit instructional sessions could help

students take advantage of MT as a tool for FL learning. Therefore, adopting the idea of guided activities, the present study developed a model, GUMT, to foster effective utilization of MT in FL students' writing.

Recognizing the need for research on the structured application of MT use in FL curricula and on how students perceive such applications, we implemented the GUMT model in KFL classrooms for low-intermediate (or high-beginner) college students and conducted pre-/post-surveys to examine students' perceptions. We hypothesized that the GUMT model in FL writing would trigger critical reflections as both MT users and FL writers, which, in turn, would help their FL writing and generate more effective use of MT. The current study was guided by three research questions, in order to document students' critical reflections on GUMT model components as well as to examine the students' perceptions of their own writings with the GUMT model practice. The three research questions are:

- Q1. How do students perceive MT use by using the GUMT model?
- Q2. How do students perceive the feedback component of the GUMT model?
- Q3. How do students perceive their FL writing by using the GUMT model?

METHODS

Our GUMT model provided students continuous guidance and feedback on how to use MT via five different writing assignments throughout the semester. Thus, we viewed the GUMT model as a more in-depth approach than a one-time instructional session or writing task. The model design intended to implement MT with scaffolding so that FL learners improve their FL learning with the tool (MT) that they have already used by reflecting on and redirecting their relationship with MT. The following section describes our GUMT model design in detail.

Project Context and Description

The GUMT model activities that will be described here were implemented in a third-semester KFL course in the Korean Language program at a large southwestern U.S. university. There were two class sections, both taught jointly by the third and fifth authors. It was a high-beginner/low-intermediate class, following the level categories of the main textbook used in the course.

The GUMT model project included three main phases: instruction (Step 1), practice (Steps 2 & 3), and feedback (Steps 4 & 5), as shown in Figure 1.

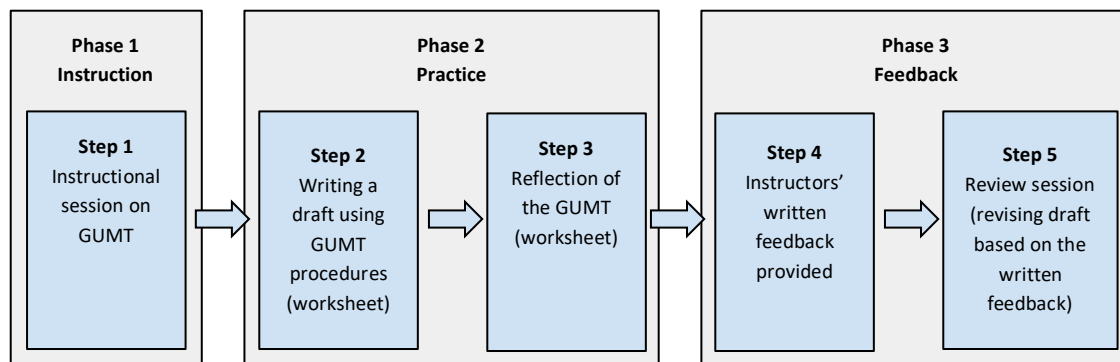


Figure 1. *Workflow of the GUMT model*

During Step 1, instructors dedicated one instructional session in which students: 1) reviewed popular MT resources' strengths and weaknesses (e.g., Google Translate and Naver Papago, two of the main online MT platforms in Korean-English translations); and 2) evaluated the pragmatic appropriateness of the translated results through pragmalinguistic cues and other online resources such as Google Images and News searches (more details are provided below). This session aimed to develop better awareness of how MT can be an effective supplemental tool for FL learning. Informed by O'Neill (2016, 2019b), in the first activity, the class discussed the strengths and limitations particular to both Google Translate and Naver Papago with examples. The examples included different speech styles, level of politeness each MT uses such as casual or polite style sentence ending, and in which genre each speech style would be more appropriate. Instructors overviewed the two MT platforms' built-in features, such as the honorifics function, a word's part-of-speech display, and direct link to online dictionaries, all of which could benefit FL writing.

For the second activity in Step 1, students engaged in pragmatic and grammar evaluation exercises. Pragmatic evaluation is meaningful in the use of Korean because its refined lexical and morphosyntactic honorific system requires users to make intentional pragmalinguistic choices. The system relies heavily on pragmatic contexts, emphasizing the relationship between pragmalinguistic choices and grammatical appropriateness. For example, 만들다 *mantul-ta* 'to make' as a main verb of a sentence can be 만들어요 *mantul-eyo* (polite style) or 만드세요 *mantu-seyyo* (polite style with subject honorific or polite command), depending on the subject. It can also be 만듭니다 *mantu-pnita* (deferential style) or 만드십니다 *mantu-si-pnita* (deferential style with subject honorific), depending on the formality of the setting. Throughout the activity, students were encouraged to think about the contexts of the given samples when they reviewed the translated results in order to achieve the pragmatically and grammatically appropriate results. The contexts included several factors, such as formal and informal settings, a relationship between the speaker and listeners (or the writer and readers), and the purpose of the conversation or writing. For example, students evaluated the MT output in the casual style of "what are you going to eat for lunch?" and modified it to the polite style with subject honorific suffix.

Instructors also demonstrated how Google Images search and Google News search could function as corpus data to make sociopragmatic judgments. The Google Images search and Google News search are parts of Google's search engine that use texts as a search term. Google Images generates related images to the text input and Google News generates news articles that contain the text search term within the title and body of each news article. Students searched expressions and words on Google and clicked the News and Images tabs from search results. By reviewing the search results, students could confirm whether the MT outputs were appropriate vocabulary or expressions in terms of the context in which they plan to use the word. For example, when the word "letter" is translated, there are a couple of possibilities including *pyunji* and *subhan*. *Pyunji* is used more in modern, daily life, while *subhan* is used in more traditional and official settings. When each one was image-searched, *pyunji* yielded typical paper letter images whereas images of formal letters written on letterhead were found when *subhan* was searched. The News search also showed contextual differences. Contexts for the news articles that used *subhan* were more formal, including international relations, politics, and official letters from a president, while the majority of news contexts where *pyunji* was used were informal, informing the user of its personal nature. In these ways, Google Images search

and Google News search could help students differentiate *pyunji* from *subhan* and select the more appropriate one based on the purpose and audience for their writing.

