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The Role of AI Translators on Reading Comprehension*

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ABSTRACT

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This study aims to investigate reading comprehension and students' perception in a university reading course using an AI translator, whether *Google or Papago Translate*. The subjects were comprised of 113 students divided into three groups: the control group analyzed reading texts traditionally, the first experimental group analyzed reading texts using *Google or Papago Translate*, while the second experimental group also analyzed reading texts using *Google or Papago Translate*, but then also revised the machine translator's incorrect translations. Reading comprehension tests and a post-questionnaire were then administered to examine the effects of using AI translators. The findings showed that all three groups significantly improved their reading comprehension scores in the post-tests as compared to those in the pre-tests. However, there were no statistically significant differences between groups. Regarding students' perception, the participants using an AI translator showed no statistical differences between the two experimental groups. However, in terms of sentence structure, students' translations after using an AI translator were perceived to be of significantly higher quality compared with those that simply used the translator. Most participants stated that using AI translators was much more beneficial to get the main idea and for understanding the whole passage, rather than using it simply to learn vocabulary and expressions. Furthermore, using AI translators relieved the participants' anxiety and burden while also satisfying them. However, such students also had lower mean scores in terms of interest and motivation for language learning in the post-questionnaire items. Based on the results of the study, pedagogical implications and future research are suggested.

KEYWORDS

AI translator, reading, perception, artificial intelligence, machine translator

1. Introduction

The information age has changed every aspect of the world. The development of technology has further revolutionized the translation process and the workflow of the translator. The existence of AI translation tools makes it possible for people with various linguistic backgrounds to connect in a global society. Language barriers no longer prevent individuals from interacting and speaking with one another due to these technological breakthroughs.

Translation has traditionally been taught using a teacher-centered approach, in which the teacher performs the majority of the work during the lecture. In Korea, this is still the case in secondary education, when teachers prepare students for college entrance exams. A one-way method of teaching translation skills to students in tertiary education is no longer sufficient and successful when translations become an academic subject rather than a test. Through today's technology, instructors fulfill the roles of coordinator, facilitator, and inspirer, organizing and directing students to access information and leading them to self-directed learning. It remains necessary, however, to continue finding ways to encourage students to participate in developing the knowledge, skills, and attitudes required to prepare them for their future careers.

Using a machine translator for understanding foreign languages makes it possible for students to move from passive learners to active learners (Becker 2000). It also enables students to learn the target language more accurately and explicitly when they otherwise lack sufficient vocabulary and expressions for speaking and writing (Chon and Shin 2020, Jolley and Maimone 2015, Kim N-Y 2018, Lee 2020, Stapleton and Kin 2019). According to some studies (Lee and Briggs 2021, O'Neill 2019, Tsai 2019), machine translation enables L2 learners to express their ideas more freely and fluently while employing more accurate vocabulary and grammar. Additionally, some research has suggested that translations can be an effective way to comprehend reading texts (Bagheri and Fazel 2011, Karnal and Pereira 2015, Karnal and Vera 2013).

However, AI translators have some weaknesses, such as unexpected errors that necessitate users to both spot and be able to correct the translation (Niño 2009). Additionally, the quality of translations vary depending on the length of the text, which can confuse the AI, resulting in the translated text sometimes having a different meaning than that of the original. According to Siregar et al. (2020), students should understand the importance of many cultural factors when translating texts, and should carefully consider how to best use translation tools to optimize their English language learning. This implies that it is not advisable to rely entirely on an AI translation tool or machine translation (MT) to produce an accurate translation. In fact, since teachers cannot ensure that students will learn new languages using machine translators, relying too much on machine translators may hinder foreign language learning. Hoi (2020) insisted that learners should continue employing human interpreters when using machine translators to get better at language learning. Additionally, although most EFL learners seem to make common use of machine translators, EFL teachers do not seem to support or encourage learning through machine translation. That is, MTs may restrict the development of their student's language learning skills and could make it challenging to determine how much they contributed to the reading proficiency of students.

AI translation research has undergone remarkable changes in the last two decades. Few studies have been done on reading comprehension, although many have been done to determine the value of translators in vocabulary, grammar, and writing. Additionally, there has neither been much research done on the precise approaches for using a translator in reading comprehension classes nor on effective methods for using machine translators. According to prior studies (Brahmana, Sofyan and Putri 2020, Niño 2009), MT can inhibit students from acquiring L2. Additionally, because the translation is done without taking the context into account, there may be instances where utilizing an AI automatic translator results in incorrect or incomplete translations (Chon and Shin 2020, Lee 2020,

Medvedev 2016, Siregar et al. 2020). That is, students need to verify the accuracy of the text produced by automatic translators. Considering this view, the current study is an attempt, in the context of Korean university students, to explore the different methods to which students attribute their perceived successes and failures while translating English texts using an AI translator. In this study, students who were required to use an AI translator were divided into two groups: those who simply used automatic translators, and those who made modifications to the AI translations after using them. Taking all this into consideration, the research questions for the study were as follows:

   a. What are the effects of using AI translators to enhance EFL learners' reading performance?
   b. How do students perceive using AI translators in improving their reading comprehension?

2. Literature Review

2.1 Machine Translation in Language Learning

Computational linguistics (CL) or natural language processing (NLP), known as 'machine translation' (MT), studies the use of software to translate text or speech from one natural language into another (Qun and Xiaojun 2015). Today, nearly all students frequently use machine translators in vocabulary learning, writing, and reading comprehension since AI translators are cost-free and provide quick outcomes. In this regard, research on MT in foreign language learning has increased. It is well known that machine translation is a useful and effective tool for learning foreign languages (Tsai 2019).

Some studies prove that L2 learners can use vocabulary and grammar more accurately and write their ideas more freely and fluently using machine translation (Lee and Briggs 2021, O'Neill 2019, Tsai 2019). When students do not know the proper vocabulary and expressions for speaking and writing, using machine translation allows them to learn the target language more precisely and explicitly (Stapleton and Kin 2019).

In addition, it has been proven that translations can be a useful method to understand reading texts (Bagheri and Fazel 2011, Karnal and Pereira 2015, Karnal and Vera 2013). In some texts and between some languages, the quality of MT has risen to a point where some researchers think it is comparable to human translation (Vasheghani 2020). More and more students are using machine translators when they encounter English vocabulary that they are not familiar with, or when they cannot find the proper expressions while writing in English (Chon and Shin 2020, Lee 2020).

