

# Autonomous learning of vocabulary of English as a foreign language using multimedia resources

## Aprendizaje autónomo de vocabulario del inglés como lengua extranjera usando

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Julio César Berthely Barrios\*  
Ismael Esquivel Gámez\*\*

### ABSTRACT

#### Keywords

vocabulary learning;  
english as a foreign  
language; multimedia  
resources

The purpose of this study was to evaluate the impact of using multimedia resources on the English vocabulary learning as a foreign language in a sample of university students. Following a quantitative approach, a quasi-experimental, longitudinal-prospective study was conducted with 62 university students, 42.6% were women with mean age of 20.9 and 20.6 in the case of men; previously divided into three different groups. For pre and post-training measurements, two instruments were used in their forms A and B, validated in previous studies. As a secondary goal, the influence of the cognates present in both tests on the score and the way of asking them was verified, in consequence an instrument of own design was applied. During the training, the use of lessons from a virtual platform made it possible to present multimedia resources and evaluate autonomous learning in formative manner. In the post-test, only one type of test was applied to each group, detecting significant improvement in three out of the four original instruments. However, the results should be treated with reservations due to the limitation represented by sample size and conduct of the study, in distance mode.

### RESUMEN

#### Palabras clave

aprendizaje de  
vocabulario; inglés  
como lengua  
extranjera; recursos  
multimedia

*El propósito del presente trabajo fue evaluar el impacto del uso de recursos multimedia sobre el aprendizaje de vocabulario en inglés como lengua extranjera en una muestra de universitarios. Al seguir un enfoque cuantitativo, se realizó un estudio cuasi-experimental, longitudinal-prospectivo con 62 estudiantes universitarios (42.6% mujeres con edad promedio de 20.9 años y 57.4% hombres con edad promedio de 20.6 años), quienes fueron asignados previamente a uno de tres grupos. Para las mediciones previa y posterior a la capacitación, se usaron dos instrumentos en sus formas A y B, validados en estudios preliminares. Como objetivo secundario, se verificó la influencia de los cognados presentes en ambas pruebas sobre el puntaje y la manera de realizar las preguntas, para lo cual se aplicó un instrumento propio. Durante el entrenamiento, el uso de lecciones de una plataforma virtual permitió presentar los recursos multimedia y evaluar de manera formativa el aprendizaje autónomo. En la posprueba, a cada grupo se le aplicó un solo tipo de examen y se detectó mejora significativa en tres de los cuatro instrumentos originales; sin embargo, los resultados deben ser tratados con cautela debido a la limitación del tamaño de la muestra y la conducción del estudio en modalidad a distancia.*

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\* Maestro en Enseñanza del Inglés como Lengua Extranjera. Profesor del Tecnológico Nacional de México, Campus Veracruz, México. ORCID: <https://orcid.org/0000-0003-2950-7270>, correo electrónico: [jcesar.berthely@gmail.com](mailto:jcesar.berthely@gmail.com) | \*\* Doctor en Tecnología de Información y Análisis de Decisiones. Profesor de tiempo completo de la Universidad Veracruzana, México. ORCID: <https://orcid.org/0000-0001-7914-5170>, correo electrónico: [iesquivel@uv.mx](mailto:iesquivel@uv.mx)

## INTRODUCTION

During the teaching-learning of a second language, the teacher requires different tools to facilitate the process according to the difficulties faced by a student, in order to improve his or her performance. Vocabulary learning is an essential component of second language (L2) or foreign language (LE) teaching. In practice, the teacher realizes the difficulty this represents, due to what Beghadid (2022) points out about vocabulary "being a central axis in the teaching-learning process, because it is necessary to develop all linguistic skills" (p. 26). To this, Nation (2021) adds that "knowledge of vocabulary in a language implies knowing its spoken and written forms, its meaning and the ability to use it in a context" (p. 6).

Therefore, it is necessary for the learner to achieve "vocabulary learning autonomously, in order to establish the basis for understanding the context and meaning of a written text in a foreign language" (Basto-Olaya *et al.*, 2017, p. 103). Each student learns words in a different way, through particular strategies for memorizing and organizing the storage of concepts; while some resort to deducing the meaning of the word, others look up its definition in the dictionary. As for retention, some learners use the physical and visual arrangement of the words to help memorize them (visual memory); others read aloud to remember the words (auditory memory); and still others write the words over and over again (kinesthetic memory) so as not to forget them (Beghadid, 2022).