As the last part of Step 1, students practiced the use of MT with their instructor first, and then with their peers in a small group. A worksheet (see Appendix A for the Writing Assignment Worksheet and Prompt) was provided, which allowed students to confirm the MT results and to visualize their decision-making process. Filling in the worksheet, students could evaluate their translated results and make final decisions. Then, a self-reflection activity on their final decisions followed.

In Step 2, students were given opportunities throughout the semester to apply the GUMT model in their five writing assignments with the same worksheet they used in the instructional session (Step 1). In each writing task, students were instructed to first write a draft in Korean followed by an English draft. From their first Korean draft, students selected words/expressions that they were not sure of and used MT for those words/expressions with various purposes. Students revised and finalized their draft based on the MT's output and Google Images/Google News search. In Step 3, students reflected on their use of MT with the same worksheet. Students also answered reflection questions on the worksheet. Appendices B and C show examples of how participants utilized the GUMT worksheet (Appendix A).

Finally, students received instructors' written feedback on their final drafts as well as reflections on the MT use (Step 4). There were also in-class review sessions after each writing assignment so that students could refine their final draft with instructors (Step 5). As students used the GUMT model as a tool for self-assessment, in that students corrected their expressions in writing reflecting MT output, it became important for students to know if the output represented the ideas they actually wanted to express. It was also important to continuously guide lower-level students to learn how to use MT effectively to satisfy the sociopragmatic and pragmalinguistic requirements of Korean, as researchers recommended (Bahri & Mahadi, 2016; Bowker, 2020; Ducar & Schocket, 2018; Jolley & Maimone, 2015; Lee, 2020; Niño, 2020; O'Neill, 2019b; Valijärvi & Tarsoly, 2019). Thus, written feedback on the final draft was provided by the instructors. The feedback focused on how the students can use the GUMT model more effectively as well as engage in a grammar and pragmatic evaluation of the final draft. The sentences that still needed corrections in the students' final drafts were highlighted by the instructors. Then, students compared, refined, and revised the highlighted sentences from the written feedback during the in-class review sessions.

Participants

Forty-three out of 48 students who enrolled in the given course participated in this study. They ranged from 18 to 39 years old, with 32 participants being between 18 and 21 years old. The students progressed to this third-semester course either upon completion of the second semester KFL course or through a successful placement test. All the students are either fluent in or native speakers of English. The class instruction was provided to students in a mix of both English and Korean.

The number of participants for each task was between 20 and 30 due to students not completing assignments or withdrawing from the class. However, 32 students participated in the writing assignment at least three times among five writing assignments. Table 1 describes

the number of participants who completed each assignment. Out of the 32 students, 31 students completed the post-survey.

Table 1
Number of Participants Who Completed Each Writing Assignment (total n=43)

Assignment #	1	2	3	4	5
#	27	26	30	29	20
%	62.8	60.5	69.8	67.4	46.5

Our student population had various majors including double majors, as shown in Table 2. While the East Asian Studies major has been offered for students whose geographical focus is Korea, Korean studies has been offered only as a minor, with the two options of a language or a culture focus. Out of 32 students who participated in at least three writing assignments, 18 were pursuing Korean language minor, 10 did not have any minor yet, and three were pursuing minors in other disciplines such as business, geoscience, economics, and mathematics. Among the 18 Korean language minor students, there were four students who double minored in different disciplines including pre-health, fashion, military leadership, and Spanish. All the students reported that they had used MT, with Google Translate and Naver Papago being the main MTs used.

Table 2
Majors of 43 Participants, Including 7 Double-major Students, Who Completed the Pre-survey

Biochemistry	1	Food studies	1	Philosophy	1
Biomedical science	1	Global studies	1	Physics	1
Business	3	History	1	Physiology	2
Computer science	3	Illustration	1	Psychology	4
Criminal justice	1	Information science	1	Retail and consumer sciences	1
East Asian studies	4	Japanese	2	Screenwriting	1
Economic	2	Law	1	Sociology	3
Elementary education	2	Linguistics	4	Sustainable plant system	2
English	1	Music education	1	Theatre	1
Fine arts	1	Nutritional science	2		

Data Collection

A pre-survey was conducted before the first MT instructional unit to uncover students' current MT usage and their attitude towards MT as a language-learning tool (Appendix D). After the pre-survey, the GUMT model activities were implemented. First, a 50-minute instructional unit was given to all 43 research participants in two sections of the third semester KFL course. Students were given five writing assignments throughout the semester, applying what they learned from the instructional session. Each writing assignment had reflection questions on their use of MT following the GUMT model steps. After the last writing assignment was submitted, students filled out a post-survey about their perception and experiences of participating in the GUMT model activities (Appendix E). Forty out of the 43 participants completed the post-survey. Thirty-one out of the 32 students who completed at least three out of five GUMT model writing assignments also completed the post-survey. The pre- and post-surveys included items about MT usage and their perception. Items regarding the feedback sessions from teachers, Google Images searches, and Google News searches were included only in the post-survey. The items consisted of open-ended, multiple choice, and 5-point Likert scale questions (with 1 being *Not at all helpful* or *Least effective* and 5 being *Extremely helpful* or *Most effective*).