There has been considerable technological progress in AI translation systems. Two well-known translation tools that are frequently used in Korea are *Google Translate* and *Naver Papago*. Since students frequently use both of these resources to help them with their writing (Park 2018), AI translators appear to play an increasingly important role in foreign language learning. In this regard, research has been done to evaluate the benefits and drawbacks of machine translation as well as its effectiveness.

Kumar (2012) made an effort to research how MT systems were used by business and IT students. It examined how Arab college students used and depended on MT tools. The study employed a survey which asked 60 students to complete a questionnaire. The findings showed that all students employed MT and *Google Translate* (GT) was used most frequently. Additionally, the findings showed that more than 75% of students primarily used GT to comprehend the texts. They receive intellectual and scientific terms from MT for their writing projects. MT was highly beneficial for translation and reading comprehension. However, machine translators also produce many errors in long and complex sentences or sentences that contain idiomatic and cultural meanings (Medvedev 2016).

Students are thus best advised to utilize it as a tool to aid them in learning English rather than to completely rely on the results of its translations.

According to Baker (2013), students have favorable experiences with MT since it provides students with a quick model for how to write what they want to communicate, and so provides a quick and effective approach to learning a new language. Karnal and Pereira (2015) investigated the impact of MT on reading comprehension. The strategies used by the 10 intermediate students were analyzed using MT using think-aloud protocol. According to the study, using MT pushed students to utilize more methods and entailed greater cognitive demands, which led to their comprehension being more efficient.

In the Korean context, a study was conducted to explore the effects of the use of bilingual dictionaries and MT (Kim N-Y 2018). Students who enrolled in an English speaking and writing class were asked to use either a bilingual dictionary or a machine translator. The results of the study showed that participants considerably increased their speaking and writing abilities in both the bilingual dictionary and machine translation groups. No group differences were found proving that both tools are equally beneficial for learning English. According to the survey results, the group using a bilingual dictionary had more favorable attitudes regarding learning English than the group using a machine translator.

Some debate exists regarding whether machine translation access could lead to a focus on specific words rather than the overall text. According to Siregar et al. (2020), students should be aware of the value of various cultural elements, and assess how to use translation tools to find the best equivalents and to improve their English-language proficiency. This suggests that relying solely on a translation tool or machine translation to provide accurate translations is not advised. In this regard, even if *Google Translate* can be used as a learning media in translation, students ought to make self-corrections and consult dictionaries to confirm the correct meaning of doubted words and then choose the best option by considering the context (Brahmana et al. 2020).

Regarding the use of MT in the language learning classroom to scaffold L2 learning, some drawbacks have been noted. One limitation of MT as a support for input and comprehension is the often decontextualized nature of the translations it produces. Due to the fact that a lot of its translations are too literal, the decontextualized translations generated by MT may not help students comprehend the text (Niño 2009).

Indeed, relying too much on MT to understand texts may hinder L2 learning as teachers cannot guarantee that students are, in fact, learning new languages rather than merely auto-translating content (Karnal and Pereira 2015). According to Hoi (2020), even if machine translation is improving and can help people be more productive, too much reliance on it should be avoided. He argued that learners are advised to continue using human translators since, in so doing, they would be able to improve their language skills.

However, AI machine translation methods based on complex deep learning algorithms have been proposed to compensate for such shortcomings. Since artificial neural network machine translation identifies and translates the context of sentences, utilization speed and accuracy are rapidly increasingas compared with previous translators. Based on the findings of previous research, it cannot be denied that MT aids in foreign language learning.

2.2 Students' Perception toward AI Translators

Previous studies showed that EFL learners frequently used AI translators in English learning, especially when learning vocabulary, reading, speaking, and writing. In addition, much research has focused on how students perceive AI translators since learners use them in their foreign language learning. The opinions and attitudes of learners toward AI translators are diverse. The use of AI translators is improving students' motivation as well as their sentence structure and vocabulary (Bahri and Mahadi 2016, Jolley and Maimone 2015, Niño 2009).

MT access supports greater learner autonomy, as it allows students to read authentic materials by themselves to improve their comprehension (Akbulut 2007, Kelly and Bruen 2015) despite the occasional awkward MT interpretation (Karnal and Pereira 2015, Niño 2009). MT tools can also help narrow the L2 proficiency gap among students that exists in all classrooms (Karnal and Pereira 2015), reducing their anxiety levels as they learn foreign languages.

It has been demonstrated that students who employed machine translation in their study of foreign languages had favorable opinions of the technology (Bagheri and Fazel 2011, Bahri and Mahadi 2016, Briggs 2018, Lee 2019, 2022a, 2022b, Valijärvi and Tarsoly 2019). According to Bagheri and Fazel (2011), translation improved their motivation to study English as well as reading comprehension, grammar, and the use of appropriate expressions. Another study (Bahri and Mahadi 2016) proved that it helped learners learn in a comfortable and safe atmosphere by lowering their anxiety. By incorporating *Google Translate* (GT) as a tool in the learning process, students who learn foreign languages become more analytical and proficient, which encourages them to learn the languages autonomously and increases their confidence (Valijärvi and Tarsoly 2019).

Alhaisoni and Alhaysony (2017) conducted a study to determine how Saudi EFL university students perceived using GT. 92 students who majored in English participated in the study and were asked to answer the questionnaire about their attitudes toward the use of GT. The findings showed that a majority of the students used GT in almost all subjects. Specifically, they used it frequently to find the meaning of unknown words, do writing assignments, and read texts. The participants showed very positive attitudes toward GT since it was free and easy to access and could translate texts fast. Moreover, the students believed that the GT's translation was superior to their own and that it helped them learn new words. The students admitted that GT was not able to accurately translate a full paragraph so they had to refer to a dictionary or ask their teachers or peers to validate it. They also mentioned that GT had negative aspects on their study habits because it made them less likely to read and write themselves. The students found some of the raw GT outputs to be unreliable, especially for lengthy phrases and paragraphs.

Studies similar to the above studies are being conducted in various contexts. Jolley and Maimone (2015) examined 128 Spanish-major students and discovered that they had favorable attitudes toward using machine translators. Almost all of the students used MT and it helped to facilitate language learning. According to the survey, the students utilized MTs to complete writing, translation, and presentation assignments. However, they never or very seldom used MTs to translate entire texts. According to Jo (2018), students of all English proficiency levels may easily participate in freestyle writing exercises by using their first language in writing with the aid of machine translators. The students' self-assurance and sense of accomplishment also rose. In regards to the students who had a severe lack of English proficiency to begin with, they noticed an increase in self-confidence.

