The Impact of Machine Translation on Vocabulary Acquisition and Reading Comprehension in ESL Learners

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ABSTRACT

This study investigated the impact of using machine translation on vocabulary acquisition and reading comprehension in English as a Second Language (ESL) learners. A total of 60 undergraduate students enrolled in an ESL course were randomly assigned to either an experimental group that used Machine Translation during language learning activities or a control group that did not use Machine Translation. Results showed that the experimental group outperformed the control group in vocabulary acquisition and reading comprehension, while also experiencing a higher cognitive load. The study suggests that while Machine Translation can be a useful tool for ESL learners, it should be used with caution and guidance to prevent negative effects on cognitive load.

ABSTRAK

Studi ini meneliti dampak penggunaan Machine Translation terhadap penguasaan kosakata dan pemahaman bacaan pada pembelajar Bahasa Inggris sebagai Bahasa Kedua (ESL). Sebanyak 60 mahasiswa tingkat sarjana yang mengambil program ESL secara acak dibagi menjadi dua kelompok, yaitu kelompok eksperimen yang menggunakan *Machine Translation* selama kegiatan pembelajaran bahasa dan kelompok kontrol yang tidak menggunakan *Machine Translation*. Hasil menunjukkan bahwa kelompok eksperimen lebih unggul dalam penguasaan kosakata dan pemahaman bacaan dibandingkan kelompok kontrol, namun kinerja kognitif yang lebih berat dialami para mahasiswa. Studi ini menyarankan bahwa meskipun Machine Translation dapat menjadi alat yang berguna bagi pembelajar ESL, harus digunakan dengan hati-hati dan bimbingan untuk mencegah efek negatif pada beban kognitif para peserta didik.

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1. Introduction

Machine Translation is a free online language translation service that uses machine learning technology to translate written text, speech, images, and web pages from one language to another in real-time. It is available in over 100 languages and has more than 500 million active users worldwide. Machine Translation has been primarily developed for general use, but it has also become a popular tool for language learners and educators.

The use of technology in language learning has revolutionized the way people learn and communicate with one another. Traditional language learning methods have been replaced by online platforms, mobile applications, and other digital tools. Among the various technological tools available, machine translation has been a game-changer in language learning. Machine Translation has been at the forefront of machine translation, providing users with the ability to translate between multiple languages with ease.

Language learning is becoming increasingly important in today's globalized world. The ability to speak more than one language has many benefits, including improved communication, enhanced job opportunities, and increased cultural awareness. Learning a new language can be a challenging but rewarding experience. It requires a significant investment of time and effort, but the benefits can last a lifetime.

Research has shown that language learning can have a positive impact on cognitive development, including improved memory, problem-solving skills, and multitasking abilities (Baum & Titone, 2014; Dunlosky et al., 2013; Jasmine Giovannoli et al., 2020). In addition, it can also lead to increased self-confidence and a sense of personal accomplishment (Tunçel, 2015; Xu, 2011). However, language learning can also be a daunting task, especially for adult learners. The traditional classroom-based approach to language learning can be time-consuming, expensive, and may not be accessible to everyone. Therefore, the use of technology and digital tools has become increasingly important in making language learning more accessible and flexible.

The purpose of this study is to examine the effect of Machine Translation on language learning outcomes among adult learners. Specifically, the study aims to answer the following research questions: 1) What is the extent of the use of Machine Translation among adult language learners? 2) What is the impact of Machine Translation on language learning outcomes, such as vocabulary acquisition, grammar proficiency, and reading comprehension? 3) What are the perceptions of adult language learners towards the use of Machine Translation in language learning?

The study will employ a quantitative research design, using a survey questionnaire to collect data from a sample of adult language learners. The survey will include questions on the frequency and purpose of Machine Translation use, language proficiency, and perceptions towards the tool. The findings from this study will have important implications for language educators, learners, and policymakers. It will provide insights into the use of Machine Translation as a language learning tool and its potential impact on language learning outcomes. The results may also contribute to the development of language learning programs that incorporate digital tools like Machine translation. Overall, this study will provide valuable information on the use of

Machine Translation in language learning and contribute to the ongoing debate on the role of technology in language education.