Data Analysis

Students' perceptions towards MT use and their FL writing from using the GUMT model and the feedback component of the GUMT model were analyzed through the post-survey responses and the writing assignment reflection question responses, which were compared with their pre-survey responses. Numeric data were collected from post-survey responses on a Likert scale. Qualitative data were collected from the open-ended questions on the post-survey and from students' reflection question responses on the writing assignments. The qualitative data were coded inductively to find patterns and initial codes were generated. Then, we categorized the codes (Appendix F) and identified emerging themes. The themes were then reviewed and refined. The major themes identified were developing strategies for using MT and other online resources; awareness of limitations of using MT as lower-proficiency-level students; effective use of feedback; fostering confidence in Korean writing; and promoting fluency in Korean writing. All codes and themes were discussed by the coders (first and second authors), and coding schemes were compared and discussed to resolve discrepancies until a consensus was reached.

FINDINGS

Prior to the implementation of the GUMT model, students were asked about their use of MT and the limitations and benefits of MT that they perceived. All participants responded that they had used MT and used it for various purposes. Google Translate (59.32%) followed by Naver Papago (23.73%) were used the most among translation platforms due to their easy access and convenience. MT was most commonly used as a dictionary for looking up unknown words (31.15%). The students also used MT to revise their Korean writing (22.95%) and for interpretive purposes (19.67%), although it was not clearly stated whether their previous attempts to revise and interpret Korean text using MT were successful or not. Most students responded that they experienced difficulties in using MT because it was challenging to receive

semantically, syntactically, and pragmatically appropriate output that was an accurate equivalent to what they intended to write. As for benefits, the participants believed that MT is helpful in accessing more vocabulary, similar to previous studies' findings (Bahri & Mahadi, 2016; Briggs, 2018; Clifford et al., 2013; Jolley & Maimone, 2015; O'Neill, 2019a).

The post-survey asked about students' perceptions of the GUMT model. The participants responded that the model helped them to use MT effectively (mean=4.06 out of 5) and believed it "instilled good habits" in their writing practice. Among all students, 90.32% stated that they will continue to use MT. Students also stated that they will use Google Images search (80.65%) and Google News search (29.03%) as corpus data with additional contextual cues, compared to example sentences provided by dictionaries, to cross-check whether MT output accurately represents what they would like to express. In addition, more than half of the students perceived that the GUMT model helped them to critically look into how the Korean language works as a language when evaluating MT output, whether or not they are appropriate to use in the context of their writing (*extremely helpful*=35.48%, *helpful*=25.81%, *somewhat helpful*=19.35%, *a little helpful*=12.90%, *not at all helpful*=6.45%, mean=3.71). Students' responses to the post-survey can be found in Appendix G.

We further report our analysis on students' perceptions of the GUMT model's impact on their MT use and FL writing as well as the feedback component of the GUMT model driven by our research questions. The following themes were identified: 1) developing strategies for using MT and other online resources (RQ1); 2) awareness of limitations of MT as lower-proficiency-level students (RQ1); 3) effective use of feedback (RQ2); 4) fostering confidence in Korean writing (RQ3); and 5) promoting fluency in Korean writing (RQ3). The following subsections present analysis from both post-survey and students' reflection data.

RQ1. How Do Students Perceive MT Use by Using the GUMT Model?

Developing Strategies for Using MT and Online Resources

According to the post-survey results, students perceived that the GUMT model was *extremely helpful* (38.71%) or *helpful* (38.71%) for knowing how to use MT more effectively. Students also held positive perceptions about using Google Images search to supplement MT translated results, as 19.35% responded *most effective* and 45.16% *effective*. However, although there were students (9.68%) who perceived the Google News search to be effective, most students did not believe the Google News search was effective (mean=1.97).

From our analysis of students' reflections, we found that most students perceived they were able to develop different strategies using MT and Google Images and Google News searches to generate the best possible output. They tried and applied different units (i.e., a word, phrase, sentence, or paragraph that one can submit for translation) and found that more concrete concepts and nouns worked better with their searches. Then, they dissected or combined units (e.g., sentences into smaller clauses, or vice versa) to achieve better results, as seen in the following example of a student reflection:

At first I looked up 드려 [*give - humble form*], the translator and images were not accurate at all. I think this might be because the word is not conjugated properly or because it lacked content. After putting the entire phrase, the results started to be more accurate to what the phrase should be. (Student 1, reflection) [translation added by authors]

Student 1 not only showed that their image searches could confirm an accurate translation but also developed strategies to use MT more effectively; that is, changing the units of the input (e.g., inputting the entire phrase). Furthermore, with loan words or words with other language origins, students manipulated inputs: “Since I knew that garden and cliffs probably had a Korean word, I switched the input language from English to French and found the correct words” (Student 2, reflection). The student wrote places they would like to visit and the names of the places in French. Before this input language change, MT output for the words were transliterated instead of correct translations.

Regarding students’ perception of using Google Images searches as a supplement to MT, we found that students perceived that a Google Images search was most helpful in cross-checking MT output. The Google Images search was used either to confirm if the MT was correctly translated or to find new words/expressions to replace original words/expressions. The following quotes are representative of how students used Google Images searches and their positive experiences:

The first round gave me the word ‘한 지방’ (*one province*) which none of the pictures matched what I was thinking of. I ended up clicking on one of photos which gave me the word ‘시골’ country side. When I looked up pictures of that word all the pictures matched. (Student 2, reflection) [translation added by authors]

After searched on image and news, I think 이의 [*objection*] is more using on suggestions and 거부감 [*rejection*] is more likely use for personal like or dislike. (Student 16, reflection) [translation added by authors; errors in original]

In addition, although not every student appreciated Google News searches, some students recognized that Google News searches could demonstrate another, or potentially better, word/phrase choice than that chosen from their original writing. While Google Images searches were perceived as helpful to confirm the appropriate words/expressions students wanted to express in their writing, most students responded that Google News searches were not effective, which they also attributed to their limited Korean proficiency and Google News search’s less intuitive features compared to Google Images search. However, it was found that some students utilized images within news articles or the number of search results to make decisions to use or not use the searched expressions in their drafts.