The main objective of this study was to determine the effect of the use of multimedia resources on English as a foreign language vocabulary proficiency in university students. These resources combine textual, graphic, audible and video content in order to cover different learning styles. As a secondary objective, we set out to perform a vocabulary diagnostic and to verify three conditions: a) the type of association of the level of difficulty with the level of achievement, b) the influence of the presence of cognates on the score, and c) the effect of the way of asking cognates on performance. The theoretical framework and related previous studies are described below, followed by the methodological framework, the results and their discussion, and ending with the conclusions.

## THEORETICAL FRAMEWORK

In the learning process, it is essential to have sufficient vocabulary, especially to develop language, which is the basis for assimilating knowledge in every educational experience, both in teaching and in everyday relationships (Casimiro and Fuentes, 2020). Toaquiza-Viracocha (2018) points out that "vocabulary plays an important role in language development and even more so in learning a foreign language in order to express ideas, thoughts and feelings" (p. 7).

On the other hand, in language learning, having sufficient proficiency in all four skills (listening, speaking, reading and writing) is essential for communication between people who do not share a first language. Several studies prove that, without adequate vocabulary knowledge, the learner will encounter difficulties in fluent conversation and reading comprehension (Cheng & Matthews, 2018; Kasim & Raisha, 2017; Masrai, 2019).

It is important to note that the difference between learning a new language and acquiring it is related to vocabulary acquisition and vocabulary learning. For Beltrán (2017), "vocabulary acquisition differs from vocabulary learning" (p. 95), as the former occurs unconsciously and naturally, while the latter is a conscious process that occurs during classroom instruction. Sánchez-Piragauta (2022) points out that it is important to learn vocabulary from the first moment that learning begins, since it is a process that requires the reorganization of words; thus, the repetition of terms is fundamental, that is, using the lexicon more frequently (ToaquizaViracocha, 2018, p. 16).

For Belardi *et al.* (2020), vocabulary is an ambiguous conception, so they prefer lexical notion (p. 227), considering that it is more complete since it refers to the database of words and combinations that humans have. According to Vera-Mansilla (2020), "building a good lexical base in the first levels of education will be indispensable for individuals, since it will allow them to express properly what they want and need" (p. 14), so that the more vocabulary is retained, the better communication will be.

Similarly, Vera-Mansilla (2020) indicates that "with the help of the lexicon it will be possible to achieve a superior command of grammar", which is another necessary component in this learning process. Aristu and Torres-Ríos (2021) state that words are many times learned incidentally, but this learning can be more meaningful when combined with explicit and intentional learning, taking into account the context and the needs of the students. Aristu and Torres-Ríos (2021) also mention that it is possible to work in an intentional way is highlighting lexical units, so that the student can stop to analyze the meaning of a word from the context and look at other dimensions such as its morphology or grammar. Moreover, learning will be more meaningful if students become autonomous and "take a proactive attitude toward vocabulary learning" (Qian & Sun, 2018).

Autonomous learning, considered fundamental for the formation of university students, requires these skills in the management of information and communication technologies, as well as the promotion of an investigative culture in the teacher that is reflected in the inquiry capabilities of their students (Mendoza-Solórzano, 2017).

Following a didactic sense of the acquisition and use of vocabulary of a foreign language, Díaz (2018) mentions two types: "active or productive

vocabulary, that which people manifest verbally or in writing, and passive or receptive vocabulary, corresponding to the words that people know and identify visually or aurally" (p. 2). In the same sense, Acosta-Jarama and Lamela-Ríos (2019) refer to a third type: potential vocabulary, which is defined "as the lexical units that the learner does not know, but can deduce independently and with the help of his or her linguistic competence" (p. 25).

Based on the characteristics of the multimedia resources developed for the present study, our interest focuses on passive vocabulary, which can be described as "the comprehension of words that are not actively used in communication" (Novoa, 2019, p. 258). Similarly, Novoa (2019) considers that comprehension of this type of vocabulary can be drawn upon as an indicator in overall reading comprehension, as well as in specific comprehension skills.

In addition, learning words by context is a way of educating oneself in a casual way, reading or listening to the language in a natural way, which makes learners focus on the message (Nesrallah & Murad, 2020). This is considered one of the most important strategies for lexical learning, as it allows the learner to deduce the possible meaning of an unfamiliar word within its linguistic context. For it to work, it is necessary for learners to know approximately 95% of the words in a text, which will allow them to make an accurate choice of terms to focus on (Nesrallah & Murad, 2020), and to infer both coverage and potential meanings.