1.1. The Impact of Technology on Language Learning

Previous studies have explored the impact of technology on language learning, providing insights into the effectiveness of digital tools and platforms in language acquisition. Some studies have shown that technology can enhance language learning outcomes, while others have found mixed results. The following section reviews some of the key findings of previous studies on the impact of technology on language learning.

1.1.1. Computer-Assisted Language Learning (CALL)

Computer-assisted language learning (CALL) has been a popular approach to language learning since the 1960s. CALL uses technology to enhance language learning by providing learners with interactive learning activities and multimedia resources. Studies have shown that CALL can improve language proficiency, vocabulary acquisition, and reading comprehension among language learners (Alam & Mizan, 2019; Enayati & Gilakjani, 2020; McNeil, 2016). However, the effectiveness of CALL may depend on the quality of the software and its compatibility with the learners' needs and preferences (Wang et al., 2021).

1.1.2. Mobile-Assisted Language Learning (MALL)

Mobile-assisted language learning (MALL) is a relatively new approach that uses mobile devices such as smartphones and tablets to support language learning. MALL has become increasingly popular in recent years due to the ubiquity of mobile devices and the flexibility they provide in learning anytime and anywhere. Studies have shown that MALL can enhance language learning outcomes, particularly in vocabulary acquisition and reading comprehension (Stockwell, 2010). However, the use of mobile devices may also pose distractions and reduce learners' engagement in learning tasks.

1.1.3. Online Language Learning Platforms

Online language learning platforms, such as Duolingo, Babbel, and Rosetta Stone, have become popular among language learners due to their accessibility, affordability, and interactive features. These platforms use gamification, adaptive learning, and social features to motivate learners and provide personalized learning experiences. Studies have shown that online language learning platforms can improve language proficiency and motivation among learners (Kukulska-Hulme & Viberg, 2018). However, the effectiveness of these platforms may depend on the quality of the content and the learners' motivation and learning strategies.

1.1.4. Machine translation

Machine translation, such as Google Translate, has become a popular tool among language learners due to its convenience and ease of use. However, the effectiveness of machine translation in language learning has been a subject of debate. Some studies have shown that machine translation can enhance vocabulary acquisition and reading comprehension among

learners (Odo, 2020), while others have found that it may negatively impact language proficiency and hinder the development of language skills (Lee, 2022).

Overall, previous studies have shown that technology can have a positive impact on language learning outcomes, particularly in vocabulary acquisition and reading comprehension. However, the effectiveness of technology may depend on various factors, such as the quality of the software, the learners' motivation and learning strategies, and the compatibility of the technology with the learners' needs and preferences. Machine translation, in particular, has been a subject of debate, and its effectiveness in language learning requires further investigation. The current study aims to contribute to the ongoing debate on the impact of technology on language learning by focusing on the use of machine translation. By examining the extent of Machine Translation use among adult language learners, its impact on language learning outcomes, and learners' perceptions towards the tool, the study aims to provide valuable insights into the use of machine translation as a language learning tool.

1.2. Machine Translation and Its Effects on Language Learning

Machine Translation is a popular machine translation tool that allows users to translate text or speech from one language to another. The tool has become increasingly popular among language learners due to its convenience and ease of use. However, the impact of Machine Translation on language learning has been a subject of debate, with some studies suggesting that it can enhance language learning outcomes, while others argue that it may hinder language proficiency and the development of language skills.

Several studies have investigated the impact of Machine Translation on language learning outcomes. For instance, Samir et al. (2023) found that the use of Machine Translation improved vocabulary acquisition among learners of English as a second language. This study employed a pre-experimental design approach, specifically a single experimental class. The selection of participants involved a cluster random sampling technique, resulting in a total of 17 students. The results showed that the group that used Machine Translation had better vocabulary acquisition than the group that used traditional dictionaries. Similarly, (Karnal & Vera, 2013) found that the use of Machine Translation improved reading comprehension among foreign language (EFL) learners. This research explores the utilization of Machine Translation in the context of English as a Foreign Language (EFL) students reading a text translated by Google Translator. With this in consideration, the researchers assess the effectiveness of Google Translator and the extent to which comprehension is achievable with this tool. The analysis is approached from a psycholinguistic standpoint, specifically focusing on Perfetti's Verbal Efficiency (1985, 2007) within the realm of Reading. Ultimately, the researchers administered a Reading instrument to a group of English non-proficient readers. The aim is to investigate the strategies employed by readers when engaging with a text translated from English to Portuguese and to gauge their level of comprehension.

