

Northwestern College, Iowa

NWCommons

Master's Theses & Capstone Projects

Education

Fall 2021

Combining Translation and Contextual Learning to Support English Learners in Elementary Level

Andy P. Liu

Follow this and additional works at: https://nwcommons.nwciowa.edu/education_masters



Part of the [Education Commons](#)

Combining Translation and Contextual Learning to Support English Learners in

Elementary Levels

Andy Peace Liu

Northwestern College

An Action Research Project Presented
in Partial Fulfillment of the Requirements
For the Degree of Master of Education

Abstract

Many schools instruct English Learners (ELs) without the use of their first language (L1), especially during the beginning stages, because they believe the presence of ELs' native language will hinder their second language acquisition. According to recent studies, students' first language proficiency supports their second language acquisition because languages share some common linguistic components. In this action research, the researcher intends to use L1 translation and contextual learning strategies to support ELs' vocabulary acquisition in Grades 2 and 3 science, and students will choose which strategy(ies) they prefer to use to study the new words. Students take pre-and post-tests, and assessment results are analyzed to try to identify the effects of L1 translation in relation to other learning strategies.

Keywords: translation, English learners, science vocabulary acquisition

Table of Contents

Abstract	2
Introduction.....	Error! Bookmark not defined.
Review of Literature	7
The Case Against English-Only Instruction for EL in China	7
Research on Using L1 or Translation to Support L2 Acquisition.....	9
Limitations of Recent Studies on Using L1 or Translation to Support L2 Acquisition.....	11
Methods.....	13
The Research Context	13
Interventional Strategies and the Timeline.....	13
Data Collection and Security.....	14
Findings.....	15
Data Analysis	15
Discussion	21
Summary of Major Findings	21
Limitations of Study.....	22
Further Study.....	22
Conclusion	23
References.....	25
Appendix.....	29

Introduction

It's preferable to teach English Learners in the English context rather than relying on translation (Alroe, M. J., & Reinders, H., 2015). Students in China learn new vocabularies through illustrations, photos, drawings, realia, and/or modeling by teachers, and English is the only instructional language to be used in the classes. However, English Learners (ELs) are learning the language and the academic content at the same time. "It takes about two years for ELLs to become proficient with conversational everyday English, which is contextualized; by contrast, academic language is more abstract and may take five or more years to acquire" (Palmer, et al., 2010, p.46). Learning abstract vocabulary becomes very easy when ELs can also receive some instruction in their first language. For example, say one Grade 3 student is learning a new word, "electricity"; he believes it's referring to the lightbulb or cables because he sees the wires, lightbulbs, and electric outlets in the illustration, but he gets it immediately after a teacher writes 电(dian) which is the Chinese equivalent for electricity.

Kelly and Bruen (2015) interviewed twelve Higher Education Institute lecturers in Ireland; they all supported the use of translation in language teaching and learning. If ELs are instructed in an English setting with translation to learn the academic vocabulary, they can not only become proficient with conversational English, but also acquire the academic language in a much faster way.

Sending preschoolers or elementary students to English-only schools early is not always good for second language (L2) acquisition. "The earlier, the better" is not always right for acquiring all second language skills. The development of the first language (L1) plays a significant role in L2 acquisition, and early L2 exposure advantages are modulated by the L1 experience (Xue, et al., 2019). According to the results of a research study conducted in Beijing,

China, “40% of the poor Chinese (L1) readers were also poor English (L2) readers” (Gao, 2019, p.2). Recent studies have revealed that children’s first language (L1) proficiency supports their second language (L2) acquisition (Kim, Y. S. G., & Piper, B., 2018; Tong, 2018; Xue, et al., 2019; Marchman, et al., 2020).

The purpose of this action research study is to determine the combined effects of translation and contextual learning strategies on Grades 2 and 3 students' science vocabulary acquisition in an English school in China. Before this study, Chinese students were not allowed to use their first language to learn new vocabulary at school, and they studied their academic vocabulary using illustrations, photos, drawings, and/or English texts. Teachers and pupils couldn’t use Chinese at any time during class instruction, even if doing so could make the abstract concepts much more easily understood than by using other strategies, and all students could only use English-only dictionaries. To enable students to use translation in this project, bilingual (English to Chinese) dictionaries were employed as a tool to support Grades 2 and 3 students’ science academic vocabulary acquisition since they were cheap and easy to locate. This action research project seeks to answer the following questions:

- Can translation help students learn and improve academic vocabulary acquisition?
- Can translation be as effective as contextual learning strategies, such as illustrations, drawings, realia, and photos, in L2 academic vocabulary acquisition?

In this action research project, all students chose which strategy(ies) they implemented for acquiring new science vocabulary, such as translation, illustrations, photos, drawing, and English definitions. The school provided the English/Chinese dictionaries and students prepared their vocabulary notebooks for recording only new and/or unfamiliar academic vocabulary, reducing the workload on students and helping the researchers identify which strategy(ies) each

EL preferred to employ to master academic vocabulary. Giving freedom of choice to the participants enabled us to identify when and how translation should be used to study science vocabulary since not all vocabulary are best learned with their L1.