### ***Previous related studies***

Learning an LE or L2 is a dynamic and complicated process that benefits when learners take strategic steps to facilitate it (Ghalebi *et al.*, 2020). One of the main challenges faced by learners is vocabulary acquisition, so several authors have attempted to identify the learning strategies employed (Al-Harbi & Engku, 2018; Al-Khresheh & Al-Ruwaili, 2020; Beltramino *et al.*, 2018; Ghalebi *et al.*, 2020, 2021; Hadi & Guo, 2020; Sanchez-Lume *et al.*, 2022). Overall, the results of these studies show a preference for cognitively less demanding strategies.

Notably, Al-Harbi and Engku (2018) found that the most used strategies are "I try to remember the word by repeating it several times", "I try to guess the meaning of the word from the text" and "I learn new words when interacting with native speakers". They also concluded that social (acquisition through social interaction) and memory (association of prior knowledge with new words) strategies are the most and least used, respectively. Their findings also indicate that males prefer the social strategy and females prefer the cognitive strategy (repeating, summarizing, or inferring meaning).

Hadi and Guo (2020) found that students preferred contextual learning of words rather than memorizing them, were able to identify, select and understand the primary words, and preferred more reading, in addition to the feedback they received. At the same time, they noted that students relied mainly on dictionaries, riddles, repetition and auditory coding to learn vocabulary, and that they were able to manage and control their emotions during their learning.

Lohaus and Herrera-Fernández (2021) conducted a quasi-experimental study, with pretest and posttest, to determine the effect of a multimodal didactic strategy in the teaching of English words, using Chilean sign language and the manual alphabet. The authors formed two groups, aged 16 to 44 years, whose oral productive vocabulary was assessed. The experimental group received a designed didactic strategy and the control group, traditional teaching. The results show that the intervention produced a positive effect on oral vocabulary production compared to the control group.

Yawiloeng's (2020) study examined the effects of a video on English as a second language vocabulary in Thai students. To collect the data, the author used five types of research instruments, including an English word list, a pretest and posttest, an English vocabulary video, and a semi-structured interview. The findings revealed an increase in posttest scores after the use of the English vocabulary video. It also found that students preferred to learn vocabulary through videos that contained subtitles in both languages, related images, and audios with appropriate volume. The findings lead to theoretical and pedagogical implications about the significant role of multimedia learning in linking visual and auditory information.

Work developed by Ansarin and Kazemipour-Khabbazi (2021) compared the effect of single and double annotation modes, working memory, and three tasks of different engagement loads (sentence writing, full draft, and paragraph writing) on passive and active vocabulary development in English as a foreign language. Annotations for 20 lexical items were presented to English Language and Literature majors while listening to an expository text. A multiple-choice comprehension test was administered just after listening to the text and after the visual presentation to ensure that participants paid attention to the words and the text. Paribakht and Wesche's (1997) vocabulary knowledge scale was used as a pre- and post-test, while working memory ability was measured through a listening scope task. The study corroborates the effect of modality on vocabulary learning and suggests that both working memory and task type are significant factors in English vocabulary learning.

Tavasoli *et al.* (2020) developed studies to investigate the effectiveness of different multimedia glossaries on learners' vocabulary acquisition and reading comprehension in a computer-assisted language learning

environment. Participants were exposed to four different conditions: 1) L2 definition only, 2) L2 definition together with audio, 3) L2 definition with video, and 4) L2 definition with image. Vocabulary acquisition was measured using a pretest-posttest design; results showed that all four conditions led learners to gain vocabulary. Specifically, participants who had access to L2 definition plus pictures and videos achieved significantly higher scores than the other two groups. Tavasoli *et al.* (2020) further suggest that different types of glossaries presented on screen may increase vocabulary knowledge and that this would have pedagogical implications for LE teachers and materials developers.

Based on the review of similar studies, a virtual learning environment based on multimedia resources was created for vocabulary acquisition.

## **METHODOLOGY**

From a quantitative approach, a quasi-experimental study of longitudinal and prospective type was carried out. The characteristics of the sample, the instruments used and the procedure followed for vocabulary learning are presented below.