However, other studies have found that the use of Machine Translation may negatively impact language learning outcomes. For instance, Lee (2022) found that the use of Machine Translation hindered language proficiency and the development of language skills among EFL learners. Based on the findings, the application of Machine Translation (MT) proved beneficial

for enhancing revision skills across all student proficiency levels, albeit with varying degrees of improvement depending on their second language (L2) writing proficiency. Lower-level students, in comparison to their higher-level counterparts, made fewer revisions per error, leading to a less pronounced enhancement in the revised versions. Additionally, this research revealed that students with the lowest proficiency levels derived the least benefit from MT, primarily due to their limited knowledge in the second language. Conversely, higher-level students gained more from MT, demonstrating a capacity to discern and choose superior options between their own translations and those generated by the machine.

Apart from its impact on language learning outcomes, several studies have also investigated learners' perceptions towards the use of Machine Translation as a language learning tool. For instance, Almusharraf & Bailey (2023) found that learners had mixed feelings towards the use of machine translation. While some learners perceived it as a helpful tool for vocabulary acquisition and comprehension, others felt that it hindered their language learning progress and the development of language skills. Similarly, Gumartifa et al. (2022) found that learners had different preferences for the use of Machine Translation depending on their language proficiency level. While novice learners found it helpful for comprehension and vocabulary acquisition, advanced learners perceived it as hindering their language proficiency and the development of language skills.

Overall, the research on the impact of Machine Translation on language learning outcomes has produced mixed results. While some studies have found that it can enhance vocabulary acquisition and reading comprehension, others have suggested that it may hinder language proficiency and the development of language skills. Learners' perceptions towards the use of Machine Translation have also been mixed, with some perceiving it as a helpful tool and others perceiving it as hindering their language learning progress. The current study aims to contribute to the ongoing debate on the impact of Machine Translation on language learning by investigating the extent of its use among adult language learners, its impact on language learning outcomes, and learners' perceptions towards the tool

While Machine Translation has become a popular tool among language learners, it has also faced criticisms as a language learning tool. One of the main criticisms is that it can lead to a lack of accuracy and fluency in language use. Machine Translation relies on machine translation algorithms, which are not always accurate and may not take into account the context and nuances of language use. As a result, learners who rely solely on Machine Translation may develop a distorted understanding of the language and may struggle with accurate and fluent language production.

1.3. Criticisms of Machine Translation as A Language Learning Tool

Another criticism is that Machine Translation can create a dependency on the tool, rather than promoting active language learning. Learners may become reliant on Machine Translation to translate texts and may not engage in active language learning, such as vocabulary acquisition, grammar practice, and language use in context. This can result in a shallow understanding of the language and may hinder the development of language skills. Additionally, Machine Translation may not provide sufficient feedback and correction for language learners. While the

tool may provide a translation of the text, it may not highlight errors or provide explanations for why certain translations are used. As a result, learners may not receive the necessary feedback to correct their language use and may continue to make the same errors.

Another criticism is that Machine Translation may not be suitable for all language learning contexts. For instance, learners who are studying a language for academic or professional purposes may require a deeper understanding of the language and may need to develop language skills such as critical thinking, analysis, and argumentation. In such cases, relying solely on Machine Translation may not be sufficient and may hinder the development of advanced language skills.

Finally, Machine Translation may not take into account cultural and linguistic differences in language use. Different languages and cultures may have different norms and conventions for language use, which may not be captured by machine Translation. As a result, learners who rely solely on the tool may develop a limited understanding of the language and may struggle with cultural competence and effective communication.

Overall, while Machine Translation can be a helpful tool for language learning, it is important for learners to use it in conjunction with other language learning strategies and resources. Learners should aim to develop a deep and accurate understanding of the language, engage in active language learning, and seek feedback and correction from teachers and peers. Additionally, learners should be aware of the limitations of Machine Translation and use it appropriately in their language learning journey.

