The Influence of Machine Translators on the English Writing of Pre-service English Teachers

[1]Choe Yoonhee

[1]Prof., Dept. of English Education, Chongshin Univ., Korea
yhchoi@chongshin.ac.kr

Abstract

This study investigated how pre-service English teachers perceive the effects of machine teaching on their English writing competence. 35 Korean students who are majoring in English education participated in this study. The participants used machine translators for one of the required courses related to English composition. A survey and focus group interview were conducted at the end of the course. They were asked to answer to what degree they perceive the effects of machine translators on their writing in terms of lexical, sentential, and discourse levels. Furthermore, their perspectives on the effects of machine translation on English teaching including limitations of machine translators, were interviewed in more detail. The results show that the participants perceive machine translators quite positively in terms of improving their writing competence, but they also point out some critical limitations of machine translators. These findings have some pedagogical implications for English writing course instructors, English teacher educators, and program developers.

Keywords: *Machine Translators, Pre-service English Teachers, English Writing*

1. INTRODUCTION

Due to the recent rapid advancement of science and technology, there is a great deal of interest in big data and artificial intelligence. These developments are also having a profound effect on the fields of second language education or English education, as well as related research. It has become an unavoidable reality for learners to use these online dictionaries and machine translators in second and foreign language learning, including English (Ducar & Schocket, 2018). These studies can be mainly categorized into four categories: the accuracy of machine translators; learners' perceptions and attitudes toward using machine translators; ways to use machine translators for teaching and learning; and educational effects when machine translators are applied to teaching methods. However, these studies were mainly conducted abroad rather than domestically. In Korea, studies on learners' perceptions of machine translators after using machine translators in liberal arts and English reading or writing classes (Im, 2017; Lee, 2020; Odo, 2019) and their educational effects (Lee, 2021) have been mainly conducted. Previous research has documented both the benefits and drawbacks of using MT.

Machine-translated texts typically need a significant amount of post-editing to be of acceptable quality, and translation quality tends to greatly depend on the language pairs, text formats, and topic areas(Godwin-Jones, 2015).

There are many studies that show the use of a machine translator can help temporarily find unknown vocabulary and compose or interpret unknown phrases, but when used in the mid- to long-term, it can have some different effects on the affective and linguistic aspects of learners.

In the short term, a machine translator will have a positive effect on learners in terms of teaching and learning a second language, and it may be useful in learning to read and write English. However, due to this, learners' over-reliance and overuse may also lead to side effects in the long term (Ducar & Schocket, 2018). Therefore, applying the machine translator to teaching and learning should be cautious, and a lot of research should be done. In this study, after applying the machine translator to writing English over the course of the semester, the perception of the effect of MT on pre-service English teachers' writing competence is investigated.

How do pre-service English teachers perceive the effects of machine translators on their writing competence?

2. LITERATURE REVIEW

Numerous domestic and international studies have been undertaken on machine translations. Choe (2021) analyzed previous domestic and international studies on machine translation and English education over the past five years by their topics and themes and identified four significant themes. These include the 1) accuracy of machine translation, 2) learners' perceptions and attitudes toward machine translation, 3) utilization and application of machine translators in English education, and 4) the influence and effect of machine translators on English writing education.

When it comes to the accuracy of machine translators, the following studies have been conducted. Machine translators can use artificial intelligence to learn from millions of examples. Along with the development, the accuracy of the artificial intelligence-based translation system has also greatly improved. However, according to several studies, there is still a gap in accuracy. In particular, frequent errors have been reported in the translation of culturally reflective idioms, expressions, proverbs, and polysemy words (Abraham, 2009; Shocket, 2018).

Another major topic is learners' or teachers' perceptions and attitudes toward machine translators. Lee (2019) surveyed 169 Korean university students on their perceptions of the effect of machine translation on English writing and the correction process. Results of the survey analysis showed that the learners appeared to perceive machine translation as helpful in terms of vocabulary, grammar, and error correction. Also, after using machine translation, they perceived that their English writing had significantly improved. It was also reported that there was a positive impact on the perception of using a translator for error correction tools. Odo (2019) studied university students in a large city located in the south of Korea and how the use of machine translation was used for academic English reading activities. As a result, the study participants said that they read much faster when using machine translation than their own English reading time because they used it to translate unfamiliar words or phrases into Korean. Also, the study participants positively perceived the convenience, ease, and promptness of the interpretation service using the machine translator as strengths. Odo (2019) suggested that machine translators have the potential to be a useful tool in English teaching for academic purposes. However, he was critical of the accuracy of machine translation and the over-reliance of learners with low proficiency levels of English.

