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Applying L1 Translation in L2 Vocabulary Building: Efficacy of Immersion Learning Method in the Online Environment

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Abstract: *The study was designed to examine the effective manners for beginners to study foreign language vocabulary using mobile-assisted programs of different language learning approaches. We reported on a simple process of language learning on Wenjuanxing, an online survey instrument with over 80 million active users for data collection. Some beginning learners use unsystematic ways to learn L2, which are not recommended. In a between-subjects design, 78 high school students (aged 15 to 18) with 36 males and 42 females were randomly assigned into three groups: no L1 translation, L1 translation before, L1 translation after. They learnt 12 Spanish words through a tutorial video and then completed a vocab test to examine their short-term language acquisition. After 24 hours, another similar vocab test was given to examine their long-term language acquisition. The results revealed a noticeable difference in long-term memory between with and without L1 translation, providing a route for L2 vocabulary learners to follow in the online environment.*

Keywords: *L1 translation; high school students; short-term; long-term; language acquisition*

1. Introduction

1.1 Background and previous researches

While learning foreign languages, the L2-only method is deemed to be essential. However, it has been challenged due to the inevitable role of L1 as a teaching/learning reference for the development of L2 [1]. In vocabulary learning, providing L1 translation equivalents contributes to longer memory retainment of L2 vocabularies since it increases learners' self-certainty and allows them to link the words to long-established semantic and linguistic structures of L1[2]. If the L1 is used 'systematically, selectively, and in judicious doses' [3], it will assist foreign language learning [4]. Research on the systematic use of L1 in L2 learning/teaching yielded similar results. "Taking advantage of what students have already known conceptually, strategically, and linguistically allows a "cumulative development" and "intellectual continuity" in language development." Researchers reached the conclusion that using L1 helps to increase learners' efficiency and smoothen their learning process [1].

Apart from the discussions on the usage of L1 in foreign language classrooms, the bilingual immersion programs were already established and believed to be beneficial for academic achievements later [4]. However, vast majority of the L2 learning program sets in classrooms through face to face teaching. Thus, few studies started to focus on vocabulary learning in the online environment. Language-learning Mobile Apps for L2 learning are suggested to be useful [5]. Some suggested the paradigm for EFL learners to retain vocabularies using mobile programs [6], but the effectiveness of applying the Immersion Method of language learning online remains unanswered.

The study investigates the relationship between the Immersion Learning Method and vocabulary acquisition for Chinese high school students--whether it is of higher efficacy for Chinese high school students to learn an untouched language with L1 translation or just simple Immersion. Following the Covid-19 epidemic, a growing number of mobile-assisted learning has been adopted by the society, such as online coursing, online tutorials and even online schooling. The results of this project may provide students with an opportunity to choose an efficient approach to study L2 vocabularies.

The hypotheses of the study are shown below:

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-- H1: When learning a new language, the presence of L1 translation improves the vocabulary acquisition in short-term memory for Chinese high school students.

-- H2: When learning a new language, the presence of L1 translation improves the vocabulary acquisition in long-term memory for Chinese high school students.

-- H3: When learning a new language, the order of occurrence of L1 translation influences the vocabulary acquisition for Chinese high school students.

-- Sub-hypothesis 1: When learning a new language, the presence of L1 translation reduces the response time for beginning language learners when they are tested on the acquisition of language vocabulary.

1.2 Operational definition

1) Immersion Learning Method

Our project was inspired by the app 'Rosetta stone'------a language learning app that uses The Dynamic Immersion Method, in which words are taught without English translation but images and pronunciation, imitating the natural language learning process. Immersion Method of language learning was developed in 1972 by Lambert and Tucker [7] who instructed teachers to use the target language ONLY to encourage the students to learn the required language.

2) Presence of L1 translation

L1 stands for First language, or Mother tongue. In this case, since our subjects are Chinese high school students, their L1 is Chinese. The L1 translation is the Chinese translation of Spanish words .The presence of L1 translation is the independent variable of the first experimental domain; therefore, it is of great importance to mention that NOT all tutorial videos contain Chinese translation equivalents to the Spanish words.

3) Presence of Images

In the tutorial videos, each word is shown with two corresponding images. The presence of images is a crucial aid which helps the learners to intensify their memories of the Spanish words. In particular, learners in Group A (without L1 translation) were given a tutorial video of the words with only the images as explanations.