Research on learners' perceptions related to machine translators has also been conducted in the Korean context. Lee (2018) conducted a study with five students who used machine translation and described their experiences in detail through interviews. Students worked on a post-editing assignment using Korean translations of English medical articles. As a result, the participants stated that while post-editing was challenging, the quality of the machine translation was not as poor as they had anticipated. They said that post-editing was necessary to enhance the quality of the translated data and that machine translation needs to be acknowledged as a beneficial learning tool.

Noh (2021) investigated how machine translation affected the English writing of Korean university students. The study attempted to explore how the use of a translator affected learners' writing skills in terms of vocabulary and grammar and students' perceptions towards MT. As a result of the study, both the beginner and the intermediate level groups improved their English writing skills using a translator. Eighty-six percent of the participants used machine translators for the purpose of translating from Korean to English rather than English to

Korean, indicating that facilitating translators is more related to writing than reading. All participants responded that their confidence in English improved due to learning to use a translator, showing high satisfaction, the convenience of writing in English easily and quickly, and the reliability of translation accuracy and completeness. However, the most frequently mentioned disadvantage of using a translator was dependence on the translator. Translators were most helpful for writing (50%) and reading (30%), followed by speaking (14%) and listening (6%). Furthermore, the participants responded positively regarding interest and confidence in English and improving English skills when using the translator. Similarly, Lee and Lee (2020) attempted to understand the perceptions and attitudes of Korean high school students concerning the use of an online machine translation as well as monitoring changes in the frequency of errors in their writing that resulted from its use. The results showed that students showed positive attitudes toward using a machine translator and they used it commonly and practically. However, it was more frequently employed in their writing than in their reading.

However, despite the fact that previous studies reported positive attitudes toward machine translation, Kim (2018) pointed out that excessive dependence on machine translation decreased learners' learning motivation and produced ethical problems. He asserted that the use of machine translation would not be helpful to EFL learners in the long run.

As such, machine translation is penetrating deeply into the EFL learning environment, but research on how to utilize machine translation in English reading is currently insufficient. As such, it is not advisable to reject or to overuse machine translation technology because either option could impede students' ability to learn.

3. Methodology

3.1 Participants

The study examined how AI translators influenced EFL learners' reading comprehension. It consisted of 113 university students who registered for three mandatory English 2 classes. These classes were randomly assigned to three different groups: a control group and two experimental groups. The control group used no AI translators when comprehending their reading texts. The first experimental group used AI translators such as *Google* or *Papago* to assist in their reading comprehension. The second experimental group used AI translators like the first experimental group and then discussed and revised the errors in a group based on the *Google* or *Papago* translation. The researcher taught all three classes according to the reading schedules and, except for the treatment, the three classes were taught with the same textbook and the instructor applied the same teaching methods with the same online application tools for English learning.

The control group had 33 students with 21 females and 12 males. The first experimental group consisted of 40 students, of which 31 were females and 9 were males. The second experimental group comprised 40 students with 22 females and 18 males. Majors varied in the three classes. The majority of the students were freshmen, with 9 sophomores and 4 juniors in all three groups. Seniors (three students) were only in the control group. Every student took pre-reading tests based on the materials from the reading text. The findings revealed that there were no significant differences in the pre-reading tests (see Table 3). Therefore, the groups were homogeneous. All participants voluntarily agreed to participate in this study and signed a consent form.

3.2 Teaching Procedures and Instruments

The purpose of these English 2 classes was to enhance students' reading performance. Every student took a pre-reading test before the first reading started at the beginning of the semester. The reading titled '*We All Need a Role Model*' was the first of eight readings for the semester. The reading test included 20 questions based on the first reading. There were various question types including multiple choice questions (finding the main idea and detailed information), short answer questions (contextual words, and true/false), and vocabulary-related questions.

Table 1. Procedures of Using AI Translators in the Reading Activity

Session	Class			Time Alloltment
1st	Pre-Reading Test			20 mins. (online) / 20 Qs
2nd	Main-Reading Activity			60 mins.
	No AI Translator	AI Tanslator	AI Translator with Revision	
3rd	Post-Reading Test			20 mins. (online) / 20 Qs
	Post-Questionnaire & Interviews			15 mins. / 30 mins.

The study took two class periods, 75 minutes each. In the first class period, after students checked their attendance, students took a pre-reading test. All general English 2 classes were operated online due to COVID-19, so the pre-reading tests were conducted using a testing system embedded in LMS at this university. Two experimental groups carried out the study on the same day, but the control group that used no AI translators did it on the next day because of the designated class schedules.

After students took the pre-reading test for twenty minutes, the test in LMS was automatically closed. Then, the instructor went through the pre-reading activities. Students were required to bring a picture of their role models. Then, the instructor asked them to upload their pictures and discuss these two questions shown in the PPT slide: '*Who is your role model?*' and '*Why do you choose your role model?*' After the students shared their opinions with other classmates, the instructor explained the predicting skill and explained the preview of the reading. That is, the instructor generally discussed the key points of the whole reading so when students were divided into groups to talk about the main passage of the reading by paragraphs, they would understand which part of the reading they were assigned to. Next, for the rest of the first class period, students in experimental group 1 analyzed the main reading passage using either *Papago* or *Google* AI translators by *Kakao Talk*. Those in experimental group 2 discussed the main reading passage using either AI translator first, then the instructor asked them to revise any errors they found in the AI translation.

Regarding the second class period, the instructor allocated the first twenty minutes for the organization of their ideas and opinions about the main reading passage, then they took a post-reading test for twenty minutes via LMS. After they were finished taking the test, the instructor pointed out the gist of the main reading passage and went through each paragraph to clarify difficult parts, redefine certain words or specific sentences, and revealed the author's point of view.

At the end of the semester, the researcher requested that students fill out a post-questionnaire to explore how students perceived the use of AI translators, whether *Papago* or *Google*. Those who responded to the post-questionnaire using the *Google Form* survey link detailed some of the advantages and disadvantages of using AI translators. Only the two groups who used the AI translators sent answers for the post-questionnaire.

Finally, given the circumstances (Covid restrictions), all of the interviews were carried out on *Kakaotalk*. Eight students were randomly selected: four students (2 males and 2 females) from both experimental groups. Each

interview took about 30 to 40 minutes to talk about the use of AI translators in English reading classes. Before they started the interviews, they all agreed to the interviews. All the interviews were carried out in Korean and they were translated into English.