Students’ Awareness of Limitations of MT Use

Students commented in the post-survey and reflection questions that the uncertainty and inability to make decisions about the grammatical correctness of MT output is a disadvantage, in addition to other concerns including potential overreliance, pragmatic errors in the MT translated results, no explicit grammar feedback, and ethical concerns. Some students commented that they were still unsure whether MT output was using contextually more appropriate words/expressions and grammar than those they came up with first to exactly mean what they intended to. This result is consistent with other researchers’ findings that lower-proficiency-level students might have disadvantages when using MT (Alhaisoni &

Alhaysony, 2017; Clifford et al., 2013; García & Pena, 2011; Niño, 2020; O'Neill, 2019a; Valijärvi & Tarsoly, 2019). Student 8's comment below shows a similar view.

I find that the translator is only as useful as much grammar or vocabulary you know, so the less information you know, the less useful the translator will be and you won't be able to infer as much information from trying to mess around with the translator (Student 8, reflection)

Written feedback and feedback review sessions were suggested as one of the solutions to the challenges and frustrations students experienced: "the written feedback helped clarify the questions I had pertaining to the correct translation as well as correcting the grammar mistakes I made" (Student 14, post-survey). More detail about teacher feedback is presented below.

RQ2. How Do Students Perceive the Feedback Component of the GUMT Model?

While implementing the GUMT model, we found that multiple types of feedback, from MT's output as automated feedback to that of instructors, was a key step of the GUMT model as a resource to enhance students' writing. In particular, students felt that the GUMT model provided valuable feedback-receiving opportunities to understand mistakes and errors, to find proper/better expressions, and to resolve their uncertainty about the results of using MT.

Automated Feedback from MT

Students perceived that the GUMT model was most effective for receiving feedback to *clarify meanings* (25.81%) followed by *spell check* (22.58%), *check grammar* (22.58%), and *find better expressions* (22.58%) by comparing their own writing and MT results. However, only 6.45% answered that the GUMT model was effective in *finding a new word* that they did not know already, and no student reported the model to be effective for *checking honorific forms*. The following quotes represent how students used the GUMT model mostly in their writing: "Sometimes a word I would use would have multiple meanings, and I needed to make sure that the word I was using was contextually correct" (Student 5, post-survey). From the MT output as automated feedback, the students were also able to learn new aspects of Korean language including the meaning of grammar that they did not know before, despite the fact that only 6.54% found the GUMT model most effective in *finding a new word* as in the following quote:

With some of the verbs I know. For example, I didn't know the meaning of ~(으)ㄹ 때 'when', so I put 먹을 때 into the translator and it said "when you eat," so I figured out that ~(으)ㄹ 때 means when you do + a verb. (Student 8, reflection) [translation added by authors]

From the students' reflections, we also found that the GUMT model functioned as a self-assessment tool providing automated feedback for students in the process of Korean writing. The following quote shows such recognition of the use of MT as an effective self-assessment tool:

This [GUMT model] not only refined my translator usage and my writing, but made it more efficient than it would have been otherwise. By the final writing assignment, I knew what to look for in the translator right away, and how I could modify my sentences to make them sound better. (Student 3, post-survey)

These quotes indicate that students perceived the GUMT model as an effective automated feedback tool for clarifying meanings, correcting grammatical errors, and finding better expressions while also being aware of possible multiple meanings depending on the context of writing.

Feedback from Instructors

The post-survey result indicated that students were particularly in favor of the review sessions to evaluate their own writing in addition to their self-assessment using MT output. The students reported that they *strongly agree* (51.61%) or *agree* (41.94%) that the written feedback and review sessions were helpful. Instructors' feedback included MT use strategies. Instructors reminded the students of the learning objectives of MT instructional sessions and more effective MT use strategies they applied in the previous assignments or new ones that could apply. The written feedback and feedback sessions also allowed students to revisit and confirm the appropriate expressions in the context of their draft. Students seemed to value the instructors' feedback, as they regarded it as enriching the explanations of cultural contexts in relation to students' own writings. In particular, when students were trying to use new phrases or grammar in their writing, they wanted to learn detailed cultural references to make sure whether they used them correctly, as stated in the following quotes:

If I was trying to use new phrasing or grammar that I hadn't really used before it was nice to know if I had used it correctly or got even close to using it right. (Student 6, post-survey).

The written feedback has helped me verify that I am approaching the use of (and the drawbacks inherent in using) machine translators correctly. It was also useful to verify that some of the frustration I experienced trying to get the translated phrases to match my intended meaning was expected, and not due to me using the machine translator improperly. (Student 7, post-survey)

The above quotes showed that the GUMT model, which included instructors' continuous feedback in design, provided the needed guidance for students to use MT appropriately in their writing in relation to appropriate linguistic and cultural contexts when the GUMT model was integrated into lower-level FL classroom instruction.

RQ3. How Do Students Perceive their FL Writing by Using the GUMT Model?

The post-survey and students' reflections revealed that students have a positive attitude toward MT practice and perceptions regarding MT use in FL writing. In the post-survey, the students responded that the GUMT model helped their writing, especially with searching for vocabulary

(mean=4.03), short phrases (mean=3.61), sentences (mean=3.48), long phrases (mean=3.03), and paragraphs (mean=2.71). This shows the students' continued use of MT mainly for searching vocabulary or short phrases in writing practice. Although students considered MT effective in micro-level assistance such as for vocabulary or short phrases, they varied in their opinion about the GUMT model's ability to provide appropriate speech styles and honorific expressions (*extremely helpful*=9.68%, *helpful*=22.58%, *somewhat helpful*=16.13%, *a little helpful*=35.48%, *not at all helpful*=16.13%, mean=2.74), which is consistent with their pre-survey responses. Even though the survey results show that students thought that the GUMT model was not helpful for them regarding speech styles and honorific expressions, they responded that the GUMT model was helpful in finding context-appropriate vocabulary and expressions (*extremely helpful*=51.61%, *helpful*=19.35%, *somewhat helpful*=19.35%, *a little helpful*=9.68%, *not at all helpful*=0%, mean=4.13).