This action research project reports on the effects of translation in supporting EL science academic vocabulary acquisition. Students' pre-and post-test results were collected, and a questionnaire was employed to gather quantitative and qualitative data to further study the effects of L1 translation on acquiring science vocabulary.

Review of the Literature

The Case Against English-Only Instruction for ELs in China

Research results in Beijing, China, showed that 40% of the poor Chinese (L1) readers were also poor English (L2) readers (Gao, et al., 2019). After their study on 1,824 Chinese–English bilingual students, Gao et al. (2019) concluded that students with L1 reading difficulty had significantly increased risks of L2 reading difficulty. Their results support the Linguistic Interdependence Hypothesis, which states that children with deficits in L1 might face the same challenges in L2 because languages share some common cognitive bases or linguistic components. In this sense, according to the research findings, students with a strong L1 foundation have a reduced risk of L2 acquisition difficulty. However, how can we develop children's Chinese when they are not allowed to use their L1 in classes? For instance, English is the only instructional language used to teach academic content to Chinese students in the author's school. The leadership believes that it is better to instruct students in an English-only setting at the beginning of their schooling, so all Chinese natives are instructed using only L2 from kindergarten to high school, and they can only study Chinese after they reach Level 1 or 2 based on their age. As such, they lose the chance to develop their L1 linguistic skills during their early stage of life. It is later realized that they must learn the language and academic content at the same time. For example, many students don't know what vinegar is when they are learning acids; it is common at home but not often seen in their textbook. The definition of “vinegar” in the English dictionary is harder to grasp for Chinese students during the elementary levels because many of the words in the definition are new to them. In comparison, the transferred students from Chinese public school can easily learn the meaning of vinegar and acids by using an English to Chinese dictionary, and they can easily relate the learning content to their real life

because they might have heard, read, and/or even studied about them in L1 settings. They are just learning the language, not the concept.

ELs who study in English immersion (English only instruction) can't use L1 to study many new science vocabulary words since their L1 (Chinese) is underdeveloped. Xue et al. (2019) conducted research in China with 85 Grade 5 Chinese native learners of English who had all received English immersion (meaning teachers used only English in-class instruction, and students were only exposed to Chinese environment after English class) for two to three years from Grade 4. Their findings reveal that "the earlier, the better" is not always right for acquiring all second language skills because the development of L1 plays a significant role in L2 acquisition, and early L2 exposure advantages are modulated by the L1 experience. "In the foreign language setting in China, some L2 language skills do not apply to the assumption of the earlier, the better" (Xue et al., 2019, p.18). These findings reveal that Chinese students still need to develop their L1 linguistic skills and studying in an L2 setting too early hinders their L2 acquisition.

Marchman et al. (2020) conducted a study on two-year-old children from Spanish-speaking families in the US. Two and a half years later, they found early efficiency in L1 had significant influences over their later L1 and L2 competencies. Even though this study was not conducted in China, it indicates that students need to develop their L1 first in the early years of their life. Chinese children need to become competent in their Chinese before they start their education in L2, so they should be instructed with L1 before they develop their competency in Chinese since their L1 proficiency supports both later L1 and L2 competencies.

In the elementary levels, learning in an English immersion setting before they develop their L1 competency inhibits ELs' L1 and L2 development in a foreign setting in China.

According to the Linguistic Interdependence Hypothesis, children need to continue to develop their L1 linguistic skills to support their L1 and L2 competencies.

Research on Using L1 or Translation to Support L2 Acquisition

Palmer et al. (2010) conducted a ten-week study on a Chinese boy in Canada. The boy was educated in China before he joined the local Canadian school. They found that “older children will have had ample exposure to their L1, which minimizes their confusion in conceptual transfer from one language to another” (Palmer et al., 2010, p.46). Chinese students need to be sufficiently exposed to their L1, and it can reduce the confusion in the transfer of learning from one language to the other. In this sense, using L1 translation during class instruction provides a way for ELs to learn Chinese.

Alroe and Reinders (2015) conducted a study on L2 vocabulary acquisition in a major university in Bangkok; 1003 freshmen participated. They divided the participants into two groups; one group studied vocabulary using translation pairs (English words with their Thai translations), and the other used context clues. In the end, they found that participants who studied words in context outperformed those who learned through translation pairs. They also concluded that “weaker students equaled advanced students in their scores for the word-to-word translation of target vocabulary into L1” (Alroe & Reinders, 2015, p.51). However, they gave the post-test immediately, so it is unknown whether there was retention or not for both strategies. Nevertheless, the study did prove that students learning with contextual clues outperformed those using translation pairs in vocabulary acquisition in the short term, and L1 translation supports that low-proficiency learners study new English vocabulary.

Kelly and Bruen (2015) interviewed twelve college lecturers from a Higher Education Institute in Ireland, and all lecturers expressed positive attitudes towards the use of translation in language teaching. Using translation to teach a new language was rejected primarily due to the use of translation to teach grammatical rules, the difficulty in translating from the L1 to the L2, a reliance on processing the L2 through the L1, and finally, slowing down students' L2 processing skill and speed. However, these criticisms against translation overlook the fact that it can complement the Direct Method of language learning (teaching L2 directly to students without the use of their mother tongue). They concluded that teachers can employ translation as a pedagogical tool that can complement the existing pedagogical approach to language teaching and learning.