3.3 Analysis

The data comprised pre-reading tests, post-reading tests, and post-questionnaires analyzed via SPSS 20.0. Paired sample *t*-tests were conducted to examine the effects of enhancement in the reading performances within each group between the pre- and post-reading tests. A one-way ANOVA was performed to investigate the differences among the groups and whether using AI translators was significantly effective.

Regarding the post-questionnaire, fifteen close-ended items were analyzed with descriptive statistics. The questionnaire was modified based on the study of Kim and Cha (2020) and Cha, Kim and Kim (2022). Independent *t*-tests were employed to examine the differences between the two experimental groups for the close-ended items. Two open-ended questions, the benefits and drawbacks of using AI translators, were categorized and analyzed. Students' responses were written in Korean, so all of their responses were translated into English. The results were presented by frequency and percentage. If one student's response included two separate opinions, they were counted as two responses. Finally, the interviews were conducted to examine students' perspectives on using AI translators. They were analyzed to examine insights on how students use AI translators in English reading classes effectively.

4. Results and Discussions

4.1 Effects of Reading Performance within Groups

The aim of this study was to investigate whether using AI translators can influence EFL learners' reading performance. The first research question explored any effects on reading comprehension scores after comparing pre- and post-reading tests among the three groups. To examine the effects of reading performance in each group: the no AI translators group (control group), the using AI translators group (experimental 1 group), and the using AI translators with revision group (experimental 2 group), paired sample *t*-tests were performed between the pre- and post-reading test scores.

Table 2 presents the results of the pre- and post-reading tests among the three groups. The mean score of the pre-reading test was 55.60 (*SD* = 14.74) while that of the post-reading test was 66.89 (*SD* = 11.90). There was a significant difference in the control group (*t* = -4.23, *p* < .01). Regarding the first experimental group, the mean score of the pre-reading test was 62.38 (*SD* = 11.67) while that of the post-reading test was 69.13 (*SD* = 11.47). A significant difference was also found in the group using AI translators. The students in the second experimental group scored 61.38 (*SD* = 13.62) on the pre-reading test and 70.25 on the post-reading test. This group was also found to be significantly different (*t* = -4.23, *p* < .01). That is, all three groups' test scores significantly improved in the post-reading test regardless of their use of AI translators. Even the students who did not use AI translators when they were analyzing the main reading passage enhanced their reading comprehension scores although their mean scores on the pre-and post-reading tests were lower than the two experimental groups.

Table 2. Result of Paired Sample *t*-tests for the Effects of Using AI Translators

Task	Test	*M*	*SD*	*df*	*t*	*p*
Control	Pre-test	55.60	14.74	32	-4.23	.00**
	Post-test	66.89	11.90			
Experimental 1	Pre-test	62.38	11.67	39	-4.00	.00**
	Post-test	69.13	11.47			
Experimental 2	Pre-test	61.38	13.62	39	-4.23	.00**
	Post-test	70.25	12.14			

Experimental 1: AI translators; Experimental 2: AI translators with Revision
**$p < .01$

Regardless of whether or not students used AI translators, all three groups demonstrated notable improvements in reading comprehension. Interestingly, students, with or without an AI translators' help, improved their reading skills. In other words, this finding provided a different result from previous studies that noted that students may be prevented from learning new languages if they rely on machine translation (Karnal and Pereira 2015). To put it another way, this outcome was different from the previous study's hypothesis that depending on machine translators to interpret text might prevent students from effectively learning new languages (Karnal and Pereira 2015). Even though teachers are unable to guarantee that students would eventually learn new languages because they would simply choose the more practical method of using AI translators, the results demonstrated that students could broaden their reading comprehension with their use.

4.2 Effects on Reading Performance between Groups

To explore the significant differences among the three groups, as demonstrated in Table 3, one-way ANOVAs were conducted. Regarding the pre-reading tests, there were no significant differences among the three groups. That is, the findings of one-way ANOVAs confirmed that the three groups were homogeneous ($F = 2.65$, $p = .08$).

TABLE 3. Group Differences in Reading Comprehension on the Pre-test

Group	*M*	*SD*	*df*	*F*	*p*
Control	55.60	14.74	110	2.65	.08
Experimental 1	62.38	11.67			
Experimental 2	61.38	13.62			

Experimental 1: AI translators; Experimental 2: AI translators with Revision

As for the post-reading tests, Table 4 presents the findings of the three groups. The results of the one-way ANOVAs revealed that no significant differences were found in the mean scores of the three groups ($F = .741$, $p = .479$). However, experimental group 2, which was using AI translators with revision, scored the highest ($M = 70.25$) among the three groups in terms of the mean score. Next, experimental group 1 which was using only AI translators scored 69.13 while the control group scored 66.89, the lowest among the three groups.

TABLE 4. Group Differences in Reading Comprehension on the Post-test

Group	*M*	*SD*	*df*	*F*	*p*
Control	66.89	11.90	110	.741	.479
Experimental 1	69.13	11.47			
Experimental 2	70.25	12.14			

Experimental 1: AI translators; Experimental 2: AI translators with Revision

This result lends some support to the research by Kim N-Y (2018) that no significant differences in speaking and writing was found between the group who used bilingual dictionaries and the group who used machine translators. The participants showed no noticeable differences in reading. Furthermore, there were no significant mean differences between the groups regardless of whether they put their cognitive effort into comprehending the texts or not. The finding of this study deviates from those predicted by earlier research that using AI translators forced students to employ more strategies and involved higher cognitive demands, which improved the efficiency of their comprehension (Karnal and Pereira 2015). It can be assumed that rather than interpreting the complete sentence or the whole text, students just employed the translator to interpret the sections that were unclear or unknown to them. Additionally, it seems that translators have advanced significantly and that their translations have improved to a level that is nearly equivalent to that of human translations, as suggested by Vasheghani (2020).

While the AI translator groups showed improvement in reading, there were no significant differences in the results achieved by each group. It was not in favor of Brahmana et al. (2020), who recommended that students self-correct and check dictionaries to make sure words had the right definitions before comprehending by taking context into account. And although the decontextualized or overly literal quality of the translations are a limitation of AI translators (Niño, 2009), AI translators are improving quickly, using data that has been accumulated over the years to make it more feasible for the AI to contextualize its translations.