Fostering Confidence in Korean Writing

Our analysis of students' reflections showed that the GUMT model provided opportunities for students to develop a positive affective domain. With continuous comparison with MT output combined with instructor feedback, students were able to gain confidence, validation, and reassurance that they were progressing while also engaged in analysis of their own writing. Not only were their mistakes noticed, but the students were able to recognize what they could accomplish. When students found out that their own writing and the MT output were the same or very similar, they felt reassured and validated in their ability to write in Korean. Students said that they were happy, surprised, and were "able to gain more confidence in what I have written because the translator could understand me" (Student 15, reflection). This validation provided encouragement, as one student wrote: "surprisingly! I think I am starting to get better at expressing myself correctly in writing! This was very encouraging. 😊" (Student 10, reflection).

Students were motivated and planned to "work on making progress to learn" in general. Students also recognized the areas that they needed to improve and stated that this motivated them to continue learning Korean, focusing specifically on these problem areas, as noted below by the following student:

I mix up my particle usage a lot, and instead of saying I have to get a new book, I said that Barnes & Noble had to get new books, according to both of my translators. It wasn't appropriate because I had used incorrect particles—I need to go back and review! (Student 10, reflection)

The positive effects on students' affective domain were evident as students mentioned that the GUMT model showed "me that my Korean writing was actually evolving and getting better" (Student 8, post-survey) because the student was not sure whether progress was being made without the guidance provided via the GUMT model.

Promoting Fluency in Korean Writing

Post-survey responses showed that the students perceived they were able to harness MT's benefits for their writing fluency; MT enabled them to express their ideas more freely as well as write longer drafts by utilizing multiple MT platforms and Google Images/Google

News searches. More than half of the students perceived that the GUMT model was helpful for them to write in more length (*extremely helpful*=9.68%, *helpful*=45.16%, *somewhat helpful*=29.03%, *a little helpful*=12.90%, *not at all helpful*=3.23%, mean=3.45). Further, more students responded that the GUMT model helped them to be more creative when they write in Korean (*extremely helpful*=22.58%, *helpful*=48.39%, *somewhat helpful*=25.81%, *a little helpful*=3.23%, *not at all helpful*=0%, mean=3.09) as well as helping them to express their thoughts more freely in Korean (*extremely helpful*=25.81%, *helpful*=54.81%, *somewhat helpful*=16.13%, *a little helpful*=0%, *not at all helpful*=3.23%, mean=4.00). These results indicate that students perceived the GUMT model fostered students' creativity in their writing as they realized different ways of expressing ideas: "it made me think outside the box and be a bit more creative" (Student 1, post-survey).

In sum, the participants had a positive reaction to the GUMT model activities and MT's role in their writing practice overall. The purpose of using MT remained like that of pre-survey; however, students responded they were able to expand their own writing strategies using MT. According to post-surveys and reflections, the GUMT model can enhance their FL writing as a language learning tool by providing opportunities to explicitly talk about errors they found as well as providing encouragement and motivation.

DISCUSSION

The current study was motivated by the question of how we can increase the affordances of MT as a resource for writing for high-beginner and low-intermediate level LCTL students. The GUMT model was developed and implemented to foster better awareness of MT outputs' pragmatic and grammatical appropriateness. Findings reported in the result section confirmed our hypothesis and revealed that the GUMT model provides multiple sources of feedback that lower-level students need to facilitate more effective MT use and to compensate for their lack of FL proficiency as well as the fact that the students perceived it as an essential part of the MT writing activities. The students also believed that the GUMT model provided opportunities to boost their confidence and improve fluency in their FL writing.

These findings demonstrate the GUMT model has the potential to provide the additional guidance needed for lower-level FL students and is appreciated by them. In other studies, it is believed that MT is a more suitable resource for advanced students and MT was often considered confusing and daunting for lower-level students (Briggs, 2018; Clifford et al., 2013; Lee, 2020; Lee & Briggs, 2020; Niño, 2020; Valijärvi & Tarsoly, 2019). To provide more effective opportunities for using MT with lower-level students, many researchers recommended structured and guided activities (García & Pena, 2011; Lee, 2020; Lee & Briggs, 2020; Niño, 2020; O'Neill, 2016, 2019b; Tsai, 2020; Valijärvi & Tarsoly, 2019). The awareness of mistakes and errors is the starting point of an effective revision process, as well as a strong way to judge how effectively students are engaged in error correction (Han & Hyland, 2015). Therefore, systematically guided activities to notice errors in MT and their own writing, as well as continuous written feedback and feedback review sessions were built into the GUMT model based on the suggestions of previous studies.

Students' responses showed that lower-level students demonstrated the awareness of types of challenges and difficulties using MT and other online resources (such as Google News searches) that previous studies have mentioned (Niño, 2020; Valijärvi & Tarsoly, 2019). Previous studies such as Briggs (2018) and Lee and Briggs (2020) demonstrated limitations of

lower-level language learners' MT use, for example, not being able to correct errors even though they were given MT to use. We found that our students were able to notice errors in their writing, but those errors were minimally corrected, partially corrected, or left unchanged in their final draft despite the implementation of the GUMT model. Some students explicitly mentioned in the writing assignment reflection that they were confused and unsure whether their correction or the MT output was correct. This indicates that lower-level proficiency may hamper full recognition or appreciation of the corrected expressions which MT output or multiple sources of feedback provided. However, as Student 6 and Student 7 commented in the post-survey, feedback from instructors regarding their word or expression choices after completing the GUMT model steps and their MT usage strategies was able to support the students' choices and strategies, guiding them in the right direction if they needed assistance. Therefore, these student remarks and positive responses on written feedback and feedback sessions found in our post-survey affirm that the GUMT model can address researchers' calls for guidance with lower-level students.