To study cross-language contributions of morphological awareness to word reading and vocabulary in Chinese–English bilinguals, Tong, et al. (2018) researched 97 Chinese–English bilingual children in Grades 1-4. Their research results indicate that Chinese phonological awareness contributes significantly to English word reading and English vocabulary.

To examine the Linguistic Interdependence Hypothesis, Kim and Piper (2018) researched 628 school children (312 female) located in the counties of Kenya. They revealed that participants' L1 literacy skills at time one predicts their L2 literacy skills at time two, and literacy skills in multiple languages have bidirectional relations. Eliminating the use of their native language at schools hinders ELs' L1 development. Consequently, it impedes their L2 acquisition. Students need to keep on developing their L1 linguistic skills to support their L2 development because literacy skills in different languages enjoy a bidirectional relation.

Marchman et al. (2020) researched the effects of L1 proficiency on L2 acquisition in 95 two-year-old children (41 males and 54 females) from Spanish-speaking families in the US. Two

years later, they found that early efficiency in spoken language processing, as early as 2 years of age, was associated with their later language competencies not only in Spanish (L1), but also in English (L2). These results suggest that building a strong foundation in a child's native language contributes significantly to their L1 proficiency as well as for later L2 acquisition.

Students' L1 proficiency supports their L2 acquisition, and a strong foundation in their L1 contributes greatly to their L2 linguistic development. While it is not good to use translation all the time when ELs study a new language, L1 translation can still play a role in supporting students' L2 acquisition.

Limitations of Recent Studies on Using L1 or Translation to Support L2 Acquisition

Alroe and Reinders (2015) conducted the previously mentioned study using translation pairs and contextual clues to learn L2 vocabulary in a major university in Bangkok. They found that translation supports low proficiency students' L2 vocabulary acquisition, but their results proved that university students learning with contextual clues outperform those using translation pairs. However, an objection may be raised because this study does not have a delayed post-test, so it does not indicate whether either of the approaches has long-term value on vocabulary acquisition.

In the study by Kelly and Bruen (2015), they indicated that recent theories on language teaching and learning have at best ignored the role of translation, and at worst vilified it. English is the only language during all class instruction; students can't use their L1, and they must use an English-only dictionary at school. Most theorists believe the presence of L1 hinders L2 acquisition. In the end, their research findings concluded that translation supports learners' L2

acquisition under a principled theoretical framework, yet its effects are unsupported by sufficient research literature (Kelly & Bruen, 2015).

“The earlier the better” is not always good for L1 and L2 development, and ELs learning a second language through immersion too early inhibits their L2 acquisition (Gao, et al., 2019; Xue et al., 2019; Marchman et al., 2020). Students need to develop their L1 linguistic skills first, and the practice of removing L1 to push little kids to acquire their L2 in the short term should be reevaluated. English immersion has its benefit, but ELs still need to develop their L1 to support their L2 language acquisition. Future studies should address how many years of L1 Chinese study is optimal for L2 English development relative to the age of acquisition (Xue et al., 2019).

To answer the question of whether L1 is activated in proficient L2 learners, Ma and Ai (2018) conducted two experiments, the first being done on low-proficiency L2 learners and the second on advanced learners. The results support that translation is activated in low-proficiency L2 learners. "The patterns observed in higher-proficiency bilinguals in the present experiment were strikingly similar to those in lower-proficiency learners reported in Experiment 1" (Ma & Ai, 2018, p.517). They concluded that L1 translation activates the orthographic information in both low and high proficiency Chinese-English bilinguals, but not the phonological information of the L1 during L2 vocabulary comprehension.

Methods

This action research seeks to find out the effects of L1 translation (Chinese) on Grades 2 and 3 EL science vocabulary acquisition.

The Research Context

This study was conducted in a bilingual school in Guangzhou, China. All students are Chinese natives, and they use a self-educating curriculum from the United States. This is an individualized curriculum from the United States, which means students of different grades study in the same classroom; they progress at their rate of learning, so even kids in the same grades are learning different units. There are 22 students in the same class, ranging from Grade 1 to Grade 3. Only 12 Level 2 and 3 students joined this project because Level 1 kids aren't ready to read and write in their L1 (Chinese). All of them receive English instruction from 8 a.m. to 2:45 p.m., and Chinese becomes the instructional language most of the time from 2:45-4:30. All students are exposed to Chinese after school.

Interventional Strategies and the Timeline

This project intended to identify whether L1 translation supports science vocabulary acquisition in students in Grades 2 and 3. It lasted for five weeks. The school principal's approval was gained before the research began, and students were told to prepare a separate vocabulary notebook for studying new academic vocabulary using their L1 translation (Chinese), illustrations, drawings, photos, and/or realia. All participants took the pre-test in the first week and the post-test at the end of the study. In the end, a questionnaire (Appendix B) was completed by all ELs to gather additional data to further study the effects of L1 translation on science vocabulary acquisition.