### ***Participants***

We worked with 62 university students previously assigned to three English level 1 groups in a public institution. Women represented 42.6%, with an average age of 20.90 years, and men represented 57.4%, with an average age of 20.62 years. Motivation was sought for the participants with an incentive in their course grade, according to their performance.

### ***Procedure***

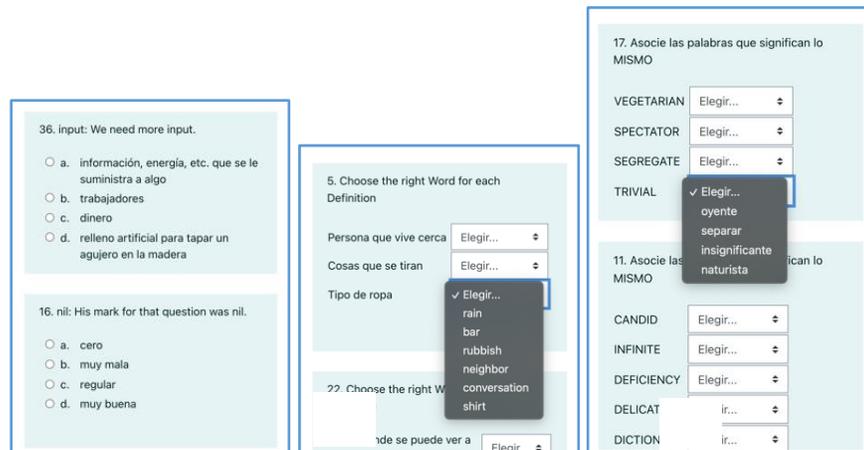
The evaluation and training sessions were conducted from Monday to Thursday via videoconference on the Teams platform. In each session, participants were asked to activate the camera on their devices, controlling through software the execution of the activities in the established schedule. Care was taken to ensure that the students were not distracted and that they responded by means of text messages to the questions they were asked, so as not to distract the others.

One day prior to the first session, it was ensured that all participants accessed the Moodle platform, where the tests and multimedia resources were hosted. In addition, in the initial sessions the procedure to be followed during the treatment was shared. For diagnostic purposes, the Spanish Bilingual Vocabulary Size Test (VST), Spanish Vocabulary Level Test (SVLT) and Cognates were administered to all participants in two 60-minute sessions and one 40-minute session, respectively. Then, a group of ten 50-minute daily sessions of training based on adaptive lessons was started. When they finished the first five sessions, they resumed the

lessons in a similar manner. Subsequently, each group was evaluated according to the assigned test.

### Materials

Measurement: Figure 1 shows a sample of questions from the three tests, of which two versions (A and B) of the pre- and post-vocabulary training measurement were used.



**Figure 1.** Excerpts from vocabulary tests (A: VST, B: SVLT and C: Cognates).

The Spanish Bilingual Vocabulary Size Test (VST): adapted from the Nation test (Firda *et al.*, 2021), it measures knowledge of a sample of words of different frequency levels. It covers a wide range of frequency bands, including high, medium, and low. Prior to the test, they are presented with instruction in Spanish and English on how to answer the test. For each version there are 50 multiple choice questions and each question shows a word in English followed by an example of its usage for the student to choose the correct answer from four Spanish options, which may represent a synonym, a definition or translation of the word.

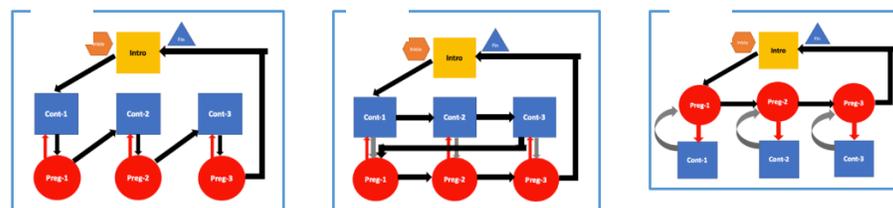
The Spanish Vocabulary Levels Test (SVLT): measures vocabulary breadth and depth. By breadth of vocabulary knowledge, it refers to "linear and one-dimensional aspects, while depth is related not only to the meaning of words [but] also to their semantic relationships, collocation patterns, and syntax" (Bardakci, 2016, p. 241). In other words, breadth is the number of words a person knows, while depth indicates the degree of mastery of all these words. The test consists of 50 asymmetric association questions with three definitions in Spanish and six answers in English, for a total of 150 words per version.