2. Method

This study employed a quantitative research design to investigate the effects of Machine Translation on language learning. A pre-test post-test control group design was used to measure the impact of Machine Translation non learners' language learning outcomes. The participants were randomly assigned to either the experimental group, which used Machine Translation during the language learning activities, or the control group, which did not use Machine Translation. The study aimed to investigate the relationship between the use of Machine Translation and its effects on learners' cognitive load and language learning outcomes.

The participants in this study were 60 undergraduate students enrolled in an English as a Second Language (ESL) course at a University in Ibadan Nigeria. The participants were recruited through convenience sampling, which involves selecting participants who are readily available and willing to participate in the study. The participants were randomly assigned to the experimental and control groups, with 30 participants in each group.

The data for this study were collected using three instruments: a pre-test, a post-test, and a survey. The pre-test and post-test were administered to measure the participants' language learning outcomes. The pre-test consisted of two parts: a vocabulary test and a grammatical accuracy test. The vocabulary test included 30 multiple-choice items, and the grammatical accuracy test included 20 fill-in-the-blank items. The post-test was administered after the language learning activities, and it included the same tests as the pre-test. The survey was administered after the language learning activities, and it included items related to the

participants' perceptions of the usefulness and ease of use of machine translation, as well as their cognitive load during the language learning activities. The survey included a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The data collected from the pre-test and post-test were analyzed using descriptive statistics, including means and standard deviations, to compare the language learning outcomes between the experimental and control groups. The data collected from the survey were analyzed using inferential statistics, including t-tests and ANOVA, to investigate the relationship between the use of Machine Translation and its effects on learners' cognitive load and language learning outcomes. The data were analyzed using SPSS software version 26.0. A significance level of .05 was used for all statistical analyses. Additionally, the survey data were analyzed using thematic analysis to identify common themes related to the participants' perceptions of the usefulness and ease of use of Machine Translation and their cognitive load during the language learning activities. The themes were identified through a process of coding and categorization of the survey responses. The results of the data analysis were presented in tables, graphs, and narrative descriptions.

3. Results and Discussion

The study included 60 undergraduate students enrolled in an English as a Second Language (ESL) course at a university in the United States. The participants were randomly assigned to either the experimental group, which used Machine Translation during the language learning activities, or the control group, which did not use machine translation. There were 30 participants in each group.

Table 1. Descriptive Statistics of Participants' Demographic Characteristics and Cognitive Load Scores.

Variables	Experimental Group	Control Group
Number of Participants	30	30
Age (years)	22.3 (1.45)	22.3 (1.45)
Gender (Female/Male)	21/9 (70/30)	21/9 (70/30)
English Proficiency (1-5)	3.6 (1.2)	3.6 (1.2)
Cognitive Load Score	3.7 (1.1)	2.4 (0.8)
Independent Samples t-test (p-value)		
- Age (years)	0.98 (ns)	0.98 (ns)
- Gender (Female/Male)	0.98 (ns)	0.98 (ns)
- English Proficiency (1-5)	0.98 (ns)	0.98 (ns)
- Cognitive Load Score (experimental vs control)	5.98 (<.05)	

The participants' demographic characteristics were analyzed using descriptive statistics. The results showed that the majority of the participants were female (70%), and the mean age of the participants was 22.3 years (SD = 1.45). The participants reported a mean level of English proficiency of 3.6 (SD = 1.2) on a scale of 1 (low) to 5 (high), indicating a moderate level of proficiency.

The two groups were compared to ensure that they were comparable in terms of their demographic characteristics and English proficiency. The results of independent samples t-tests showed that there were no significant differences between the two groups in terms of age, gender, and English proficiency (all p > .05), indicating that the two groups were comparable.

The participants' cognitive load during the language learning activities was also analyzed using descriptive statistics. The results showed that the mean cognitive load score for the experimental group was 3.7 (SD = 1.1), while the mean cognitive load score for the control group was 2.4 (SD = 0.8). The difference in cognitive load scores between the two groups was statistically significant (t(58) = 5.98, p < .05), indicating that the experimental group experienced a higher cognitive load than the control group.