Data Collection and Security

Pre- and post-tests were administered to collect assessment data. Since they were using an individualized curriculum, each student had his/her pre-and post-test. Additional data were gathered from EL vocabulary notebooks; students selected which strategy(ies) they wanted to employ to take notes, so the researcher could gather data on the effects of one or more strategies. This helped identify the effects of L1 translation in relation to other strategies on supporting ELs' science vocabulary acquisition. In the end, all participants completed a questionnaire so that information could be gathered about the best strategy(ies) that each student preferred to use to learn science vocabulary, as well as if Chinese (L1) was or was not a necessity for them to study L2 science vocabulary.

Parents' consent was not required since this study was conducted in the general classroom setting. Pseudonyms are used to protect all participants. All research data are stored in a laptop, and no original research data would be released without parents' or guardians' written consent.

Findings

Data Analysis

Of the twelve students, only Phoebe and Mike were Level 2 kids, and the rest were in Level 3. Both Level 2 kids preferred to use illustrations for learning the new science vocabulary. Phoebe specifically stated that she wanted to use L1 translation to study the new vocabulary, but she chose to use illustrations because she couldn't read and write them in Chinese. So, Grade 2 students are probably not ready to employ their L1 to study L2 vocabulary, at least in reading and writing. Future research should focus more on students from Level 3 and above to study the effects of translation on ELs' academic vocabulary acquisition.

Figure 1

Pre-assessment Results

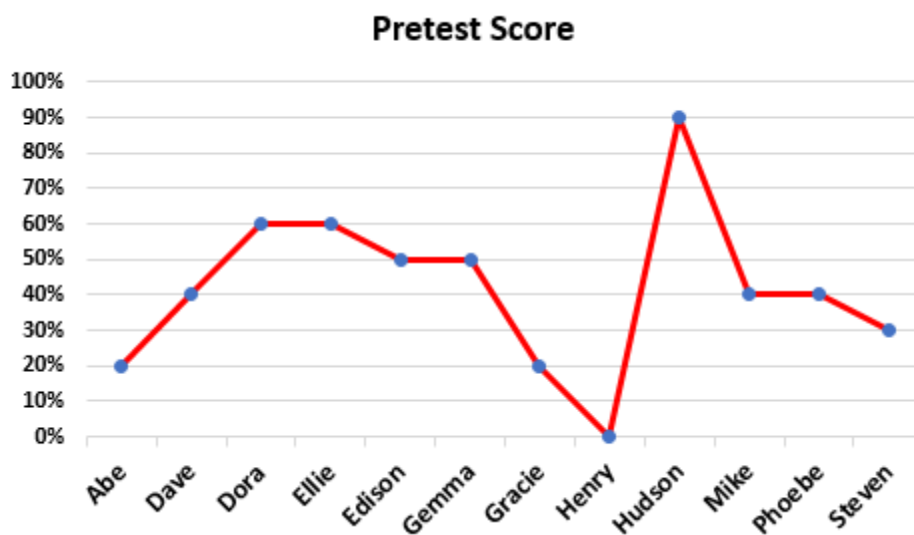


Figure 2

Post-assessment Results

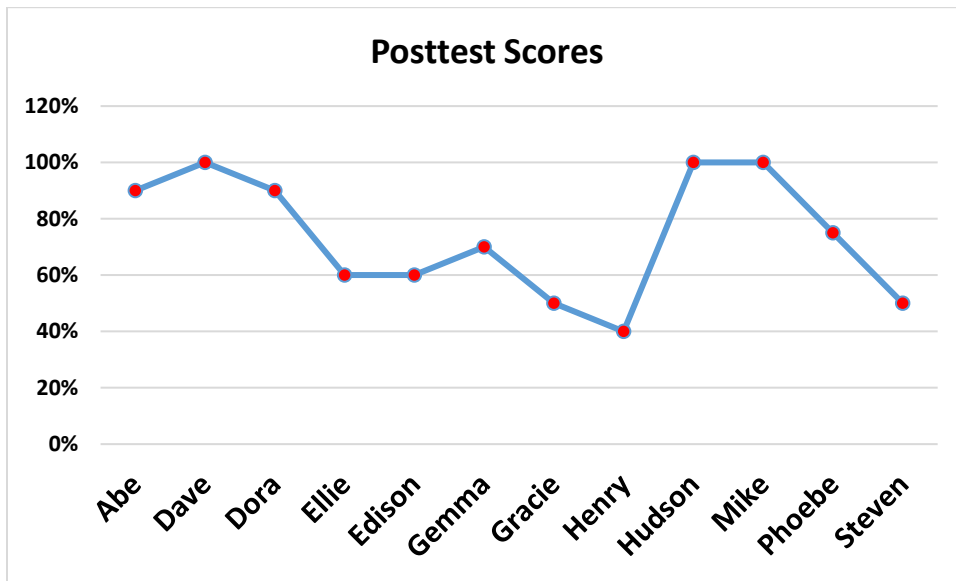


Table 1

Number of Strategy/ies Applied by Students

Students	Translation	Illustration	Drawing	Photos	English Definition
Abe					√
Dave	√	√	√		√
Dora			√		√
Ellie	√		√		
Edison		√			
Gemma	√		√		√
Gracie	√				
Henry	√				
Hudson			√		√
Mike		√			
Phoebe		√			
Steven	√				

Pre- and post-tests (Appendix A) were administered to all twelve participants at the beginning and the end of this project. They consisted of two lists of ten science vocabulary, and students picked the most appropriate way for them to tell the definition of each word, such as drawing, L1 translation, and English (L2). According to Figure 1 above, the four students (Abe, Gracie, Henry, and Steven) who used only one strategy (English definition or L1 translation) to study science vocabulary scored the lowest on their pre-tests.