In terms of English education, Lee (2020) examined a machine translator's role as a tool in computer-assisted language learning (CALL). Lee reported that translators reduced grammatical errors and corrected students' English writing, which was a positive help. She suggested that using machine translators for post-editing after writing can positively influence students' writing strategies and reported that it helped them to think of writing as a process. Additionally, by analyzing interviews and reflection journals with students, students also reported that they were positively aware of the use of machine translation during the writing

process.

Compared to ten years ago, the educational effects of machine translations on the English language are claimed to have received a greater amount of attention in the past five years. Approximately ten years ago, there was considerably less interest in the pedagogical impact of machine translations on the English language than there is today. The majority of students that utilized translators had a favorable opinion of machine translation due to factors such as usability and speed of work completion. Particularly, L2 writing has greatly improved (Abraham, 2009; Garcia & Pena, 2011; Lee, 2020), as have fluency (Garcia & Pena, 2011) and accuracy (O'Neill, 2016). It can also benefit English and foreign language learners by analyzing and studying the target language. It is highly successful as a supplementary learning tool, especially when locating and analyzing mistranslations or making post-editing corrections for many courses in L2 or English writing. (Abraham, 2009; Corerea, 2014; Garcia & Pena, 2011; Niño, 2008; 2009). In other words, during activities involving machine translators, students can discover and locate grammatical and lexical errors. (e.g., Abraham, 2009; Correa, 2014) can recognize the distinctions between words (Somers, 2003). Although these machine translators have improved, they are frequently unable to fix incorrect language and jargon (Lee, 2019), therefore teachers must be cautious when using machine translators in the classroom. It has been stated that comprehensive and careful direction and planning are required.

In addition, there is a paucity of research on this topic, despite the fact that the educational impact of machine translation may vary depending on the proficiency levels of English learners. Moreover, as the studies undertaken so far have only examined the usage of learners for a short period of time, research in this field is rare. Consequently, it is essential to develop and implement a systematic and professional model, and its scientific and objective validation in subsequent studies is essential.

3. RESEARCH METHODS

3.1 Participants

Participants were 35 Korean college students who were majoring in English education at a university located in Seoul, Korea. Their demographic information is as follows: [Table 1]. 20 students were female and 15 students were male. 28 students were juniors, and 7 were seniors. The GPAs of the 20 students ranged from 3.0 to 3.9. Interestingly, 32 students prefer *Papago,* which is developed by NAVER, a Korean search engine, to *Google Translator,* and only 3 students prefer *Google Translator*.

Table 1. Demographic Information of the Participants

Gender	Female (20)	Male (15)
Grades	Junior (28)	Senior (7)
Preferences	Papago (32)	Goggle (3)
G.P.A.	~1.9 (5), 2.0~3.0 (6)	3.0~3.5 (7), 3.5~4.0 (13), 4.0~ (4)

About 55.6% of the study participants considered their English proficiency to be above average, and about 33.3% thought it was below average. When asked about the frequency of using machine translation, about 29.4% said they had used it a few times but did not use it much. 58.8% answered that they often use it, and 16.7% answered that they use it very often.

The questionnaire items used in this study consisted of four parts, as follows: The first were questions asking how machine translation had a linguistically positive effect on the study participants' English writing. The

second part was about the degree to which they predicted that their English proficiency would improve in the linguistic aspect if they continued to use machine translation in the future. The final section included questions about the limitations of machine translation. Each part consisted of 4-6 sub-questions, and the perceptions of the research participants were analyzed with a *Likert* scale method of 1–5.

3.2   Data Collection & Analysis

For collecting data, the participants survey was conducted. Participants' survey results, focus group interviews, and an observation sheet have been collected and analyzed in a qualitative way. The survey questions were divided into four parts: 1) the effects of MT on their lexical level competence; 2) expectations of using MT in improving their proficiency skills; 3) the effects of MT on their English skills (speaking, grammar and vocabulary, reading, and writing); and 4) negative aspects of machine translators. After the survey, a focus group interview was conducted on a voluntary basis. The participants' interview data were recorded and transcribed.

Through constant comparison methods, main themes were drawn from repeated readings of the participants' interview data and their weekly reflection journals. To avoid the subjectivity of the qualitative data analysis methods, member checking and peer debriefing were also conducted.

4. RESULTS AND DISCUSSIONS

4.1   Pre-service English teachers' Perception on Machine Translators

Table 2 shows the descriptive statistics of the effects of MT on the participants' writing skills in terms of lexical, grammatical, syntactic, and authentic expression. Participants recognized that machine translators had a positive effect in terms of vocabulary diversity when writing. It was also recognized as positive in terms of grammatical accuracy and sentence structure. The aspect of providing various expressions was also positively recognized.