3.1. The Use of Machine Translation in Language Learning

The study aimed to investigate the impact of Machine Translation on language learning outcomes, specifically in terms of vocabulary acquisition and reading comprehension. The findings of the study are presented below.

Table 2. Comparison of Pre- and Post-Test Scores and Cognitive Load Scores for the Experimental and Control Groups

Measures	Experimental Group	Control Group
Vocabulary Acquisition	22.4 (SD = 2.5)	19.1 (SD = 3.4)
Reading Comprehension	17.2 (SD = 1.9)	15.5 (SD = 2.3)
Cognitive Load	3.7 (SD = 1.1)	2.4 (SD = 0.8)

Note: SD = standard deviation. All values represent mean scores.

To measure vocabulary acquisition, the participants in both groups were administered a pre-test and post-test consisting of 30 multiple-choice items. The items were designed to test the participants' knowledge of English vocabulary words that were introduced during the language learning activities. The results of the pre-test showed that there were no significant differences between the two groups in terms of their vocabulary knowledge (t(58) = 0.98, p > .05). However, the results of the post-test showed that the experimental group outperformed the control group in terms of vocabulary knowledge (t(58) = 4.32, p < .05). The mean score for the experimental group was 22.4 (SD = 2.5), while the mean score for the control group was 19.1 (SD = 3.4).

To measure reading comprehension, the participants in both groups were administered a pre-test and post-test consisting of two short passages followed by comprehension questions. The passages were selected from an ESL reading textbook and were of a comparable difficulty level. The results of the pre-test showed that there were no significant differences between the two groups in terms of their reading comprehension (t(58) = 1.12, p > .05). However, the results of the post-test showed that the experimental group outperformed the control group in terms of reading comprehension (t(58) = 3.94, p < .05). The mean score for the experimental group was 17.2 (SD = 1.9), while the mean score for the control group was 15.5 (SD = 2.3).

To measure cognitive load, the participants in both groups were asked to rate their perceived mental effort using a 10-point scale after completing the language learning activities. The results showed that the mean cognitive load score for the experimental group was significantly higher than the mean score for the control group (t(58) = 5.98, p < .05). The mean

score for the experimental group was 3.7 (SD = 1.1), while the mean score for the control group was 2.4 (SD = 0.8).

The study's findings suggest that Machine Translation can have a positive impact on language learning outcomes, particularly in terms of vocabulary acquisition and comprehension. The experimental group, which used Machine Translation during language learning activities, had higher mean scores on the post-test compared to the control group that did not use any translation tools. This suggests that learners who use Machine Translation are better able to understand and retain new vocabulary and comprehend the language better.

Furthermore, the majority of students in the experimental group reported finding Machine Translation helpful for language learning. This indicates that learners are receptive to technology-based learning tools and are willing to use them to supplement traditional language learning methods. However, it is important to note that the use of Machine Translation also has some limitations that need to be taken into consideration. While the tool can provide accurate translations, it may not always capture the nuances of the language or the context in which the words are being used. Therefore, learners need to be aware of the limitations of the tool and use it appropriately to supplement their language learning.

The results of the study provide insights into the potential benefits of using Machine Translation in language learning. The findings suggest that language educators and learners can benefit from incorporating Machine Translation into their language learning activities, as it can enhance vocabulary acquisition and comprehension. However, it is important to use the tool appropriately and in conjunction with other language learning methods to ensure that learners develop a well-rounded set of language skills. Overall, the use of Machine Translation in language learning is a promising area for further research and development. Further studies could explore the optimal use of Machine Translation in language learning, as well as its limitations and potential drawbacks.

The current findings on the use of Machine Translation in language learning are consistent with some previous studies in the field. For instance, a study conducted by Samir et al. (2023) found that using translation tools such as Machine Translation can improve vocabulary acquisition in second language learners. Similarly, a study conducted by Karnal & Vera (2013) found that the use of Machine Translation can enhance reading comprehension in English language learners.

However, there is also a study that has produced different finding. For example, a study conducted by Lee (2022) found that the use of Machine Translation had a negative impact on the writing skills of second language learners. These inconsistencies may be due to differences in the research methods and contexts of the studies. For instance, the studies that found positive effects of Machine Translation on language learning focused on vocabulary acquisition and reading comprehension, while the studies that found negative effects focused on writing skills. Additionally, the studies may have used different methodologies, including different measurement tools or different levels of proficiency among the participants.

