

## Summative Research Report

---

### ABSTRACT

Word by Word is an integrative vocabulary system that helps language learners not only build their vocabulary but integrate learning into their daily life. The two-part vocabulary system pairs a vocabulary learning system and augmented browser file to integrate new words into your own personal lexicon. The pairing of the two systems ensures that users see and learn the vocab through continual exposure. The team created a beta system that had limited function to test the overall usability and participant satisfaction of using the system.

For this particular beta version, Word by Word focused on Spanish vocabulary. The system was composed of ten vocabulary word pages and five questions per word. This usability test looked to assess the system's usability and participant perceived satisfaction and learning retention. The test consisted of five participants working through a three-part usability test that spanned a week period to mimic a traditional weekly study session that could be assigned by a teacher or professor. The team found all participants enjoyed the system and felt as though they gained knowledge and value.

## WORD BY WORD: USABILITY AND VALUE GAINED

The Word by Word vocabulary system was designed to help language learners enhance their foreign language vocabulary beyond the basic words needed to communicate. While not a substitute for language learning, the program aims to supplement formal teaching and/or individual study. By focusing specifically on expanding the learner's vocabulary, Word by Word aims to increase every user's vocabulary at their specific level. This test looks to understand the usability and perceived gained value participants feel after interacting with the system. As a discount usability test, the test consisted of five participants focusing mostly on quantitative data and observations made by the team. The team sought to answer the following research question:

Do users find the Word by Word system to be usable and have perceived value gained in regards to foreign language vocabulary retention and understanding?

The team predicted participants would feel as though they gained knowledge and predicted their vocabulary retention tests would also showcase their results. The team understood the limitations of their research and plan to use this usability test as an entry into further testing and refinement of their system.

## METHODS

This usability test and survey combination was designed to test and gather users' actual response to the system. The test is designed to mimic a user's recommended study plan. This is based off of the system's design and reinforcement of vocabulary learning methods. Because the system is designed to help increase vocabulary knowledge through reinforcement and other active learning methods, the test was conducted over a one-week period, and all participants were screened to ensure they would mimic our target user profile.

### Participants

In order to best replicate a typical user experience, participants in this test were screened to ensure they fit our target user profile. Because our target audience is broad and not limited by demographics, the participants could have been of any age or education. The main identifier of our target audience is their desire to learn a foreign language, whether it be for fun or for educational purposes. Therefore, our potential participants were first asked if they had a desire to learn a different language. If they selected no, they were removed from our potential participant pool and thanked for their participation. If they answered yes, they were added to our participant pool. Since our test was designed with beginner Spanish learners in mind, we had to ensure participants were not predisposed to the Spanish language and asked if they ever studied the Spanish language. If they said yes, they were removed from our potential participant pool and thanked for participating. If they answered no, they remained in our potential participant pool.

### Usability Test Design

Research was conducted using a three-part usability test that had each participant interact with the system for a total of 30 minutes. Because the system is based on a gradual, overtime learning model, the test must be conducted over a span of time, using multiple exposures. While an optimal study would have more sessions and be conducted over a larger period of time, one week posed a strong timeframe that showcased early retention and potential for future retention. The total study session of 30 minutes was chosen because it is the recommended weekly study goal. The three-part usability test took place over Zoom and was observed by the team.

## Part One

Once passing the screener, participants participated in the test. The test was conducted in three parts in one week. Part one of the usability test consisted of a Spanish leveling test to assess the participants' general knowledge of the Spanish language. This test mimics the leveling test that users would first go through and will help us gather a basic leveling of users' language experience. Higher scores would indicate higher language exposure or guessing skills, while lower scores would indicate lack of language exposure or guessing skills. This is important data to help indicate who has more background knowledge and can help with our analysis.

Next, participants took a Spanish vocabulary pre-test to serve as a basis of their language retention. This test served as the original comparison to compare results with the post test. The baseline will show the users' initial understanding of the Spanish language before using the system and was directly compared to the post-test results.

The last task of part one was completing a 15 minute session with the Word by Word system. Participants had a unique link to their version of the site to ensure no participant disrupted another participant's test. Once finished with part one, the participant was thanked and reminded of the next testing session time and date.

## Part Two

Part two of the test took place 24 hours after the first part. Participants first took a test to see how many words they remembered from their last session. This test checked the participants' ability to remember the words they were exposed to in the last test. It will put a numerical value to their ability to recall the words they learned the day before. Once completed, they then worked through a 10 minute study session on Word by Word.

## Part Three

Part three of the test took place 5 days after the first test. Participants first took a definition test to assess their retention and understanding of their new vocabulary. The test put a numerical value to their ability to recall both the definition and words. After completing their definition test, they completed a 5 minute study session. To end the usability test, participants took the Spanish vocabulary post-test to see a comparison to their overall learning retention. These results were compared to the initial Spanish vocabulary pre-test.

Once all three parts of the test were completed, the participants took the perceived value survey, where they rated their experience with the system, their perceived value gained, and general rating of the system.