One of our most interesting observations from our data that answers RQ1 is that students often demonstrate ambivalent attitudes towards MT. While many students felt that the GUMT model helped them to improve their writing in Korean in the overall reflection sections of the five writing assignments, they still held lingering negative attitudes toward MT's limitations. For example, one limitation of MT mentioned most in the pre-survey was incorrect speech styles even with its built-in honorific feature. The students practiced recognizing speech styles as well as honorifics and changing them to fit their intention and audience as a part of a pragmatic evaluation during the first instructional session. Throughout the semester, students were also encouraged to continue evaluating speech styles and honorifics to see MT output as a resource, since the GUMT model's purpose was using MT and other online resources not as the exclusive answer or an authoritative resource, but as a consulting tool to help students. Students showed evidence that they were made aware of the differences and were able to point out appropriate speech styles and any needed honorifics. They adapted and rejected speech styles and honorifics from MT outputs depending on their purposes. We believe that these practices contributed to the feeling that the GUMT model helped them find contextually appropriate expressions and a look into how the Korean language worked more critically. Nevertheless, students continue to perceive that MT has limitations in speech styles and honorifics. About 16% of students seemed to extend this idea to the GUMT model and believe that the GUMT model was not helpful in using appropriate speech styles and honorifics, although their reflections tell otherwise.

One possible explanation is that students perceived speech styles and honorifics as a grammar point focusing on conjugation, as they are presented in the textbook, rather than as a pragmatic or contextually appropriate language choice (Brown, 2011; Ryu, 2018). Therefore, they responded that the GUMT model was not helpful in this area because they needed to re-conjugate or needed to do additional work to get the right speech style or honorific expressions for their draft. This outcome indicates students' view of MT as an answer key. A similar idea was found from one of our students' comments: "The best translators are your Korean teachers" (Student 12, reflection). The students did, however, talk about the relationship between interlocutors and genre in the discussion of the speech style appropriateness of MT output. For example, a student chose to adopt the speech style from the MT output rather than the one that the student originally used because they believed that the MT output speech style was more appropriate for the genre, which was an announcement message in a store. As Lee (2020) argues, if we continue to help students to see MT as a peer who can provide input

to help with their language learning, not as the answer key to their assignment, it will expand how lower-level students utilize MT in their writing and language learning.

CONCLUSION

The current study initiated purposefully designed MT use in an FL classroom setting through the GUMT model. The current version of the GUMT model was applied to lower-level KFL classrooms, showing in detail how MT can be integrated into a lower-level LCTL classroom. Throughout the study's application, we focused on students' perceptions of the components of the GUMT model and MT use, guided by the current design containing the process of critical awareness on building effective skills and habits of MT use.

The findings showed that students were able to engage in writing activities while gaining confidence, getting validation, and receiving encouragement, which is in line with the positive aspects of MT, especially the effect of stress and anxiety reduction, found by previous research (Bahri & Mahadi, 2016; García & Pena, 2011; Lee, 2020). Students also positively perceived each step of the GUMT model, showing its potential roles at the micro (such as spelling) and macro levels (such as conveying ideas).

FL instructors can help students explore the world and the language in more practical, constructive ways by incorporating technologies from their everyday lives (e.g., Google Images search, MT) into language classrooms. In this regard, when activities are carefully designed around MT, it can provide students with the opportunities to practice how to incorporate and utilize it for language learning effectively. As with other tools and technologies not allowing our FL students to use MT might result in sheltering them within the "safe" boundary of textbook vocabulary and grammar, limiting students' opportunities to experiment with TL in real life.

We believe that the GUMT model activities can be further used beyond writing instruction, fostering a culture of perceiving MT as feedback, a self-diagnostic tool for daily language use with various purposes. Further research on implementing the GUMT model with diverse LCTLs and language activities (such as interpretive activities) would expand our understanding of how different versions of the GUMT model designs can be developed and help students connect language classroom activities and their lives in FL contexts.

ACKNOWLEDGMENTS

This work was supported by the Center for Educational Resources in Culture, Language and Literacy Grant and the 2020 Korean Studies Grant Program of the Academy of Korean Studies (AKS-2020-E24).

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APPENDIX A

Writing Assignment Worksheet and Prompt

Step 1. Write your first draft in Korean on your own. You may use the glossary at the end of your textbook and/or dictionaries.

Step 2. Write what you drafted in Step 1 in English as well.

Step 3. Use a machine translator (name of translator: Google Translate, Naver Papago) and edit your writing in Step 1. Please apply the guidelines you learned in the class.

*Purpose: 1. Checking spelling, 2. Checking grammar, 3. Clarifying meanings, 4. Checking honorific forms, 5. Finding better expressions, 6. Other: please specify.

Words /Phrases	Purpose* [Please choose one from the above]	Translator 1st run	Choice after Image search	Choice after News search	Final choice Of Korean expressions

Step 4. Please compare your own sentences and translated sentences and share your thoughts and experience using the translator to complete this writing assignment.

1. Which translated part was most similar to your own Korean writing?
2. Which translated part was most different from your own Korean writing? Was the translated sentence contextually awkward or appropriate? Why do you think so?
3. In what ways did image or news searches help you with your final draft (if you used either of them)?
4. What were you able to learn from using a translator to complete this writing assignment?