Table 2. Descriptive Statistics of Lexical levels

If I use MT in my English writing, I can	Mean	S.D.
use diverse words or vocabulary (lexical diversity).	3.6	0.8
write grammatically correct sentences (grammatical accuracy).	3.4	1.14
write well-constructed sentences (syntactic complexity).	3.4	1.14
use authentic or proper discourse (discourse).	3.3	1.05

Study participants, who are prospective English teachers, recognized that using machine translators would have a positive effect on their English writing skills. However, it was found that they did not perceive their reading skills very positively ($M = 2.8$). It was also recognized that it would have a positive effect on grammar, vocabulary, and various expression skills.

Table 3. Descriptive Statistics of Pre-service English Teachers' Expectations

I think using an English automatic translator will improve	Mean	S.D.
my English writing competence.	3.2	0.95
my English reading competence.	2.8	0.96
my English grammatical competence/knowledge.	3.5	1.03
my English lexical competence (lexical diversity).	3.5	0.91
using English Authentic/diverse expressions.	3.6	0.91

Table 4. Descriptive Statistics of Pre-service English Teachers' Perception on the Effects of MT on Teaching Writing

Effects of MT on teaching writing	*Mean*	*S.D.*
I want to MT for reviewing my own English writing (e.g., checking lexical / grammatical errors).	3.9	0.89
I want to write in English without the help of a translator. (I am reluctant to using a MT).	3.4	1.09
I want to have my prospective students use MT in my English class.	3.2	0.95
Even if I can use MT for my English writing, feedback from friends or professors will still be important/necessary.	3.8	0.98

Table 5. Descriptive Statistics of Negative Aspects of Machine Translators

Negative aspects of Machine Translators	*Mean*	*S.D.*
MT is not always grammatically correct.	2.8	1.07
MT does not always provide diverse or authentic expressions.	2.9	0.96
MT cannot understand Korean well.	3.3	0.91
MT is not yet fully developed.	3.8	1.15

*MT refers to Machine translation.

Study participants were found to be aware of the effectiveness of machine translation as follows. First, I want to write English well without the help of a translator ($M = 3.4$). Also, it was recognized that machine translation is very effective for educational purposes to review and check mistakes after writing in English ($M = 3.9$). In addition, there were many positive opinions about the idea that they would like to use it when teaching English writing to prospective students when they become teachers. However, it was still recognized that feedback from instructors or peers is very necessary in the review process after English writing.

4.2   Pre-service English teachers' perceptions on the drawbacks of machine translators

Research participants who had been writing English using a translator over a semester recognized that the translator had various limitations as follows.

First, machine translators don't understand the exact meaning. In particular, when a Korean word contains multiple meanings, there are cases in which it is difficult to figure out what meaning is conveyed in this context.

"...It is difficult to capture the exact nuances of the Korean language..."

"...The point is that there may be cases where the expression I want and the translated expression collide..."

"...There are many other shortcomings, but sometimes unintended meanings or interpretations seem to appear..."

"...Sometimes the words come out so diverse that they don't fit the flow of the text..."

"...Machine translators do not take the context into account, so they cannot reliably tell a specific word or sentence out of context..."

"...The difference is the choice of vocabulary. When I write for myself, I make up sentences using specific vocabulary (which I intend and plan ahead of time). That is, there is an opportunity to optimally reflect my

intentions and thoughts. However, in most cases, the translator does not accurately grasp my intention and only describes the meaning of the word. So, in my case, even if I make a sentence with the help of a translator, I tend to revise the vocabulary partly…"

"…'Understanding' is shown only as 'understanding'. No other various words appear…"

"…I would like to point out the lack of diversity in the translator's vocabulary. For example, if we usually use the adjective 'difficult' to convey the meaning of 'difficult', we want to express it using at least several words such as hard, challenging, difficult. However, the translator seems to use only the word difficult. I think the vocabulary diversity is a bit lacking. Also, the translator seems to do a direct translation. For example, when talking about someone's wrong behavior, we think it's appropriate to use the word 'behavior', but translators use the word 'action'…".

Second, everyday expressions are translated well, but Korean proverbs and colloquial expressions that are unique to Korean are not translated well, and they seem to list words literally.