4.3 Students' Perceptions on Using AI Translators

4.3.1 Post-questionnaire (Close-ended)

Regarding the last research question, a post-questionnaire was conducted to investigate how students perceived using AI translators in English reading classes. As such, only the two experimental groups using AI translators responded to the post-questionnaire. Group one was comprised of students who used AI translators only and group two was comprised of students who used AI translators with revision. The questionnaire was divided into three sections: five items for *reading skills*, five items for *affective aspects*, and five items for *usefulness*. All fifteen items were analyzed with descriptive statistics.

Table 5 presents the first section with five items for *reading skills*. The mean score of the first item, *"Using AI translators is effective for grasping the topic of the reading,"* was 4.54 in group one and 4.68 for group two. As for the second item, *"AI translators are effective for comprehending the main readings,"* group one scored 4.59 and group two scored 4.54. Regarding the third item, *"It is useful to understand the exact meaning of the sentences,"* the mean score of group one was 3.36 and that of group two was 4.08. Concerning the fourth item, *"It is useful to solve reading comprehension questions,"* group one received a score of 4.62, and group two received a 4.59. In the last item in the section, *"AI translators are useful for learning vocabulary and expressions,"* group one was 3.97 and group two was 3.95.

TABLE 5. Results of Post-Questionnaire (Close-ended): Reading Skills

Item	Group	*M*	*SD*	*t*	*p*
1. Using AI translators is effective for grasping the topic of the reading.	1.00	4.54	1.00	-.68	.50
	2.00	4.68	.75		
2. AI translators are effective for comprehending the main readings.	1.00	4.59	.91	.25	.80
	2.00	4.54	.77		
3. It is useful to understand the exact meaning of the sentences.	1.00	3.36	1.01	-3.63	.00**
	2.00	4.08	.68		
4. It is helpful to solve reading comprehension questions.	1.00	4.62	.94	.10	.92
	2.00	4.59	.96		
5. AI translators are useful for learning vocabulary and expressions.	1.00	3.97	.90	.13	.90
	2.00	3.95	1.08		

Group 1: Experimental group 1 (AI translators only), Group 2: Experimental group 2 (AI translators with Revision)
** $p < .01$

Findings for the first five items revealed that there were no significant differences among the items except item three. As for group one, which used AI translators only, it was not helpful to simply use the AI translators (M = 3.36, SD = 1.01). However, students in group two believed that using AI translators with their revisions helped them understand the exact meaning of the sentences. That is, after getting a translation for sentences in Korean, participants in group two were instructed to revise the parts that did not make sense, which might have been beneficial for them to clarify the meanings of the sentences. Although there were no significant differences in items 1, 2, 4, and 5, students had positive perspectives on reading skills such as understading the topic (item 1), understanding the main readings (item 2), and solving reading comprehension questions (item 4), but not for learning vocabulary and expressions (item 5).

The findings are consistent with earlier research showing that machine translation is an efficient technique for learning foreign languages (Tsai 2019). It is likely that employing machine translation makes it possible for students to learn the target language directly and precisely (Stapleton and Kin 2019), and that using AI translators to interpret texts can be helpful (Bagheri and Fazel 2011, Karnal and Pereira 2015, Karnal and Vera 2013).

Next, Table 6 presents the results of the five items for *affective aspects*. The sixth item, "*Using AI translators motivates me to learn English*," had a mean score of 3.72 in group one and 3.54 in group two. The mean score of the seventh item, "*Using AI translators was satisfactory*," was 4.77 in group one and 4.54 in group two. As for the eighth item, "*Using AI translators reduces the burden of English learning*," group one received a 5.05, and group two received a 5.08. Regarding the ninth item, "*Using AI translators reduces the fear of using English in classes*," group one scored 4.79, and group two scored 4.89. For the tenth item, "*Using AI translators makes me interested in learning English*," group one was 3.90, and group two was 3.78.

The results presented in Table 6 showed that no significant differences were found in the five items concerning affective aspects. It can be assumed that the use of AI translators was quite satisfactory in that students were provided with convenience in learning English to some extent in terms of reducing the burden of using English in classes. As can be seen from the data, the eighth item received the highest mean score of all for both groups. Similarly, the ninth item about reducing the fear of using English scored the second highest mean in the section. By contrast, students in both groups were not motivated or interested in using AI translators. Both groups of students' mean scores were not significantly improved.

TABLE 6. Results of Post-Questionnaire (Close-ended): Affective Aspects

Item	Group	*M*	*SD*	*t*	*p*
6. Using AI translators motivates me to learn English.	1.00	3.72	1.12	1.36	.18
	2.00	3.54	1.09		
7. Using AI translators makes me satisfied.	1.00	4.77	.93	1.04	.30
	2.00	4.54	.99		
8. Using AI translators reduces the burden of English learning.	1.00	5.05	1.21	-.13	.90
	2.00	5.08	.76		
9. Using AI translators reduces the fear of using English in classes.	1.00	4.79	1.10	-.42	.67
	2.00	4.89	.88		
10. Using AI translators makes me interested in learning English.	1.00	3.90	1.10	.45	.65
	2.00	3.78	1.11		

Group 1: Experimental group 1 (AI translators only), Group 2: Experimental group 2 (AI translators with Revision)

In short, there was no significant difference between the two groups in terms of reading skills and reading comprehension, and the affective aspects likewise lacked a significant result. This can be attributed to the fact that regardless of whether or not students revised the content produced by the AI translators, students' plainly expressed a positive perspective of their use of AI translators.

According to the researchers (Bahri and Mahadi 2016, Briggs 2018, Jolley and Maimone 2015, Lee 2019), the use of AI translators is improving students' motivation in addition to their language learning. The findings were consistent with earlier research findings that AI translation increased students' desire to learn English (Bagheri and Fazel 2011) and made learning more relaxing and secure by reducing their fear and anxiety (Bahri and Mahadi 2016). In particular, the participants frequently expressed high satisfaction and little fear or anxiety while utilizing AI translators to help them learn languages. It was supportive of the study (Briggs 2018, Lee 2019, Noh 2021) that students who utilized a translator improved their English proficiency and expressed high satisfaction with how convenient it was to learn in English.