Cognates: is a test developed locally and is made up of cognate-type words extracted from the previous tests (84 per version). Each one is composed

of 30 questions of symmetrical association, in which five English words appear and must be associated with a synonym or antonym in Spanish. For form A, 57% had to be associated with synonyms for a total of 148; in form B, of a total of 140 words, 60% had to be associated with synonyms.

Training: for vocabulary building, multimedia resources were developed and hosted in a Moodle course. The course was divided into five sections, for each version (A and B), corresponding to levels 1,000 to 5,000 and, in each one, several lessons with three possible paths and one to choose from (see Figure 2). Each lesson presents the content in a flexible way that allows the participant to evaluate what has been learned and to reinforce the topics in which he/she has doubts. The lessons were requested to be reviewed at least three times to reinforce the learning of the new vocabulary.

Figure 2 shows the access paths to the contents and questions; as can be seen, in path A, the first content is reviewed and then the corresponding question appears; if the correct answer is given, the second content is advanced and so on until the end of the lesson. Otherwise, the corresponding content must be reviewed again. Path B presents the contents consecutively and then the questions appear consecutively. If a question is not answered correctly, the content is displayed again. Path C first presents the questions consecutively as they are answered correctly; otherwise, the corresponding content is displayed for review because in this case content and questions associated with words representing cognates, which are assumed to be more familiar, are presented.



**Figure 2.** Lesson trajectories.

→ = Error-free trajectory.

→ = Incorrect answer, return to content review.

→ = Continuous trajectory after review.

For words that do not represent cognates, a content (see Figure 3-A) includes two to four words to be learned, which are initially shown in

capital letters within an English sentence and its Spanish translation, while listening to the English audio. Next, each word is presented in English along with its audio, followed by an allusive image, then it is indicated in Spanish, and finally, a video is shown where a mime appears acting out the word, so that the student imitates this performance. In the case of cognates (Figure 3-B), due to the similarity of the words in both languages, the word appears in sequence in English together with its audio, then in Spanish by means of a deformation effect, and finally, its definition in Spanish. In general, the questions (Figure 3-C) are of symmetrical association and present the word in English and in Spanish to relate them.



**Figure 3.** Example of content and questions in a lesson.

## RESULTS

In this section, we present the descriptive results by group-test, form and overall average, after processing the pre-test and post-test scores with SPSS V15.0 (see Table 1).

**Table 1.** Descriptive and Difference in Test Scores

GRUPO / PRUEBA	FORMA	N	PREPRUEBA		POSPRUEBA		DIFERENCIA	TAMAÑO
			MEDIA	DESVIACIÓN TÍPICA	MEDIA	DESVIACIÓN TÍPICA	VALOR Z	EFFECTO (g)
1 / VST	A	19	75.16	12.742	84.42	8.579	-3.467**	-0.719
	B	21	65.71	13.271	73.33	16.915	-2.805**	-0.420
	Global	20	69.19	13.254	77.90	13.682	-3.643**	-0.541
2 / SVLT	A	19	77.62	14.174	80.47	13.832	-0.825	-0.170
	B	21	69.87	18.724	75.78	21.153	-2.056*	-0.248
	Global	20	73.75	15.251	78.13	16.133	-1.932	-0.233
3 / Cognados	A	21	83.83	12.090	85.85	15.187	-1.460	-0.123
	B	21	85.43	17.010	85.20	21.860	-0.448	0.010
	Global	21	84.63	14.016	85.52	18.205	-1.408	-0.046

\* p < .05, \*\* p < .01. g = g de Hedges.

It can be seen that the greatest impact of training was achieved in the VST type test, where the lowest means were obtained during the pretest. As for the vocabulary diagnosis, Table 2 shows the mean scores achieved in each test, form and level. When taking difficulty into account, an expected result was that with the increase in level the mean would decrease with respect to the previous level; however, as can be seen, there are several misaligned results.

**Table 2.** Mean scores by test, form, and level obtained in the diagnosis

PRUEBA	FORMA	NIVELES					PROMEDIO
		1 000	2 000	3 000	4 000	5 000	
VST	A	0.83	0.83	0.71	0.65	0.92*	0.79
	B	0.73	0.87*	0.62	0.62	0.52	0.67
SVLT	A	0.83	0.74	0.76*	0.73	0.65	0.74
	B	0.76	0.65	0.67	0.67	0.65	0.68
Cognados	A	0.75	0.79*	0.81*	0.75	0.68	0.76
	B	0.82	0.71	0.77*	0.71	0.78*	0.76

\* Off-the-pattern results.