All students completed their post-tests four weeks later. According to the assessment results in Figure 2, all participants showed improvements in their science vocabulary acquisition. Still, four of the five participants (Edison, Gracie, Henry, and Steven) who earned the lowest grades employed a single strategy (Illustration or L1 translation) to study academic vocabulary.

This result is consistent with the finding that employing multiple strategies meets the diverse learning needs of students (Vaughn, et al., 2018). However, it doesn't mean that students employing more strategies than others would master the vocabulary faster and/or more easily since some students (Dora and Hudson) only applied two strategies but performed much better than the rest. More studies can be done in this area to identify the number of strategies a student should apply to learn academic vocabulary.

Abe and Mike didn't do very well on their pre-tests, yet they improved a lot, according to their post-test results in Figure 2. It is likely that other factors contributed to their vocabulary acquisition. However, the purpose of this paper does not call for delving deeply into those factors. A more general study can be done to study this further.

The assessment results revealed that using only L2 can't help instructors make accurate inferences on EL academic vocabulary acquisition. All students chose to use drawing to tell the meaning of the academic vocabulary, four of them answered the tests with L1 (Chinese), and

four of them finished their pre-tests without the use of their L2. The figure in appendix C.1 provides a sample of this. Test results made it clear that EL knew the right answers, and they used their L1, drawings, and English to finish their tests, rather than just L2 (English). This was mainly due to their limited L2 competence. Thus, we should employ alternate modes of expression, such as drawing, L1 translation, pointing to real objects, and so on, to assess these students' L2 vocabulary acquisition (Vaughn, et al., 2018). Doing so will help teachers determine what ELs truly know.

However, allowing students to use drawings to answer their tests makes scoring objectively hard for teachers. In Appendix C.2, a student drew a wavy line to denote a flood. The instructor had to refer to the student's vocabulary notebook or confirm with him orally to determine whether he truly knew the word. So, future researchers should avoid allowing all students to use drawings unless researchers are sure that they can find out the right answer in instances of doubt.

Table 2

Weekly Update on Vocabulary Notebook

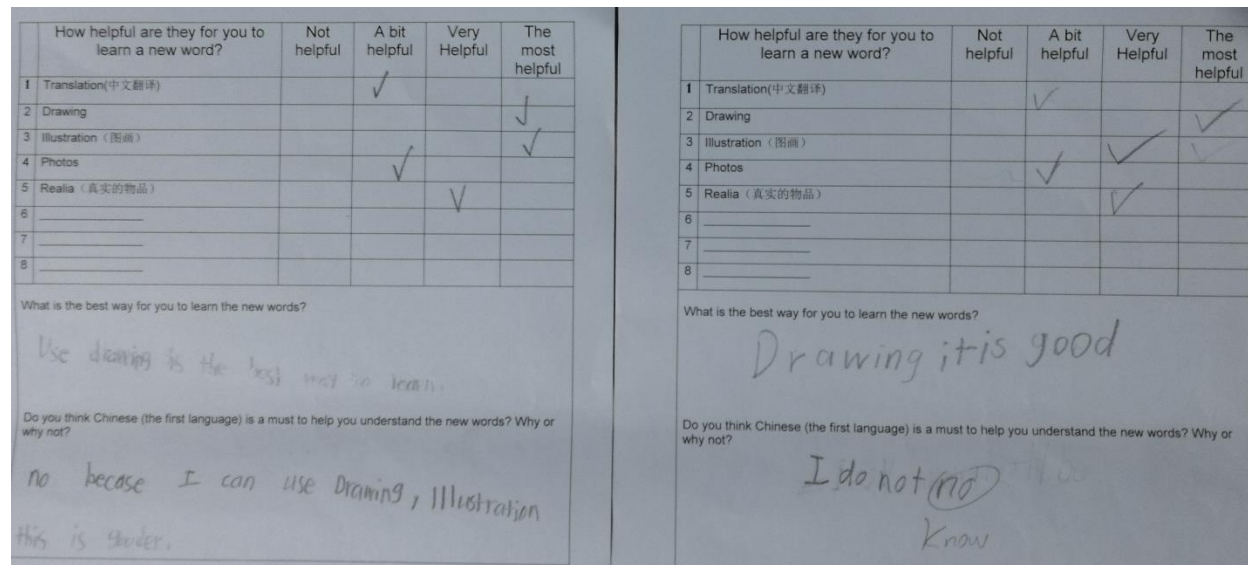
Name	Wk1	Wk2	Wk3	Wk4
Abe		√		
Dave	√	√		
Dora	√	√		√
Ellie	√	√	√	
Edison	√	√		
Gemma	√	√		
Gracie	√	√		

Henry	√	√		
Hudson		√		√
Mike	√	√	√	
Phoebe	√	√		
Steven	√	√		√

According to the assessment data, it appears that there is no significant relationship between participants' weekly updates on vocabulary notebooks and test results. Three students (Gracie, Henry, and Steven) updated their notebooks as the rest, but they earned lower grades than the others.