Table 7 displays the results of the last five items for *usefulness*. Concerning the eleventh item, "*It is necessary to use AI translators in reading activities*," group one was 4.74, and group two was 4.65. As for the twelfth item, "*It is efficient to use AI translators for English learning*," the mean score for group one was 4.56, and that of group two was 4.24. Regarding the thirteenth item, "*AI translators are useful for reading comprehension*," group one received a 4.51, and group two received a 4.27. The mean score of the fourteenth item, "*I would like to use AI translators for English reading*," was 4.49 in group one and 4.24 in group two. For the final item of the questionnaire, "*I would like to use AI translators in English classes in the future*," group one scored 4.67, and group two scored 4.38.

The findings of the last five items for *usefulness* demonstrated that there was also no significant difference between the two groups. However, as can be seen from the results in Table 7, all of the students in both groups thought using AI translators was necessary (item 11), efficient (item 12), beneficial for reading comprehension (item 13), and they wanted to use them for English reading classes although the scores were not significantly different. That is, regardless of the revision after using AI translators, it is believed that students would feel comfortable using AI translators in English reading classes.

TABLE 7. Results of Post-Questionnaire (Close-ended): Usefulness

Item	Group	*M*	*SD*	*t*	*p*
11. It is necessary to use AI translators in reading activities.	1.00	4.74	.94	1.35	.18
	2.00	4.65	.90		
12. It is efficient to use AI translators for English learning.	1.00	4.56	.82	1.53	.13
	2.00	4.24	.86		
13. AI translators are useful for reading comprehension.	1.00	4.51	.97	1.09	.28
	2.00	4.27	.96		
14. I would like to use AI translators for reading.	1.00	4.49	.85	1.14	.26
	2.00	4.24	1.01		
15. I would like to use AI translators in English clases in the future.	1.00	4.67	.84	1.36	.18
	2.00	4.38	1.01		

Group 1: Experimental group 1 (AI translators only), Group 2: Experimental group 2 (AI translators with Revision)

The results of the post-questionnaire revealed few differences between the two groups using AI translators only and using them with revision. However, it is important to note that using AI translators in English classes has become essential in the sense that it can be a tool or an effective instrument to provide benefits to students' English learning. Moreover, students showed positive attitudes toward using a machine translator and they used it commonly and practically (Lee and Lee 2020).

According to studies (Bagheri and Fazel 2011, Bahri and Mahadi 2016, Briggs 2018, Lee 2019, Valijärvi and Tarsoly 2019), students who used machine translation in their study of foreign languages found it to be a valuable tool. In this sense, the participants would undoubtedly find it valuable as a learning aid for English. Based on the results of Table 7, the use of a translator is advantageous and will be employed in the future. In other words, it is anticipated that students will continue to make use of it to reap its advantages and better understand texts.

4.3.2 Post-Questionnaire (Open-ended Items)

To closely examine students' perception of using AI translators, the results of two open-ended questions about both the benefits and drawbacks of using AI translators are presented. Most students responded to two open-ended questions and some students' responses included more than one. As can be seen from both Tables 8 and 9, the total responses were different in that more students wrote about the benefits rather than the drawbacks.

As for the benefits of using AI translators, as demonstrated in Table 8, 21 students (22.1%) stated that "*It was easy to understand the meaning of the complex sentences*." Eighteen students (18.9%) commented that "*Using an AI translator helped us lessen the anxiety of English classes*." Seventeen students (17.9%) mentioned that "*It was easy to translate the reading passage*." Twelve students (12.6%) responded that "*It was easy to figure out the meaning of the words*," and "*Using an AI translator helped us figure out the meanings fast*." Some minor opinions were 'easy to follow the class when using an AI translator (6.3%),' 'useful in learning English (4.2%),' 'improving my reading comprehension ability (2.1%), and ' comparing my translations with AI's (1.1%).'

TABLE 8. Benefits of Using AI Translators

Students' Responses	Number of Responses	Percentage (%)
It was easy to understand the meaning of the complex sentences.	21	22.1
Using an AI translator helped us lessen the anxiety in English classes.	18	18.9
It was easy to translate the reading passage.	17	17.9
It was easy to figure out the meaning of the words.	12	12.6
Using an AI translator helped us figure out the meanings fast.	12	12.6
It was easy to follow the class when using an AI translator.	6	6.3
It was useful in learning English.	4	4.2
It helped me to enhance my reading comprehension ability.	2	2.1
I could compare my translations with AI translator's.	1	1.1
It helped me to have some confidence in English.	1	1.1
It motivated me to figure out exact meanings after understanding the whole passage using an AI translator.	1	1.1
Total Responses	95	100

The findings demonstrated that students thought using AI translators was fairly useful in English classes, as some students' responses were positively reported in the results of the close-ended items as well. Most AI translator-related research tended to focus more on writing (Lee 2020, Lee 2022a) than reading. As AI translators' accuracy has become more advanced than before, it would be beneficial and easier for students to use them for reading comprehension, especially in English classes. Specifically, students also commented that using AI translators could help them figure out the contents and words faster; thus, it would enable them to follow the classes more readily. Therefore, there would be no reason for students not to use AI translators for their own benefit.

TABLE 9. Drawbacks of Using AI Translators

Students' Responses	Number of Responses	Percentage (%)
Sometimes translations were not accurate.	18	31.0
Using an AI translator did not help me to improve my English ability.	16	27.6
I depend too much on an AI translator.	14	24.1
No response	3	5.2
There is no drawback.	3	5.2
Active participation in the class could be decreased.	2	3.4
I could use 'copy & paste' keys to complete the comprehension activities.	1	1.7
Instructor would not know whether students were participating in the reading activities (online classes).	1	1.7
Total Responses	58	100

The drawbacks of using AI translators are illustrated in Table 9. Compared to the 95 positive responses, there were 58 responses for the drawbacks. Eighteen students (31%) mentioned that "*Sometimes translations were not accurate*." The second most frequent response was "*Using an AI translator did not help me to improve my English ability* (16 students, 27.6%)." Fourteen students (24.1%) commented that "*I depend too much on an AI translator*." Other opinions were 'no drawbacks and no responses (5.2%),' 'decreasing active participation (3.4%),' and 'using simple keys to complete the comprehension activities (1.7%).'

There seemed to be two major drawbacks. One of them was the AI translators' accuracy. Although their accuracy is continuously improving, there were still errors when translating into Korean which required students to revise their AI-translated texts. It is necessary for students to be able to identify the wrong parts first, and then to take steps to revise the translations based on the English text and context. The second drawback some students mentioned was that using AI translators did not help them improve their ability to comprehend English in the classes. That is, students tended to rely on AI translators to do the work for them in the first place (Karnal and Pereira, 2015, Kim 2018). In English reading classes, instructors would like their students to do their best to understand the English text for themselves, but since AI translators were instantly reachable by touching a few keys on their smartphones, students automatically used them. It would be difficult for instructors to force their students not to use AI translators; therefore, there should be some other methods to utilize AI translators effectively.