2. Methodology

2.1 Participants

The participants of the experiment were recruited through email invitation. A total of 78 high school students (aged 15 to 18) participated in the experiment, 36 males and 42 females. Approximately 80% of them are from Hangzhou, 15% from Beijing, and 5% from Suzhou. Chinese is their L1, and English is their L2 or foreign language. According to the results from pre-test, the selected participants had no previous exposure to Spanish or other Romance languages. They also appeared to show normal levels of short-term memory.

2.2 Design

1) L2

Spanish is chosen as the L2 of the experiment. Since general Chinese high school students already have the above-basic English proficiency, the Spanish words chosen must not be English cognates. Therefore, we selected 12 Spanish words that are not in any aspects similar to English. Furthermore, since Spanish shares lexical similarities with all the Romance languages, it is also important to note in our sample that subjects must have no previous exposure to any Romance languages such as Italian, Portuguese, Latin, and others.

2) Experimental Design

We conducted two experiments, with the only difference being the independent variable. In a between-subjects design, three groups of different learning conditions were randomly assigned to each participant. As shown in Table 1, the first experiment included group 1 and 2, and its independent

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variable was the presence of Chinese translation. The second experiment used group 2 and 3, and its independent variable was the position of Chinese translation. The dependent variables for both subdomains were the accuracy of responses and total response time.

Table 1 Experimental Design

	Experiment 1	Experiment 2
Group A: no translation	X	
Group B: translation first	X	X
Group C: translation second		X

3) Groups

As shown in Table 1, three groups of different conditions were assigned to the two domains. Each group was given a different tutoring video but the same vocabulary tests. Group A contains no Chinese translation but images of corresponding words. Group B contains Chinese translation

4) Instruments

In this study, the instrument used to elicit and collect information was in the form of surveys and tests: the use of background survey as a tool to measure learners' short-term memory span and Chinese proficiency and the use of vocabulary tests as tools to measure their short-term and long-term acquisition of Spanish vocabularies. The surveys and tests were carried out through an online platform "Wen Juan Xing" within two weeks. The learners were asked to learn 12 Spanish words via a tutoring video and answer a test consisting of questions on the same set of words.

5) Exclusion

Since the experiment was conducted online, responses that lasted either too short (<60s) or too long (>1000s) were considered to be invalid. Participants who encountered network interruption had to quit the experiment since the vocabulary test was set as one-time. As a result of the above reasons, eight invalid responses were eliminated.

6) Procedures

Before the experiment, the participant received a code that consisted of the group number, name of the experimenter, date, order, for instance: AN2101. The coding system allowed for more explicit data management. Participants received a list of experiment procedures for them to follow. First, they read the consent form, which contained our general requirements and procedures. They then filled out a background questionnaire, in which they reported the demographic data (age, gender, L1, L2 and L3 if existed) and their proficiency in the chosen languages. A short-term memory span test was given to test their level of memory. Entering the tutoring phase, participants watched a tutorial video of 12 Spanish words as soon as they finished viewing the protocol. In the wake of the tutorial, they will receive a vocabulary test on the words learnt to measure their short-term vocabulary acquisition. Another test of the same sets of vocabularies was given to the participants 24 hours later, which served to test their long-term vocabulary acquisition. This test differed from the previous one with the types of problems given.

7) Duration

The experiment was performed in 2020, from July 5 to July 18, spanning a total of 2 weeks.

3. Results

The responses were fed into SPSS and analyzed using T-test analysis. By using repeated measurements in the general linear model, with the plots showing the group-test, gender-test and group-test-gender, we are able to see the p-value of these three plausible correlations.

In order to compare the difference in data directly, we first calculated the standard deviation to see whether there are some outliers that may interfere with our study. Then we calculated the marginal mean value of each group and made it as the graph which is simple for us to observe and analyze.

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3.1 A minor difference between learning vocabulary with or without L1 translation in the short term.

First, we evaluated the scores of the short-term vocabulary test, and thus their level of vocab acquisition.

Table 2 Means Comparsion for short-term vocabulary test scores

	Condition	N	Mean	Std.Deviation
Group A	Immersion	27	72.22	9.337
Group B	No Immersion	26	73.46	13.249
Group C	No Immersion	26	75.77	15.277

Table 2 shows that the three groups are quite similar in the means for test scores, with Group C being relatively higher. This means all three groups have nearly the same level of vocab acquisition (about 73.8) on the 12 learnt Spanish words, suggesting that the presence of L1 has no significant influence on short-term vocab acquisition of Chinese high school students.