Figure 5

Questionnaire Samples



All students completed their questionnaires (Appendix B). Since they are Grades 2 and 3 ELs, the questionnaire was designed with simple English. Seven students selected more than one strategy as the most helpful to study new vocabulary, and the remaining five chose only one

(Figure 6). Three of them picked translation as one of the best strategies for acquiring new vocabulary, but only two of the twelve participants considered L1 translation as a must for learning new words.

Figure 6

A Questionnaire With Confusing Answers

	How helpful are they for you to learn a new word?	Not helpful	A bit helpful	Very Helpful	The most helpful
1	Translation(中文翻译)		✓		
2	Drawing				✓
3	Illustration (图画)			✓	
4	Photos	✓			
5	Realia (真实的物品)				✓
6	_____				
7	_____				
8	_____				

What is the best way for you to learn the new words?

Translation is the best way to learn.

All students gave clear information about what they thought or preferred in the questionnaire except for one. In Figure 6, that student chose drawing and realia as the most helpful ways for learning fresh vocabulary, and said translation provided little support for academic vocabulary acquisition. However, he picked L1 translation as the best strategy in his answer to the first open-ended question. His answers seem to be confusing because translation was not the most helpful strategy for him in L2 vocabulary acquisition. It is suggested that training should be provided in future studies to ensure the accuracy of all data.

Discussion

Summary of Major Findings

Participants who applied L1 translation to support their academic vocabulary performed as well as the rest. Students who used only the L1 translation strategy to study new science words performed as well as others who employed only illustration or English definition (Table 1). Therefore, ELs can acquire new vocabulary using translation, and it works as effectively as other learning strategies, such as drawing, illustration, photos, and so on. This result is consistent with the finding that translation supports EL L2 acquisition (Kelly & Bruen, 2015).

However, participants who applied multiple strategies to study the new words greatly outperformed those using only one learning strategy. The results from the pre-and post-test assessments confirm this. Moving forward, teachers need to use multiple learning strategies to meet the needs of various types of learners, and ELs need to apply more than one strategy to support their L2 academic vocabulary acquisition (Vaughn, et al., 2018).

The assessment results also reveal that ELs should be tested using alternate modes of expression so that instructors can make accurate inferences on their academic vocabulary acquisition. Due to their limited L2 linguistic skills, students know some words, but they might not be able to tell their meaning using only L2. Allowing them to use drawings, pointing to real objects/illustrations, or L1 translation allows students to show all they have learned, and it can help teachers accurately determine EL L2 vocabulary acquisition.

In Table 1, Dave, Ellie, and Gemma all included L1 translation as one of their preferred learning strategies, and Ellie was the only one using translation and another strategy to acquire the new science terms. The L1 translation should not be used alone. Their test scores indicate that L1 translation didn't hinder their L2 academic vocabulary acquisition, and it increased ELs'

L2 acquisition when it was used with other learning strategies. The presence of L1 supports L2 acquisition (Tong et al., 2018; Kim & Piper, 2018; Gao et al., 2019; Xue et al., 2019; Marchman et al., 2020).

Limitations of the Study

The major limitation of the study is that there were only 12 participants. Also, students were using the individualized curriculum and they took individualized pre-and post-tests, so comparing students' scores might lead to greater error(s) since they were studying different content and being assessed on an individual basis.

Many other factors also contribute to ELs' vocabulary acquisition, and this study focused only on the effects of L1 translation and contextual learning strategies in a classroom setting. A more general study can be conducted to measure the effects of L1 translation on ELs' L2 vocabulary acquisition.

Further Study

This study reveals that Level 2 students in primary school are not ready to employ L1 translation to study the academic vocabulary, due to their limited L1 language skills. Future research should focus on students in Grade 3 and above to identify the optimal ages for using Chinese (L1) to support ELs' academic vocabulary acquisition. It is not clear whether students' L1 competency plays a significant role in L2 vocabulary acquisition since the participants' Chinese language proficiency wasn't evaluated. It would be better to give them standardized tests to measure their L1 competence before starting the research. The assessment results can help future researchers locate qualified participants for their projects, and they can also use the data to try to identify whether L1 linguistic skills support L2 vocabulary acquisition. Lastly, some students employed a single strategy to study new science vocabulary, but they still earned

very good grades, so future researchers can delve deeper to identify what other factors are contributing to their science vocabulary acquisition.

Conclusion

This project investigated the effects of L1 translation on L2 science vocabulary acquisition. Kelly and Bruen (2015) stated that the role of translation on language teaching and learning has long been argued; recent research findings indicate that L1 translation supports learners' L2 acquisition, yet its effects are not supported by enough literature. This research study planned to combine L1 translation with contextual learning strategies (illustration, photos, drawings, and realia) to study the effect(s) of translation on Grade 2 and 3 students' science vocabulary acquisition in an English school in China. Data were collected on what strategy(ies) each student employed to study the new words and from their pre-and post-tests. All participants completed a questionnaire to gather information about the most effective strategy(ies) for ELs' L2 vocabulary acquisition.