4.3.3 Interviews

To explore more insights from the students' use of AI translators, interviews were conducted. Four students from both experimental groups were selected: experimental group 1 (AI translators only – 2 females and 2 males) and experimental group 2 (AI translators with revision – 2 females and 2 males). The interviews were administered via *Kakaotalk*. Before they responded to some interview questions, all of them agreed to their interviews on the use of AI translators in English classes. Instead of describing the comments from all eight participants, their opinions were selected based on the questions and their responses.

The first interview question was whether students' use AI translators and when they usually use them. *Male interviewee 1*, *Male interviewee 2*, *Female interviewee 1*, and *Female interviewee 2* belonged to group 1. *Male interviewee 3*, *Male interviewee 4*, *Female interviewee 3*, and *Female interviewee 4* belonged to experimental group 2. As for group 1, three students stated that they use AI translators not only in English classes but also for different purposes. An interviewee from group 2 (*Male interviewee 4*) also uses AI translators for similar purposes.

(1) Male interviewee 2: I'm very interested in movies, so when I read interview articles and search for information about movie directors, I use AI translators. I use both *Papago and Google*, but what I use more often is Papago because it can translate into the Korean context better than *Google*, in my opinion.
(2) Female interviewee 1: I use AI translators when I do my assignments, especially when translating complex sentences.
(3) Female interviewee 2: I use AI translators whenever they are necessary. I use them to translate from various languages such as English, Chinese, and Japanese. I usually use *Papago*.
(4) Male interviewee 4: Sometimes I use AI translators for finding out unknown words in classes. I use *Papago*.

The second question asked how they felt about using AI translators in English classes. This question was asking about the advantages of using them, and some students provided detailed responses. Regardless of the two groups, most of them stated that AI translators were fast, effective, convenient, and valuable in that they helped students comprehend the English text better. Their responses were in line with the findings of the post-questionnaire.

(1) Male interviewee 1: I thought it was helpful when organizing sentences, and finding the meaning of the new words. I also listened to the pronunciation and it helped me correct my pronunciation as well.
(2) Male interviewee 2: First, it takes too much time to find each unknown word when trying to figure out

the whole text since some words have several different definitions and I got confused about which definition I should use. However, when I use AI translators, I understand the whole text first and then find out the definitions of the new words. I could see how each unknown word can fit into the context of the text. Second, when I use AI translators, I do not feel the burden of figuring out the unknown text. I believe that when I would like to improve my English, I need to get closer to English by reading a lot to find grammatical patterns and expand my vocabulary. But if I need to find every unknown word using a dictionary all the time, I think some of us might might feel confused and overwhelmed. Finally, in English classes, AI translators can be effective if they can be used as tools for English learning.

(3) Female interviewee 1: If I use AI translators, I can quickly understand the text, and they helped me easily follow the classes. Also, whenever I came across words that I was not familiar with, it was great that AI translators could help me translate quickly.

(4) Female interviewee 3: I was surprised that AI translation was very natural and it was convenient.

(5) Female interviewee 4: First, using AI translators made us figure out the meanings of the text quickly. Second, it could even help me with English typing. Now, I can type faster than before. Third, AI translators were beneficial when quickly understanding the English text. Finally, I was able to identify the meaning of the new words when I read the whole text as translated by AI translators.

The third interview question was about the weaknesses of using AI translators in English classes. Although each of the students expressed their opinions differently, the drawbacks of using AI translators were also similar to the findings of the post-questionnaire. Students in both groups commented that using AI translators would make students depend on them. That is, AI translations were good enough that students do not need to work to improve their own analysis of the content.

(1) Male interviewee 1: Students would depend on the AI translators rather than try to understand the text by themselves.

(2) Female interviewee 2: Sometimes AI translation was not correct so it was inconvenient for me to revise them myself.

(3) Female interviewee 3: It was a bit regrettable that I am not the one who was doing the translation since AI translators were doing a good job.

(4) Male interviewee 3: I don't think it's a good idea to use them as a main tool because I could depend on them too much.

The next question was how efficiently AI translators can be used in English classes. As can be seen from the excerpts, regardless of the two groups, most of them mentioned that students would try not to use the AI translators first. They should at least try to figure out the meanings of the text by themselves first, and then use the AI translators as a check-up tool. In that way, students would be able to find their weaknesses in comprehension activities and later, with much practice, turn their weaknesses into their strengths in terms of analyzing the English text.

(1) Male interviewee 2: I think it would be a good idea to understand the text first before using the AI translators so that I would be able to compare the two and I could figure out what I missed or what I didn't understand.

(2) Female interviewee 1: We should analyze the text without the AI translators. Then, use AI translators,

and then compare the differences.

(3) Male interviewee 3: I think if I depend too much on AI translators, my comprehension ability will be decreased. I think the efficient way of using AI translators would be to comprehend the text myself first. Then use the AI translators' results to compare the two. After that, I could learn and fill in the parts that were lacking.

The question concerning *how they think about revising the text after using the AI translators*, was intended solely for students in group two who revised their texts after using the AI translators. All of them stated that the revision process is necessary to enhance their comprehension ability.

(1) Female interviewee 3: I think it is important to revise the parts where the translations were awkward.
(2) Male interviewee 3: I think we should go through the revision process and then check again with the AI translators at the end.
(3) Female interviewee 4: I think it is necessary to review the translations. We need to understand what words mean in a certain context. Also, when studying complex sentences, we would make sure of the parts we don't know. Sometimes, we mistype some words, so we must review the translations.

This question was the sub-question of the previous question regarding whether students would notice the differences when using the AI translators only as compared with adding a revision process. All of them commented that there were differences in the content of the translations.

(1) Female interviewee 3: Absolutely, some sentences didn't need to be revised, but I think reviewing the translations made me feel like I was studying for something and even looking at some grammatical parts as well.
(2) Male interviewee 3: I think AI translators usually helped me with the direct translations so revising repetitively made me focus more on what authors were trying to express in the text.
(3) Female interviewee 4: Sure, I can see the differences. When I use AI translators, I feel like I'm just doing 'copy & paste,' but revising the sentences makes me really learn something.

The final question concerned the use of AI translations in the English classes.