With the intention of verifying whether the presence of cognates in the VST and SVLT tests influenced the score achieved by test, form and level, scores were obtained excluding cognates. Table 3 shows the differences in means (with and without cognates), in addition to the percentage of their participation in each test and level. Overall, the mean proportion of cognates in VST-A, VST-B, SVLT-A, and SVLT-B tests was 34%, 38%, 45%, and 43%, respectively.

**Table 3.** Mean difference in scores with and without cognates, and their proportion

PRUEBA	VST-A		VST-B		SVLT-A		SVLT-B	
	DIF. - PROP.							
1 000	0.01	30%	0.07	30%	0.01	20%	0.01	30%
2 000	0.00	40%	0.02	40%	0.06	57%	0.06	43%
3 000	-0.04	20%	-0.08	70%	0.07	40%	0.19	60%
4 000	0.07	30%	0.03	20%	0.05	63%	0.10	43%
5 000	0.00	50%	-0.12	30%	0.09	43%	0.14	40%
Promedio	0.01	34%	-0.02	38%	0.06	45%	0.10	43%

Dif. = Diferencia; Prop. = Proporción.

Dif. = Difference; Prop. = Proportion.

It was expected that the means would be lower when cognates were excluded; however, it is noticeable that in both VST tests for level 3 000, instead of decreasing, the means unexpectedly increased; in the case of

VST-B, in three of the five levels the means also increased. On the other hand, in certain cases and marginally, for both SVLT tests at all levels the means did decrease, with the greatest differences being found in SVLT-B. In addition, to verify whether the way of asking the cognates in a different way influenced the score, a contrast of means of the cognates, present in the original tests and in those developed for the present study, was performed. A significant difference was found in favor of the latter for VST (0.90 vs. .71) and for SVLT (0.92 vs. 0.79). Additionally, averages were obtained in both 'cognates' tests according to the type of word to be associated (synonym or antonym). For both forms, the mean of synonyms was higher than that of antonyms (A: 0.93 vs. 0.79 and B: 0.91 vs. 0.85).

## DISCUSSION

With respect to the main objective of the present study, it was found that in both forms of the VST test, the use of multimedia resources improved vocabulary. In these, the lowest initial mean was obtained, perhaps because they were the first to be applied and took the students by surprise. The results were similar to those of Anjum *et al.* (2021), who conducted an intervention based on the use of online dictionaries, hypertext annotations, contextual word information, images and videos, among others.

The gain in the SVLT tests was only for the B form. It is possible that the absence of gain for form A was due to the fact that the highest average score of the four original tests was obtained in the pre-test, a condition also found in both cognate tests. Due to the sample size, and with a power of 80%, only in VST-A was a required effect size obtained, according to the results of the G\*Power 3.1 software. These findings are similar to those of the study by Ramezanali and Faez (2019), who used the same test and tested the effectiveness of multimedia resources in vocabulary learning, specifically resources that showed the definition of words in L2 and video animation.

With respect to the secondary objective (the type of association between levels of difficulty and performance), an inverse association was found. This means that as the frequency level increased, the average score decreased; however, in three cases, results outside this pattern were obtained. It is likely that this was due to the fact that in VST-A level 5000 and VST-B level 2000 participants knew the meaning of a considerable proportion of cognates present (5 and 4 out of 10, respectively). With respect to SVLT-A level 3000, the difference was minimal with respect to level 2000 (.02).

For the same objective, in terms of determining the influence of the presence of cognates on the score, it was expected that in general the mean scores would be lower when cognate items were excluded; however, the opposite was found in four cases. Of note is the B form of the VST test, in

which three of its levels had a negative difference when cognates were excluded. This implies that the participants did not know the meaning of these words in Spanish, since level 3 000 had the highest proportion (7 out of 10). In addition, although the proportion of SVLT items was 3 to 1 with respect to VST, the difference between averages was minimal (.02). It is possible that this is due to the fact that as the number of items is lower (VST), the participant has less opportunity to improve his or her score.

Regarding the influence of the type of question, associated with cognates, on the score obtained, it was found that, indeed, in comparison with the multiple choice questions (VST), a higher average was obtained in questions of symmetrical association (Cognates). When comparing these questions with those of asymmetric association (SVLT), the average was also higher. Added to this is the fact that the original tests for cognates have several answer options, which may confuse the participant. In addition, students seem to know slightly more about synonyms than about antonyms associated with cognates.