This study tried to discern the effects of translation on Grade 2 and 3 ELs' science vocabulary acquisition. The results indicate that translation supports ELs' L2 academic vocabulary acquisition. However, ELs who apply a single strategy, such as illustration, English definition, or L1 translation to study the new words perform poorly on their tests. Therefore, ELs need to apply multiple learning strategies to support their L2 vocabulary acquisition (Vaughn, et al., 2018). This project also tried to find out how many years of L1 Chinese study is optimal to support L2 acquisition, and findings indicate that students in Grade 2 are not ready to employ L1 translation to study L2 vocabulary. However, there is not enough evidence to support that Level 3 students are adequately prepared to apply translation to support their L2 vocabulary

acquisition. More studies are needed to find out how many years of L1 learning is optimal for L2 acquisition.

Findings indicate that L1 translation can be employed to increase ELs' science vocabulary acquisition, so schools should allow students to employ L1 translation to study their L2 vocabulary. ELs need to continue to develop their L1 to support their L2 acquisition. Instructors should encourage students to read more Chinese books to develop their native language, and students should receive bilingual instruction when it supports their L1 and L2 development. The findings also reveal that teachers should instruct ELs using multiple learning strategies. To support ELs' L2 acquisition, instructors need to use multimedia content, audiobooks, L1 translation, and physical activities with all students because using only one strategy is not enough for meeting the learning needs of all students.

References

- Alroe, M. J., & Reinders, H. (2015). The role of translation in vocabulary acquisition: A replication study. *Eurasian Journal of Applied Linguistics*, 1(1), 39-58.
<http://ezproxy.nwciowa.edu/login?url=https://www-proquest-com.ezproxy.nwciowa.edu/scholarly-journals/role-translation-vocabulary-acquisition/docview/2265879006/se-2?accountid=28306>
- Dixon, L. Q., Zhao, J., Shin, J.-Y., Wu, S., Su, J.-H., Burgess-Brigham, R., Gezer, M. U., & Snow, C. (2012). What we know about second language acquisition: A synthesis from four perspectives. *Review of Educational Research*, 82(1), 5–5. DOI: 10.3102/0034654311433587
- Gao, Y., Zheng, L., Liu, X., Nichols, ES., Zhang M., Shang, L., Ding, G., Meng, X., & Liu, L. (2019). First and second language reading difficulty among Chinese–English bilingual children: The prevalence and influences from demographic characteristics. 10:2544. DOI: 10.3389/fpsyg.2019.02544
- Hu, M. (2019). The relationship between English phonological awareness of Chinese English learners and their English skills. *Theory and Practice in Language Studies*, 9(1), 45.
<http://dx.doi.org.ezproxy.nwciowa.edu/10.17507/tpis.0901.07>
- Hua, H. (2020). A study of English vocabulary learning in China—From the perspective of conceptual metaphor theory. *Journal of Language Teaching and Research*, 11(3), 427-434. <http://dx.doi.org.ezproxy.nwciowa.edu/10.17507/jltr.1103.11>
- Karras, J. N. (2016). The effects of data-driven learning upon vocabulary acquisition for secondary international school students in Vietnam. *ReCALL: The Journal of*

EUROCALL, 28(2), 166-186.

<http://dx.doi.org.ezproxy.nwciowa.edu/10.1017/S0958344015000154>

Kelly, N., & Bruen, J. (2015). Translation as a pedagogical tool in the foreign language classroom: A qualitative study of attitudes and behaviors. *Language Teaching Research*, 19(2), 150–168. <https://doi.org/10.1177/1362168814541720>

Kim, Y.S.G., & Piper, B. (2018). Cross-language transfer of reading skills: An empirical investigation of bidirectionality and the influence of instructional environments. *Reading and Writing*, (2018). <https://doi.org/10.1007/s11145-018-9889-7>

Kozaki, Y., & Ross, S. J. (2011). Contextual dynamics in foreign language learning motivation. *Language Learning*, 61(4), 1328–1354. <https://doi.org/10.1111/j.1467-9922.2011.00638.x>

Larijani, L., Kasmani, M. B., & Sabouri, N. B. (2015). Exploring the Effects of First Language Reading on Second Language Reading across Different Proficiency Levels. *Theory and Practice in Language Studies*, 5(3), 646-651.

<http://dx.doi.org.ezproxy.nwciowa.edu/10.17507/tpls.0503.27>

Lou, X., & Ma, G. (2012). A comparison of productive vocabulary in Chinese and American advanced English learners' academic writings*. *Theory and Practice in Language Studies*, 2(6), 1153-1159. <http://ezproxy.nwciowa.edu/login?url=https://www-proquest-com.ezproxy.nwciowa.edu/scholarly-journals/comparison-productive-vocabulary-chinese-american/docview/1330861319/se-2?accountid=28306>

Ma, F., & Ai, H. (2018). Chinese learners of English see Chinese words when reading English words. *Journal of Psycholinguistic Research*, 47(3), 505-521.