3.2 Performances are generally better without L1 translation in the long term.

Table 3 Means Comparison for long-term vocabulary test scores

	Condition	N	Mean	Std. Deviation
Group A	Immersion	27	68.15	10.755
Group B	No Immersion	26	63.46	13.548
Group C	No Immersion	26	61.92	7.494

Unlike the short term test, the number of words and expressions that could be remembered after 24 hours for the three groups showed more significant differences. As presented in Table 3, the mean score of group A is 68.15, which is approximately 6 to 7 points higher than Group B and C (which scored 63.46 and 61.92), and the difference is marginally significant (P=0.101). This suggests that in the long term, the groups that contained L1 translation forgot the words more quickly, whereas the group without L1 translation could still retain a comparatively higher vocab acquisition.

The pre-test confirmed that none of these participants had previous exposure to Spanish or related languages; Therefore, the difference in the teaching approach is a significant factor which resulted in the different performance of learners in remembering the words and expressions. In other words, the immersion method without L1 translation may facilitate Chinese high school students' vocab acquisition in the long term.

3.3 Immersion Method has a positive impact on Language Elicitation.

Table 4 Comparison of accuracy of responses for problem 5

	N	# correct responses	Accuracy (%)
Group A	27	16	59.3
Group B	26	12	46.2
Group C	26	11	42.3

Additionally, we investigated the accuracy of responses for different types of problems in the short-term test. The response accuracy for the words tested in the less complicated form (given a translation in choices, given visible cue for answer) was generally over 90%. However, for questions of the more complicated form (word spelling, word application and comprehension), the response accuracy of the three groups vary to a relatively more considerable extent. For instance, problem 5 was a multiple-choice question asking learners to choose the corresponding image of a sentence in Spanish. This problem, as compared to some others, requires learners to apply and comprehend the vocabularies. As shown clearly in Table 4, learners in Group A had 16 correct responses and an accuracy of 59.3%, which is comparatively higher than Group B and C (Group B: 12, 46.2%; Group C: 11, 42.3%). The finding suggests that participants who learnt the vocabs without L1 translation perform better at problems involving vocabulary comprehension. In other words, the Immersion Method positively influences Language Elicitation.

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3.4 Immersion Method with L1 translation has a positive impact on the grasp of Direct Translation.

Table 5 Comparison of accuracy of responses

		Problem 8		Problem 9	
	N	#correct responses	accuracy	#correct responses	accuracy
Group A	27	8	29.6	15	55.6
Group B	26	11	42.3	19	63
Group C	26	14	53.8	20	77

On the other hand, tutoring with L1 translation appears to have a positive impact on Direct Translation. Take problem 8 and 9 as an illustration. Both questions require only the memorization of the direct translations but comprehension and application. In Table 5, both group B and C outperformed group A, with accuracy ranging from 7.4 to 24.2 percent larger. Problem 8 shows more distinction, with accuracy almost twice as significant for groups learnt with the aid of L1 translations than groups learnt without L1 translations. Therefore, the finding suggests that the Immersion Method with L1 translation positively influences the grasp of Direct Translation.

Additional explanation: testing the sub-hypothesis--the response time between three groups.

Since the whole study follows the rule to have zero offline contact with the participants (in Covid-19 period), the response time is recorded in the survey platform which contains several uncertainties (Internet connection; breaks between tests; loss of attention during the test). Therefore, the sub-hypothesis on the response time cannot be tested.

4. Discussion

4.1 Evaluations

The present study addressed the effects of L1 translation in the Immersion Method in an online environment for beginning language learners on their language acquisition. Three types of vocabulary learning videos have characteristics of Presence of L1 translation and Order of language. The order of language is compared with L1 Translation before vocab and L1 translation after vocab. On the one hand, the presence of L1 translation (before and after) does not affect the language acquisition of Chinese high school students, p-value =0.596 in the Short Term memory test. On the other hand, L1 translation negatively associated with the performance in the Long Term memory test, and the p-value 0.101 shows the marginal significance. Since less consensus is reached on how to measure vocabulary knowledge, a valid and reliable vocabulary test should test different aspects of vocabulary knowledge. [8]. In both language acquisition tests in the present study, consisting not only of textual definitions but also of pictures, videos and audios: because the vocabulary tutorials were presented verbally/textually and visually/pictorially, learning success should be achieved in a parallel way. Based on the different aspects of language acquisition, it is indicated that the tutorial material with L1 translation appears to have a positive impact on Direct Translation, through which they perform better on questions asking to match the L1 translation. For the tutorial material without L1 translation, it appears to have a positive impact on Vocabulary Comprehension, through matching the tested vocabulary to videos and images. Finally, there is an absence of correlation between gender and test performance and the correlation between learning preference (memorizing vocabulary by L1 translation; reading TL material; watching TL videos; combining TL sentences) and test performance.