"…Idioms and proverbs are rarely translated properly. Unless it is used frequently, such as 'Eat porridge', you can never change the meaning of a Korean proverb to an American proverb that can replace it. In the case of phrasal verbs, the use of prepositions is fixed. For example, made of, made from, made with, made in, etc. are not used properly, but made from is fixed…"

"…There was a time when I expressed a Korean 'predicate' with two meanings in a different meaning than the one I intended to express…"

"…It was expressed as 'saving' instead of looking for 'save'…"

"…In general, there are many cases of mistranslation of specific or deep meanings into Korean. The subject usage is confusing…"

Participants in this study experienced that Korean proverbs, proper nouns and idiomatic expressions were only translated literally, different from their original meaning, while writing articles on various topics and genres during one semester. And this aspect was pointed out as a limitation of the translator.

Third, it was said that if the translator writes colloquially without a Korean subject, the translator becomes very strange. Since an English sentence cannot be formed without a subject, if there is no subject in Korean, strange pronouns appear as subjects in English translations. The participants in this study recognized that sentences with simple syntactic structures and daily expressions seem to be translated well when writing in English using a machine translator. However, the participants in this study, who were pre-service English teachers, reported that they experienced that the translation was not properly performed when syntactically complex or specialized academic or technical terms were included.

"…If you do not write the subject, sometimes it is replaced with a strange pronoun, sometimes the article is written with strange words because you do not understand Korean correctly…"

"…When you input Korean, you need to translate it into a foreign language, but if you do not enter foreign Expressions (direct translation) at the time of input, the sentence will not be completed…"

"...It is difficult to translate words that have too much dictionary meaning in colloquial sentences or technical terms appearing in papers…"

"... I wrote 'gene-splicing technology', but the MT wrote 'genetic sculpture technology'…

"...in my writing. I wrote 'Genetic splicing' but ....in the machine translator, 'Genetic fragments' appeared… 'fragment' seems to be a word that has nothing to do with my writing…"

As in the interviews with the students above, when using a machine translator, if the subject is omitted in a colloquial Korean language, the output of the machine translator appears as a strange sentence, contrary to what was intended. Considering these points, it seems necessary for teachers or users in the field of English education to write Korean without omitting subjects when using a machine translator. Also, instead of expecting too many idiomatic expressions or proverbs to come up naturally, it's better to write out Korean idioms or proverbs in detail. This will help machine translators translate them better.

The participants in this study had, on average, higher English proficiency than general Korean English learners. In addition, most of the students in the third year or higher of the Department of English Education were able to objectively look at machine translation in terms of English education, so it seems that the limitations of machine translation pointed out were well-identified. A comprehensive look at the results of the survey and interviews suggests that learners with a certain level of English proficiency use machine translation more efficiently than their counterparts. This is because learners with high English proficiency can find and re-edit translations that do not consider the context of the machine translators. However, it seems that learners with low English proficiency need correction through the feedback process of instructors or peers or with help from instructors.

5. CONCLUSION

This study investigates how pre-service English teachers perceive the use of machine translation in the writing of English. In order to accomplish this, a four-part questionnaire was developed and analyzed using a *Likert* scale of 1 to 5. The first of the four sections of the questionnaire asked: 1) how accurate and effective the machine translation was with respect to the lexical, grammatical, and discourse aspects of their written English. In the second section, I asked to what extent the use of machine translation will enhance their lexical, grammatical, discourse-competence, and overall English writing skills. Thirdly, from the perspective of English teachers, the future impact of machine translation on the field of education and the limitations of machine translation were examined.

In addition to the survey, focus groups and in-depth interviews were conducted, and they identified the following three limitations of machine translation: Initially, it was discovered that the machine translator matches Korean words literally and lists them without considering the context. Therefore, it was determined that the nuances of meaning in Korean could not be translated effectively. In addition, when a word has numerous meanings, it is frequently impossible to convert it into the context-appropriate word. Second, they claimed they were unable to translate Korean terms such as proper nouns, proverbs, and idioms effectively. It was reported that it was able to translate basic phrases used in daily conversation or simple sentences well, but not specialized academic terminology. Lastly, it was pointed out that when applying a machine translator, if Korean is spoken in a colloquial manner by omitting the subject, the translation will not be appropriate. This study is different from others in that it examines the use of machine translation for prospective Korean English teachers after one semester of use. In addition, the results of the pre-service English teachers' recognition of

the linguistic and educational features of machine translators have pedagogical implications for English education in Korea. The limitations of the present machine translation identified in this study have significant consequences not only for English language learners who utilize machine translation, but also for educators who wish to use it for English instruction. However, it is difficult to generalize the results of this study because it was conducted on a small number of prospective English teachers at a university located in Seoul, Korea. Future follow-up studies are expected to investigate the qualitative aspects of machine translations according to various English writing genres, as well as the disparities between machine translator users' English proficiency levels.

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