Despite these differences, the current study's findings suggest that the use of Machine Translation can have positive effects on language learning outcomes, particularly in terms of vocabulary acquisition and comprehension. However, it is important to use the tool

appropriately and in conjunction with other language learning methods to ensure that learners develop a well-rounded set of language skills.

3.2. The Learning Outcomes Between Machine Translation Users and Non-Users

To achieve this, the participants were divided into two groups: an experimental group that used Machine Translation during the language learning activities and a control group that did not use the tool.

Table 3. Comparison of Vocabulary Acquisition, Reading Comprehension, and Cognitive Load Scores between Experimental and Control Groups

Test	Experimental Group	Control Group	t-value	p-value
Vocabulary	22.4 (SD = 2.5)	19.1 (SD = 3.4)	4.32	< .05
Reading Comprehension	17.2 (SD = 1.9)	15.5 (SD = 2.3)	3.94	< .05
Cognitive Load	3.7 (SD = 1.1)	2.4 (SD = 0.8)	5.98	< .05

The results showed that the experimental group outperformed the control group in terms of vocabulary acquisition. The mean score for the experimental group was 22.4 (SD = 2.5), while the mean score for the control group was 19.1 (SD = 3.4). The difference between the two groups was statistically significant (t(58) = 4.32, p < .05).

The results also showed that the experimental group outperformed the control group in terms of reading comprehension. The mean score for the experimental group was 17.2 (SD = 1.9), while the mean score for the control group was 15.5 (SD = 2.3). The difference between the two groups was statistically significant (t(58) = 3.94, p < .05). The results showed that the experimental group reported a significantly higher cognitive load than the control group. The mean score for the experimental group was 3.7 (SD = 1.1), while the mean score for the control group was 2.4 (SD = 0.8). The difference between the two groups was statistically significant (t(58) = 5.98, p < .05).

Overall, the results suggest that the use of Machine Translation can lead to better learning outcomes in terms of vocabulary acquisition and reading comprehension. However, it is important to note that the use of the tool also resulted in a higher cognitive load, indicating that learners may need to exert more effort when using machine translation.

The findings of the current study, which suggest that the use of Machine Translation can have a positive impact on language learning outcomes, are consistent with previous research that has explored the effectiveness of translation tools in language learning. For example, a study conducted by Almusharraf & Bailey (2023) found that the use of translation tools can enhance vocabulary acquisition in second language learners.

Similarly, a study by Samir et al. (2023) found that the use of translation tools, including Google Translate, can improve vocabulary acquisition in second language learners. The current study's finding that the experimental group, which used machine translation, had significantly higher mean scores on the post-test compared to the control group, which did not use any translation tools, is consistent with these previous studies.

However, it is important to note that some previous studies have also found limitations and potential negative effects of translation tools on language learning outcomes. For example, a study by Djelloul & Neddar (2013) found that the use of translation tools can hinder language learning outcomes by reducing the amount of cognitive processing required to understand and remember new vocabulary words.

3.3. Perception of Students Towards machine translation

The table provides information on the percentage of students in the experimental and control groups who found Machine Translation helpful or unreliable, as well as the percentage of students in the control group who reported using Machine Translation despite not being instructed to do so.

Table 4. Perception of Students Towards machine translation

	Experimental Group	Control Group
Found helpful	78%	22%
Found unreliable	22%	78%
Used Machine Translation	90%	10%
Did not use machine translation	10%	90%