APPENDIX B

An example of a student's first draft about Korean food as a response to Steps 1 and 2 of Appendix A

저는 아직 많은 한국음식을 안 먹어 봤어요. 숙제를 잡채 만들기 배웠어요. 잡채는 stir fried sweet potato noodles 과 야채 과 고기로 만들어요. 저는 매운 음식을 좋아하지 않아요. 그래서 잡채를 먹어 보고 싶어요. 잡채가 보통 반찬이에요. 저는 음식을 많이 안 먹기 때문에 잡채가 먹고 싶어요. 잡채가 royal dish 있지만 이제 생일 과 special occasions에 만들어요. 잡채가 따뜻하거나 차갑게 먹을 수 있어요. 제 아버지가 sweet potatoes 좋아해서 잡채를 시켜 드려요.

I haven't tried a lot of Korean food yet. For the homework, I learned about Japchae making. Japchae is made of stir-fried sweet potato noodles and meat and vegetables. I don't like spicy foods. So, I wanted to try eating Japchae. Japchae is usually a side dish. Because I don't like to eat a lot of food, I want to eat Japchae. Japchae was a royal dish but now it is made on birthdays and special occasions. Japchae can be eaten warm or cold. My dad likes sweet potatoes so I will order him some.

APPENDIX C

An example of a students' analysis as a response to Step 3 of Appendix A

Words /Phrases	Purpose* [Please choose one from the above]	Translator 1st run	Choice after Image search	Choice after News search	Final choice Of Korean expressions
<u>stir fried sweet potato noodles/sweet potatoes</u>	Finding better expression	고구마 볶음면/고구마	고구마 볶음면/고구마	n/a	고구마 볶음면/고구마
<u>숙제를 잡채 만들기 배웠어요.</u>	Clarifying meaning	숙제를 위해 잡채 만들기에 대해 배웠습니다.	n/a	n/a	숙제를 위해 잡채 만들기에 대해 배웠어요.
<u>잡채는 고구마 볶음면과 야채 과 고기로 만들어요.</u>	Clarifying meaning	<u>잡채는</u> 고구마 볶음면과 야채 과 고기로 만들어요.	n/a	n/a	<u>잡채는</u> 고구마 볶음면과 야채 과 고기로 만들어요.
<u>royal dish</u>	Finding better expression	왕실 요리	왕실 요리	왕실 요리	왕실 요리
<u>special occasions</u>	Finding better expression	특별한 날	특별한 날	n/a	특별한 날
<u>잡채가 왕실 요리를 있지만 이제 생일과 특별한 날에 만들어요.</u>	Clarifying meaning	잡채는 왕실 요리였지만 지금은 생일과 특별한 날에 만들어졌습니다.	잡채는 왕실 요리였지만 지금은 생일과 특별한 날에 만들어졌습니다.	n/a	잡채는 왕실 요리였지만 지금은 생일과 특별한 날에 만들어요.
<u>잡채가 따뜻하거나 차갑게 먹을 수 있어요.</u>	Clarifying meaning	잡채가 따뜻하거나 차갑게 먹을 수 있어요.	잡채가 따뜻하거나 차갑게 먹을 수 있어요.	n/a	잡채가 따뜻하거나 차갑게 먹을 수 있어요.

APPENDIX D

Pre-Survey Questions

1. Have you used a machine translator (MT) like Google Translator or Naver Papago before?
 - Yes
 - No
2. What machine translation programs/platforms have you used to translate Korean? (Select all that apply)
 - Google Translate
 - Papago
 - Bing Microsoft translator
 - Other (please specify)
3. For what purpose have you used it? (Select all that apply)
 - To read texts written in Korean
 - To use as a draft to write in Korean by inputting English
 - To revise my texts written in Korean
 - To communicate with Korean language speakers via chat or email
 - To search words or phrases that I did not know
 - Other (please specify)
4. What difficulties do you have when you use MT(s)? What limitations do you think it has/they have?
5. Do you think using MT(s) can be helpful in learning the Korean language? Please explain why.

APPENDIX E

Post-Survey Questions

Q1: Which of the following would you use for your future assignments? Please choose all that apply.

- Machine Translation (MT)
- Image search
- News search

Please specify why you would use them in Q1.

Q2: Were the written feedback and review sessions helpful?

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Please specify how the written feedback and review sessions helped you in detail.

Q3: Which of the following purposes was most effective?

- Spelling check
- Checking grammar
- Clarifying meanings
- Checking honorific forms
- Finding better expressions
- Finding a new word

Please specify why it was the most effective in Q3.

Q4: What were the benefits and drawbacks of Guided Use of Machine Translation (GUMT)?

Q5: How much did GUMT help your Korean writing skills during this semester?

	Not at all helpful	A little helpful	Somewhat helpful	Very helpful	Extremely helpful
Vocab					
Short Phrases					
Long Phrases					
Sentences					
Paragraphs					

Q6: How effective was the image search?

Least effective

Most effective

1 2 3 4 5

Q7: How effective was the news search?

Least effective

Most effective

1 2 3 4 5

Q8: Did GUMT help you to write more in length?

Not at all helpful

Extremely helpful

1 2 3 4 5

Q9: Did GUMT help you to be more creative when you were writing?

Not at all helpful

Extremely helpful

1 2 3 4 5

Q10: Did GUMT help you to express your thoughts more freely in Korean?

Not at all helpful

Extremely helpful

1 2 3 4 5

Q11: Did GUMT help you to critically look into how the Korean language works as a language?

Not at all helpful

Extremely helpful

1 2 3 4 5

Q12: Did GUMT help you with finding context-appropriate vocab/expressions?

Not at all helpful
1 2 3 4 5
Extremely helpful

Q13: Did GUMT help you with using appropriate speech styles and expressions such as honorifics, polite forms, and casual forms?