4.2 Limitations

However, because the study is conducted in an online environment, there are several limitations. First, the experiment is not highly controlled due to its ‘online’ nature with factors that might influence the validity of the findings. 1) Participants might have taken notes in the tutorial session 2) participants might go back to the video while filling out the quiz 3) the delayed internet may prolong the response time 4) participants have not been tested in the same environment and time 5) the interval between STM test and LTM test is not strictly twenty-four hours. All of the factors in the ‘online’ nature generated errors in 14 participants (out of 93) data and were eliminated. Second, although all the participants are 15-18 years old, a variety of language learning ability causes the results of the final vocabulary test to have a high standard deviation, then more participants should be included in the experiment.

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4.3 Implications

The results indicate a higher than expected aid of learning vocabulary without the presence of L1 translation. This suggests a relatively successful long-term recall for memorizing vocabularies using the Immersion Method in an online environment. Concerning the comparison of the order of L1 translation with no substantial difference in the final vocabulary test results, vocabulary learning app designers should not include it as a factor. Since mobile-assisted vocabulary learning has been acknowledged to improve language acquisition, retention and overall proficiency [9][10][11], overly abundant vocabulary building software emerged (more than 230 vocabulary learning apps in Chinese domestic market). Indicated by the results of the study, mobile-assisted vocabulary learning is provided with a route for future investigation and implication.

4.4 Future expectations

With regard to the Immersion Method Vocabulary Learning with L1 translation is positively associated with the elicitation of vocabulary, and is marginally associated with better long term performance, the study has following future expectation. First, since the study was explicitly designed to investigate the Immersion Method (with or without L1 translation), future studies are suggested to focus on other variables (e.g. L1 text-only and audio-only and picture-only) and further isolate variables. Although the problems with variables remain in the context of beginning language learners as they do not have sufficient fundamental knowledge of the new language. According to the dual-coding theory of Paivio [12], which indicates the combination of media and modes can achieve higher learning success, the use of audios and images in this study aims at making participants of different learning abilities understand the vocabulary. Second, since the vocabulary set selected in the test consists of a cross-section of words: objects, actions, description and identity, following the rules of 'What makes a good vocabulary test' by James Milton [8], another aspect of investigation can focus on specific types of vocabulary or compare the acquisition of different types of words in Immersion Method with or without L1 translation. Third, the target participants of the study are Chinese High School students who have sufficient internet knowledge and have access to mobile phones, suggested that 60% adolescents living in inner-city Shanghai and a peri-urban region of Hangzhou in 2013 and the number is increasing [13]. For future studies, different age groups of participants are recommended. The Immersion Method of language learning is largely applied offline with the support by researchers that Immersion can be viewed as an example of the integration of content and language teaching for adults [14][15], and also for young children [16][17]. However, few studies investigate Immersion Method Language Learning in Online environment; thus, future research should focus on applying the method to different age groups in the internet context.

5. Conclusion

The studies investigate the effect of L1 translation presence and its order in L2 vocabulary learning. With regard to the efficacy of three types of tutorial method, it is shown that a higher than expected mean score in the Long Term Memory test of learning vocabularies without L1 translation, while all three methods yield similar test results in Short Term Memory. Also, at the end of the experiments, several feedbacks were collected:

-- "The whole design of memorizing vocab is interestingly combined with images."

-- "Although there is no Mandarin translation, I think it makes me focus and try to figure out the meaning using the pictures."

-- "It is fun to learn words like that, even after a week the voice of the teaching video is still in my head."

Since the field of online vocabulary learning has been researched less often, but it is the mainstream of learning methods during this year and worth more attention from researchers. The study results aim to invite more researchers at this critical time. Considering the difference between online and offline learning environments, the application of the Immersion Method online should be further investigated and examined, taking the factors of STM and LTM; the proportion of L1 translation, images and audios.

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