(1) Male interviewee 1: I suggest that we use AI translators as a supplementary tool for comprehension activities.
(2) Male interviewee 2: After using AI translators, we should check whether the sentences are awkward or not. If they are, we should keep revising. Additionally, let students know that finding the materials in different languages can be challenging, but it can also provide different perspectives in the global world. Then, students could automatically use AI translators as a medium for expanding their knowledge.
(3) Male interviewee 3: There are advantages of using AI translators, so using them as one of the tools for English classes will be beneficial.
(4) Male interviewee 4: Students might feel anxious that using AI translators can be better than translating the texts themselves. But using AI translators can boost students' confidence in active participation in classes.

To sum up, students' opinions on using AI translators were valuable and insightful, suggesting that they can be used beneficially in future English classes. As Hoi (2020) stated, AI translators are beneficial, but they should be avoided if instructors thought students were in danger of becoming too over-reliant on them in language classrooms. However, if students are provided with proper instructions on how or when to use AI translators effectively for their learning, using them could benefit language learning and enhance their learning abiltities.

5. Conclusion

AI translators have gradually become popular among students, especially for foreign language learning. The use of AI translators was particularly common in English writing classes. However, learners can also use them for reading as well as vocabulary learning and grammar. Despite the fact that students are not allowed to use such tools in L2 classes, more and more learners utilize them. Therefore, this study attempted to investigate how using AI translators can benefit students, especially in English reading classes.

This study included one hundred and thirteen university students who registered for mandatory English classes which were designed to improve their English reading. Three different classes received a different treatment: a control group (no translator), an experimental group 1 (using a translator), and an experimental group 2 (using a translator with revision). There were pre-and post-tests, post-questionnaires, and students interviews.

Regarding the first research question about reading accomplishment within groups, the results revealed that there were significant differences in all three groups. Students from all three groups enhanced their English comprehension scores. That is, regardless of the use of AI translators, all three groups improved their English reading comprehension compared to the pre-stage. It is noted that students can ultimately enhance their reading abilities with or without assistance from AI translators. To put it another way, this outcome was different from the previous study's hypothesis that depending on machine translators to interpret text might prevent students from learning new languages (Karnal and Pereira 2015). Contrary to the researchers' claim (Karnal and Pereira 2015) that teachers cannot guarantee that students will learn foreign languages since they will simply choose a more practical method of text translation, the student's reading performance increased.

Moreover, when the three groups were compared, no significant differences were found between the group without AI translators and those with AI translators. This result was not in line with earlier research suggesting that when students used AI translation, they had to use more strategies and put in more cognitive effort, which increased the effectiveness of their comprehension (Karnal and Pereira 2015). It has been demonstrated that whether or not they underwent revision, the AI translator groups made progress in reading comprehension. It was not supportive that students were advised to self-correct and use other sources to clarify the exact meaning of the texts (Brahmana et al. 2020). This result is attributed to the advance of AI translators. In other words, while one of AI translators' more significant limitations in past years was that they produced decontextualized or overly literal translations; nevertheless, machine translation accuracy has increased to the point where some scholars think it is on par with human translation (Vasheghani 2020). The study's findings are consistent with previous research that has demonstrated the value of using machine translation to learn foreign languages (Tsai 2019), and that using AI translations for text interpretation can be beneficial (Bagheri and Fazel 2011, Karnal and Pereira 2015, Karnal and Vera 2013).

As for the second research question about students' perception of AI translators, the post-questionnaire was collected from both experimental groups. There were fifteen close-ended items and two open-ended items. The contents of the post-questionnaire for the close-ended items were divided into three sections: reading skills,

affective aspects, and usefulness, and each section included five items. Concerning the first section of the post-questionnaire, *reading skills*, there was no significant difference in the five items except for item three, "*It is useful for understanding the exact meaning of the sentences.*" The findings demonstrated that while significant differences were not found in most of the items, the mean scores of the rest of the items except item five revealed that students might have benefited from identifying the topic, understanding the main reading parts, and solving the reading comprehension questions. The second section of the post questionnaire, *affective aspects*, also revealed similar results in that there were no statistically significant differences, but students felt that using AI translators could help them lessen their burden and reduce their fear of using English in classes even though the use of AI translators apparently lowered their interest and motivation. The last section, *usefulness*, also showed no significant differences. However, the results indicated that students would find AI translators useful, efficient, and necessary. The open-ended items included the benefits and drawbacks of using AI translators. Students contributed various opinions on both benefits and drawbacks. They believed that using AI translators made them easy to understand the meaning of complex sentences and also helped them lessen their anxiety in English classes. On the other hand, they commented that AI translators' accuracy could become problematic for students, and AI translators could make students rely on AI translators too much, which would not lead them to significantly improve their English ability. Interviews with students provided further insights in terms of using AI translators in English classes.

The results of the interviews were in line with the findings of previous studies that showed that AI translation boosted students' motivation to learn English (Bagheri and Fazel 2011) and made studying more comfortable and secure by lowering their fear and anxiety (Bahri and Mahadi 2016). The participants in the current study expressed favorable views regarding employing AI translators and were positively disposed toward the use of this technology (Briggs 2018, Lee 2019). The students' perceptions toward AI was consistent with the researchers' claim (Lee and Lee 2020), which noted that students had positive opinions toward using machine translators and that they did it frequently and practically. Given that students may help to improve the quality of the data and that machine translation should be viewed as a useful teaching tool, students might not rely too much on the employment of AI (Siregar et al. 2020).

Following are some of the pedagogical implications of the study's findings. First, while AI translators produce translations at a comparable level to human translations, AI translators continue to have issues with accuracy or decontextualized translations. To help students become better language learners, teachers should develop practical strategies that will enable them to identify errors or mistakes in AI translations. Second, it is likely that more and more learners will utilize translators in L2 learning in the future because they make it easy and simple for learners to understand unknown words and complex sentences. Lastly, when considering the advantages of using the tools, such as reducing learners' anxiety and boosting their confidence, it is important to consider whether to use this technology or when to use it based on the learners' proficiency levels or text difficulties. Indeed, it should take into account more effective ways to use AI translators at various stages of English reading.

This study contains limitations. It was restricted to a small number of students at a university. Also, using AI translators for a longer period could provide an improved approach to language learners. Finally, if this study were to extend to examine the qualitative differences in the translations between the control group and the experimental groups, it would have provided more insightful implications.

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Examples in: English
Applicable Languages: English
Applicable Level: All