Not at all helpful
1 2 3 4 5
Extremely helpful

Q14: Did GUMT help you to use MT more effectively?

Not at all helpful
1 2 3 4 5
Extremely helpful

Q15: What did you like the most in this course?

APPENDIX F

Codes

Code	Definition	Examples
Developing own MT strategies	Students commented on what worked better and didn't work when they used MT and came up with their own strategies such as using different language units, structuring English sentences input from Korean perspectives, etc.	"Reading the translated output made it a bit easier to see how the sentences would look if I were thinking about it from a Korean perspective, rather than an English one."
Strategies to use image search	Students commented on what worked better and didn't work when they used image search and came up with their own strategies such as using different language units.	"not very useful to try to verify the better phrasing for 'resting under a tree' or 'I believe.' I think the first concept was too complicated to search for directly, and the second is not something that can easily be conveyed by an image."
Strategies to use news search	Students commented on what worked better and didn't work when they used news search and came up with their own strategies such as using different language units, number of search results, etc.	"I also learned that typing full sentences to the image or news search doesn't work sometimes. It may be easier to break the sentence up to get result[s] on those search options."
Limitation of using MT	<p>Students commented that they were still unsure or confused whether MT output was using more appropriate words/expressions and grammar than they intended to express.</p> <p>Students expressed that they need higher Korean proficiency to use MT more effectively.</p>	<p>"Even though in the translator it sounds correct, I am unsure if all my particles are right or if the set-up of the sentence is accurate."</p> <p>"I find that the translator is only as useful as much grammar or vocabulary you know, so the less information you know, the less useful the translator will be and you won't be able to infer as</p>

		much information from trying to mess around with the translator”
Feedback from MT	Students noticed and attempted to correct and/or corrected their own mistakes after they compared their own draft and MT output. Areas of mistakes include spelling, word order, particles, conjugation, word choice, and so on.	<p>“Looking at other translations can help me notice mistakes in my own writing even if I do not change my sentence completely.”</p> <p>“Often I will leave out markers so it can be helpful to have that reminder.”</p>
Feedback session	Students commented why feedback sessions were beneficial or not.	“The written feedback has helped me verify that I am approaching the use of (and the drawbacks inherent in using) machine translators correctly. It was also useful to verify that some of the frustration I experienced trying to get the translated phrases to match my intended meaning was expected, and not due to me using the machine translator improperly.”
Confidence in FL writing	Students stated that they could gain confidence in their writing, sentences, and/or Korean, by using GUMT; could realize their Korean proficiency is better than they presumed; and/or could get assurance and validation.	<p>“I was able to gain more confidence in what I have written because the translator could understand me.”</p> <p>“surprisingly! I think I am starting to get better at expressing myself correctly in writing! This was very encouraging. 😊”</p>
Fluency in writing	Students mentioned that they could write longer sentences and/or paragraphs, express their thoughts more freely, and/or be more creative in writing in Korean with the help of MT	“it made me think outside the box and be a bit more creative”

APPENDIX G

Students' responses to post-survey questions (n=31 who completed at least 3 writing assignments)

	Machine Translation	Image Search	News Search
Q1. Future use	28	25	9
	90.32%	80.65%	29.03%

Q2. Helpfulness of feedback	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	mean
	0	2	0	13	16	4.39
	0.00%	6.45%	0.00%	41.94%	51.61%	

Q3. Most effective use of GUMT	Spelling Check	Checking Grammar	Clarifying Meanings	Checking Honorific Forms	Finding Better Expressions	Finding a New Word
	7	7	8	0	7	2
	22.58%	22.58%	25.81%	0.00%	22.58%	6.45%

Q5. Helpfulness of GUMT for below units	Not at All Helpful	A Little Helpful	Somewhat helpful	Very Helpful	Extremely Helpful	mean
Vocab	1	1	4	15	10	4.03
	3.23%	3.23%	12.90%	48.39%	32.26%	
Short Phrases	0	1	13	14	3	3.61
	0.00%	3.23%	41.94%	45.16%	9.68%	
	2	11	7	6	5	3.03

Long Phrases	6.45%	35.48%	22.58%	19.35%	16.13%	
Sentences	2	3	9	12	5	3.48
	6.45%	9.68%	29.03%	38.71%	16.13%	
Paragraphs	6	8	8	7	2	2.71
	19.35%	25.81%	25.81%	22.58%	6.45%	

Q6.	Least Effective	A Little Effective	Neutral	Effective	Most Effective	mean
Image search	2	3	6	14	6	3.61
	6.45%	9.68%	19.35%	45.16%	19.35%	
Q7. News search	13	10	5	2	1	1.97
	41.94%	32.26%	16.13%	6.45%	3.23%	

Helpfulness of GUMT for below aspects	Not at all Helpful	A Little Helpful	Somewhat Helpful	Helpful	Extremely Helpful	mean
Q8. More in length	1	4	9	14	3	3.45
	3.23%	12.90%	29.03%	45.16%	9.68%	
Q9. more creative	0	1	8	15	7	3.90
	0.00%	3.23%	25.81%	48.39%	22.58%	
Q10. express thoughts more freely	1	0	5	17	8	4.00
	3.23%	0.00%	16.13%	54.84%	25.81%	
Q11. view Korean language more critically	2	4	6	8	11	3.71
	6.45%	12.90%	19.35%	25.81%	35.48%	
	0	3	6	6	16	4.13

Q12. finding context-appropriate vocab/expressions	0.00%	9.68%	19.35%	19.35%	51.61%	
Q13. appropriate speech styles and expressions such as honorifics	5	11	5	7	3	2.74
	16.13%	35.48%	16.13%	22.58%	9.68%	
Q14. use MT more effectively	1	1	5	12	12	4.06
	3.23%	3.23%	16.13%	38.71%	38.71%	