<http://dx.doi.org.ezproxy.nwciowa.edu/10.1007/s10936-017-9533-8>

- Marchman, V. A., Bermúdez, V. N., Bang, J. Y., & Fernald, A. (2020). Off to a good start: Early Spanish-language processing efficiency supports Spanish- and English-language outcomes at 4½ years in sequential bilinguals. *Developmental Science*, 23(6). e12973. doi:10.1111/desc.12973
- Ng, X. J. (2015). Factors and interventions for second language acquisition (Order No. 3689783). Available from ProQuest Central; Social Science Premium Collection. (1677544081). <http://ezproxy.nwciowa.edu/login?url=https://www-proquest-com.ezproxy.nwciowa.edu/dissertations-theses/factors-interventions-second-language-acquisition/docview/1677544081/se-2?accountid=28306>
- Nosratinia, M., Abbasi, M., & Zaker, A. (2015). Promoting second language learners' vocabulary learning strategies: Can autonomy and critical thinking make a contribution? *International Journal of Applied Linguistics & English Literature*, 4(3), 21-30. <http://dx.doi.org.ezproxy.nwciowa.edu/10.7575/aiac.ijalel.v.4n.3p.21>
- Palmer, B. C., Zhang, N., Taylor, S. H., & Leclere, J. T. (2010). Language proficiency, Reading, and the Chinese-speaking English language learner: Facilitating the L1-L2 connection. *Multicultural Education*, 17(2), 44-51. <http://ezproxy.nwciowa.edu/login?url=https://www-proquest-com.ezproxy.nwciowa.edu/scholarly-journals/language-proficiency-reading-chinese-speaking/docview/288286879/se-2?accountid=28306>
- Tong, X., McBride, C., Connie Suk-han Ho, Mary Miu, Y. W., Kevin Kien, H. C., Simpson Wai, L. W., & Yin Chow, B. W. (2018). Within- and cross-language contributions of morphological awareness to word reading and vocabulary in Chinese-English bilingual

learners. *Reading and Writing*, 31(8), 1765-1786.

<http://dx.doi.org.ezproxy.nwciowa.edu/10.1007/s11145-017-9771-z>

Vaughn, S., Bos, C., et al. (2018). Teaching students who are exceptional, diverse, and at-risk in the general education classroom. Upper Saddle River, NJ: Pearson.

Wong, L., King, R. B., Chai, C. S., & Liu, M. (2016). Seamlessly learning Chinese: Contextual meaning-making and vocabulary growth in a seamless Chinese as a second language learning environment. *Instructional Science*, 44(5), 399-422.

<http://dx.doi.org.ezproxy.nwciowa.edu/10.1007/s11251-016-9383-z>

Xue, J., Hu, X., Yan, R., Wang, H., Chen, X., & Li, M. (2019). Onset age of language acquisition effects in a foreign language context: Evidence from Chinese–English bilingual children. *Journal of Psycholinguistic Research*, 50(2), 239–260.

<https://doi.org/10.1007/s10936-019-09637-y>

Yuanlian S., & Jie L., (Aug. 2020). An e-prime study on the cognitive mechanisms of English predicative metaphor comprehension by Chinese EFL learners. Canadian Center of Science and Education. *English Language Teaching*. Vol. 13, No. 10.

<https://doi.org/10.5539/elt.v13n10p1>

Appendix A

Abe-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
warm		flood	
larva		rainbow	
pupa		mature	
thorax		daughter	
stage		reflect	

Dave-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
breeze		scales	
blow		gills	
cone		fins	
squirrel		hatch	
kitten		lay eggs	

Dora-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
warm		flood	
larva		rainbow	
pupa		mature	
thorax		daughter	
stage		reflect	

Ellie-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
berry		universe	
bury		happen	
crop		among	
needle		telescope	
spread		thought	

Edison-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
platypus		leap	
anteater		lung	
opossum		poison	
bear		rough	
bat		section	

Gemma-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
Bottom		fill	
aquarium		bone	
salmon		beak	
microscope		fowl	
prepare		penguin	

Gracie-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
fill		platypus	
bone		anteater	
beak		opossum	
fowl		bear	
penguin		bat	

Henry-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
puffy		berry	
storm		bury	
polite		crop	
sailor		needle	
temperature		spread	

Hudson-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
Bottom		fill	
aquarium		bone	
salmon		beak	
microscope		fowl	
prepare		penguin	

Mike-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
human		cook	
dust		edge	
alone		meat	
sin		iris	
warn		wax	

Phoebe-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
cook		flavor	
edge		nerve	
meat		bud	
iris		tongue	
wax		appear	

Steven-Pretest & Posttest			
Using Drawing, English, or Chinese to tell the meanings of the words.			
flood		fossil	
rainbow		foundation	
mature		jungle	
daughter		giant	
reflect		vine	

Appendix C

Figure C.1

Samples of Tests

Using Drawing, English, or Chinese to tell the meanings of the words.			
Bottom		fill	
aquarium		bone	
salmon	a kind of fish	beak	
microscope		fowl	a bird
prepare		penguin	a sea bird

Using Drawing, English, or Chinese to tell the meanings of the words.			
breeze	means a soft wind	scales	
blow	吹气, 吹	gills	
cone		fins	
squirrel	松鼠	hatch	
kitten		lay eggs	

Figure C.2

A Drawing Hard to Understand

Using Drawing, English, or Chinese to tell the meanings of the words.			
flood		fossil	
rainbow		foundation	
mature	No mature	jungle	
daughter		giant	
reflect		vine	