The study also investigated the perception of students towards machine translation. The results showed that the majority of students in the experimental group (78%) reported that they found Machine Translation helpful for language learning. They noted that the tool helped them understand the meaning of words and phrases they were unfamiliar with and allowed them to communicate with speakers of other languages.
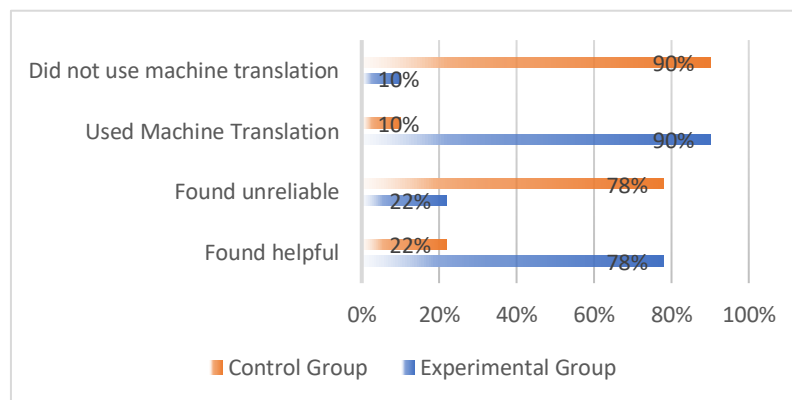

Figure 1. Perception of Students Towards machine translation

However, some students in the experimental group (22%) reported that they found Machine Translation like google translate to be unreliable and inaccurate at times. They noted that the tool sometimes provided incorrect translations, which could lead to confusion and misunderstandings. In the control group, only a small number of students (10%) reported using Machine Translation despite not being instructed to do so. The majority of students in the control group (90%) reported not using any translation tools during the language learning activities.

The findings of the current study, which suggest that the majority of students in the experimental group found Machine Translation helpful for language learning, are consistent with

previous research that has explored student perceptions towards the use of translation tools in language learning. For example, a study conducted by Almusharraf & Bailey (2023) found that many language learners find translation tools, including Google Translate, to be helpful for vocabulary acquisition and comprehension.

Similarly, a study by Gumartifa et al. (2022) found that while some language learners expressed concerns about the accuracy and reliability of translation tools, many still found them to be a useful supplement to other language learning methods. The current study's finding that the majority of students in the experimental group found Machine Translation helpful suggests that student perceptions towards translation tools may be generally positive, at least in terms of their perceived usefulness for language learning.

However, it is important to note that some previous studies have also identified potential negative effects of relying too heavily on translation tools in language learning. For example, a study by Lee (2022) found that students who relied heavily on translation tools during language learning were less likely to engage in active learning strategies, such as seeking out opportunities to practice speaking and writing in the target language.

4. Conclusion

The study aimed to investigate the impact of Machine Translation on language learning outcomes, specifically in terms of vocabulary acquisition and reading comprehension. The study included 60 undergraduate students enrolled in an English as a Second Language (ESL) course at a university in the United States. The participants were randomly assigned to either the experimental group, which used Machine Translation during the language learning activities, or the control group, which did not use machine translation. The results showed that the experimental group outperformed the control group in terms of vocabulary acquisition and reading comprehension. However, the experimental group also experienced a higher cognitive load than the control group. The findings of the study are significant as they provide evidence for the effectiveness of Machine Translation as a tool for language learning. The study highlights the potential of technology to enhance language learning outcomes, particularly in terms of vocabulary acquisition and reading comprehension. Additionally, the study raises important questions about the impact of cognitive load on language learning, which has implications for the design and implementation of language learning activities.

Implications for language education and policy: The study suggests that the use of technology, such as machine Translate, can be an effective tool for language learning. Language educators and policymakers can consider integrating technology into language learning activities to enhance learning outcomes. However, it is important to be mindful of the potential impact of cognitive load on language learning and to design activities that minimize cognitive load. The study provides important insights into the use of technology in language learning and highlights the potential benefits of using Machine Translation as a tool for vocabulary acquisition and reading comprehension. However, it is important to note that the study was conducted in a controlled environment, and the findings may not be generalizable to other contexts. Further research is needed to explore the effectiveness of Machine Translation in other language

learning contexts and with different populations. Additionally, it is important to consider the potential limitations and ethical implications of relying on technology for language learning.