When comparing the diagnostic results with those obtained by others, for the VST-A test, overall low performance in cognate recognition was found. This contrasts negatively with that reported by Zeng *et al.* (2022), who worked with Chinese-speaking students taking a course in English as a foreign language. The authors measured the effect of word characteristics (frequency, polysemy, word family and word length, as well as cognates) on vocabulary acquisition. The results indicate that cognates were easier to learn, apparently because in Chinese they are characterized by being similar in pronunciation and always share the same meaning. In contrast, for Spanish, cognates are coded by the number of similar letters they share, but they do not always mean the same thing.

With respect to the VST-B test, it can be seen that the results show discrepant means between levels, possibly due to the number of cognates handled. The results resemble those found by Silva and Otwinowska (2019), who found that the effect of inflation (increase) of cognates impacts the result obtained across levels. From the findings reported by Allen (2019a), it is argued that, to avoid this, the proportion of cognates should be controlled in lexical tests of this type.

With reference to the SVLT-A test, it was observed that the overall average decreased as the level progressed, with the exception of levels 3000 and 2000. The latter with a higher number of cognates, which contrasts with the idea that the higher the number of cognates, the higher the value benefits as "they are words that are easier for the participant to recognize" (Hashimoto, 2021). The results disagree with those presented by Allen (2019b), who using the SVLT test to determine the impact of cognates in a test of receptive lexical knowledge observed a facilitating effect of cognate frequency on the selection of the correct response and the rejection of distractor items.

With the inconvenience represented by the presence of cognates, "since the greatest obstacle to learning a second language (L2) is the interference that the mother tongue exerts on the L2" (Zapata-Ricárdez *et al.*, 2021), we proceeded to analyze the values obtained per word, specifically the false cognates. When averaging these values, we noticed a higher percentage at level 3000 with respect to level 2000. Taking into account the results of the study by Marecka *et al.* (2021), which confirms that it is easier to learn false cognates than non-cognates, it can be understood that better results were obtained at more complicated frequency levels. Zoltan (2020), who obtained results similar to those of the present study, proposes to adopt as a design criterion for this type of test a systematic understanding of the proportion and distribution of cognates.

As for the SVLT-B test, the findings indicate that scores decrease as they increase from level 1 000 to 3 000, but increase from 4 000 to 5 000. The above indicates that the presence of cognates at different levels also impacted the overall score. SoaresSilva *et al.* (2021) performed a readjustment of this test to avoid the proliferation of cognates specifically at level 4 000. When applying the original test, they reported results similar to those of the present study, but when they solved the adjusted level 4 000 (without cognates), the decreasing pattern was uniformly maintained throughout the test, thus verifying an internal consistency of the instrument, in addition to the fact that cognates impact the results when the participants are native speakers of Latin-derived languages.

## CONCLUSIONS

In accordance with the main objective, it is concluded that the gains achieved between related groups can be attributed to how they are treated, since vocabulary learning was obtained through the application of multimedia resources. It is important to note that, although the SVLT has more items than the VST, the former had a higher initial mean due to the differentiated knowledge possessed by each group. In addition, it is likely that the lower number of items in the second test may have had a negative impact.

Regarding the secondary objective, it was determined that the lack of knowledge of the meaning of some cognates in Spanish had a significant impact on performance, since the expected negative association between level and score had anomalies at certain levels. Likewise, the way in which the cognates were asked had an influence: the fewer distracters the participant had, the better the score.

All in all, it is convenient not to overlook the conditions in which the tests were used, since when applied in distance mode, participants were able to use online translators or dictionaries and social networks to share answers. Similarly, it is possible that during the training the students reviewed other content while pretending to attend the lessons.

Finally, the results should be treated with reserve due to the size of the sample used. Therefore, as future work it will be important to increase the sample size and to integrate all groups in the examination. In turn, due to the benefits achieved during the intervention and the two dimensions measured, it is considered more convenient to use only the SVLT in the future. It is convenient to standardize the number of cognates and their type (true and false) for each level, and it is important to measure the number of cognates known in Spanish, by means of open-ended questions, to confirm their influence on performance. Likewise, it is necessary to apply similar interventions in face-to-face mode and thus control the effect of possible distracters.



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