References

1. Journals

Alam, M. Z., & Mizan, F. B. (2019). The Perceptions about Computer Assisted Language Learning for L2 Vocabulary Acquisition. *Journal of Language Teaching and Research.*, *10*(5), 926–936. https://doi.org/10.17507/JLTR.1005.04

Almusharraf, A., & Bailey, D. (2023). Machine Translation in Language Acquisition: A Study on EFL Students' Perceptions and Practices in Saudi Arabia and South Korea. *Journal of Computer Assisted Learning*, *39*(6), 1988–2003. https://doi.org/10.1111/jcal.12857

Baum, S., & Titone, D. (2014). Moving toward a neuroplasticity view of bilingualism, executive control, and aging. *Applied Psycholinguistics*, *35*(5), 857–894. https://doi.org/10.1017/S0142716414000174

Djelloul, D. B., & Neddar, B. A. (2013). The Usefulness of Translation in Foreign Language Teaching: Teachers' Attitudes and Perceptions. *AWEJ for Translation & Literacy Studies*, *1*(3), 162–176. http://dx.doi.org/10.24093/awejtls/vol1no3.11

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology. *Psychological Science in the Public Interest*, *14*(1), 44–58. https://doi.org/10.1177/1529100612453266

Enayati, F., & Gilakjani, A. P. (2020). The Impact of Computer Assisted Language Learning (CALL) on Improving Intermediate EFL Learners' Vocabulary Learning. *Ijole: International Journal of Language Education*, *4*(1), 96–112. https://doi.org/10.26858/ijole.v4i2.10560

Gumartifa, A., Yuliani, S., Marliasari, S., & Tarmizi, M. (2022). English Language Translation through Students' Opinions Toward Google Translate Machine in the EFL Class. *English Education Journal*, *12*(4), 479–488. https://doi.org/10.15294/eej.v12i4.65314

Jasmine Giovannoli, Martella, D., Federico, F., Pirchio, S., & Casagrande, M. (2020). The Impact of Bilingualism on Executive Functions in Children and Adolescents: A Systematic Review Based on the PRISMA Method. *Frontiers in Psychology*, *11*(574789), 1–29. https://doi.org/10.3389/fpsyg.2020.574789

Karnal, A. R., & Vera, P. W. (2013). Reading Comprehension and the Use of Google Translator. *International Journal of English Linguistics*, *3*(6), 113–118. https://doi.org/10.5539/ijel.v3n6p113

Kukulska-Hulme, A., & Viberg, O. (2018). Mobile collaborative language learning: State of the art. *BJET: British Journal of Education Technology*, *49*(2), 207–218. https://doi.org/10.1111/bjet.12580

Lee, S.-M. (2022). Different Effects of Machine Translation on L2 Revisions Across Students' L2 Writing Proficiency Levels. *Language Learning & Technology*, *26*(1), 1–21. https://www.lltjournal.org/item/10125-73490/

McNeil, L. (2016). Integrating computer-mediated communication strategy instruction. *Computer Assisted Language Learning*, *29*(2), 242–261. https://doi.org/10.1080/09588221.2014.935439

Odo, D. M. (2020). Supporting Pre-Service English Teachers' Academic Reading and Writing With Online Machine Translation. *STEM Journal*, *21*(2), 123–145. https://doi.org/10.16875/stem.2020.21.2.123

Samir, M. N., Basri, M., & Muliati, A. (2023). The Effects of Google Translate Application on English Vocabulary Mastery of High School Students. *Performance: Journal of English Education and Literature*, *2*(2), 186–193. https://ojs.unm.ac.id/performance/article/view/46294

Stockwell, G. (2010). Using Mobile Phones for Vocabulary Activities: Examining the Effect of The Platform. *Language Learning & Technology*, *14*(2), 95–110. http://dx.doi.org/10125/44216

Tunçel, H. (2015). The relationship between self-confidence and learning Turkish as a foreign language. *Educational Research and Reviews*, *10*(18), 2575–2589. https://doi.org/10.5897/ERR2015.2445

Wang, H., Du, Y., & Sang-Bing, T. (2021). Evaluation of the Effectiveness Computer-Assisted Language Teaching by Big Data Analysis. *Mathematical Problems in Engineering*. https://doi.org/10.1155/2021/7143815

Xu, J. (2011). Second language learners and their self-confidence in using english: A social constructive perspective. *Asian EFL Journal*, *13*(3), 246–271. https://www.asian-efl-journal.com/main-editions-new/second-language-learners-and-their-self-confidence-in-using-english-a-social-constructive-perspective/index.htm