## RESULTS AND ANALYSIS

During the entirety of the usability test, participants were asked to verbalize their thoughts and reasons for choosing their responses. While none of the users have studied Spanish, two of the participants had studied French for at least four years. Both participants stated they used this knowledge to help them in the test. Other participants noted that while they did not study Spanish, they knew simple Spanish words and sayings. The participants' prior knowledge most likely helped them in the test and must be noticed in results.

### Usability Results

All participants noted they liked the aesthetic of the system, particularly the color scheme as it allowed them to easily read and differentiate the answers. The participants also liked the questions and the range of knowledge tested. The overall flow was very appealing, and they enjoyed the simple and clean design. Most participants named the word pages as one of their favorite aspects of the system. They found the word pages to be very informative and unique. Each participant was asked to rate each aspect, and the results are shown below.

Word Page Elements Usefulness	Extremely Useful	Moderately Useful	Slightly Useful	Neither useful nor useless	Slightly Useless	Moderately Useless	Extremely Useless
Definition	5	-	-	-	-	-	-
Pronunciation	4	1	-	-	-	-	-
Video	-	2	1	2	1	-	-
Synonyms	4	1	-	-	-	-	-
Antonyms	1	1	2	1	-	-	-
Photo	3	2	-	-	-	-	-
Contextual Paragraph	3	-	2	-	-	-	-
Word Hook	2	1	2	-	-	-	-
Quotes	3	1	1	-	-	-	-

Participants all ranked most functions to be useful. In comparison to the other elements, the video received the lowest satisfaction score, with three participants saying it added no value and one saying it was slightly useless. They noted that the videos were quite long, and they did not want to watch a long video. One participant also noted the videos were all in Spanish, so they could not understand what was being said. Another aspect that received a lower score was the antonyms, mostly due to the participants not using them.

The most popular features were the definition, pronunciation and photo. These features are common sticky images that help users remember vocabulary. The lower scores in the elements are likely due to the participants not interacting with the word pages. Because the test was timed, participants hurried through the word pages, trying to get through as many questions as they could. Their need to hurry caused them not to explore the word page. The users also did not like how the word pages opened into new windows in their browsers. They found the transition between questions and the word pages to be difficult.

### Perceived Value Gained

The perceived value gained was assessed through questioning and the survey but was also compared to their actual retention tests. The retention test showed all participants improved and retained their target vocabulary. As seen in the chart below, all participants tested 100% on the post-test. The average pre-test score was 52% which increased to 100% by the post test. Generally all participants had similar levels of Spanish knowledge even though they had other foreign language experience.

Retention Tests	Spanish Level Test Score	Vocabulary Pre-Test Score	Recall Test Score	Definition Test Score	Vocabulary Post-Test Score
Participant 1	50%	50%	100%	100%	100%
Participant 2	30%	40%	100%	100%	100%
Participant 3	30%	90%	100%	100%	100%
Participant 4	50%	50%	100%	100%	100%
Participant 5	30%	30%	100%	100%	100%
Average	38%	52%	100%	100%	100%

The retention tests were to assess on a qualitative level how much each participant retained. While the results cannot prove the system will cause 100% retention, the results showed each participant improved from their initial scores. Every participant said they felt as though they improved their Spanish language skills, and their retention scores showed this. It is important to note that the retention could be natural in the test, given that the participants were exposed to the same words continually and respectively. However, the system does work off of a reinforcement model.

**Perceived Value Gained**

Perceived Value	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I feel like I learned a lot from using Word by Word.	-	-	-	-	5
I feel as though I could confidently use the words I have learned	-	-	-	2	3
I would recommend Word by Word to a friend	-	-	-	-	5
I would recommend Word by Word to a language professor / teacher	-	-	-	1	4

Following the completion of their test, the participants were asked about their agreement with the listed statements. Every participant strongly agreed with the statement: I feel like I learned a lot from using Word by Word. Participants noted throughout their tests how excited they were to continue. Both participant one and two noted how fun it was to learn Spanish and stated they were becoming “Spanish masters”. As participants progressed through their study sessions, team members observed that their speed and accuracy of answering the system questions increased. During the first session, participants often answered questions wrong. However, by session three, each participant rarely answered a question wrong.

The second statement: I feel as though I could confidently use the words I have learned, received two agree votes and three strongly agree votes. Participants noted they felt confident using them in context with an English sentence, but given their lack of Spanish language skills, they could not use it in a Spanish sentence. However, they did state they would be able to recognize and read the word. Since Word by Word did not teach them Spanish, this result is expected, and their ability to recognize, read and understand is the desired outcome as the system is designed to expand and enhance an already existing Spanish vocabulary.

The last two statements addressed the participants' willingness to recommend the system to their friends and their professors or teachers. All participants stated they would recommend the system to their friends. One participant said they would recommend to their teachers or professors, while the other four stated they would strongly recommend the system. Participants one and two both said how much they wish they had a system like this when learning French. Others noted they found it to be fun and thought their friends would also enjoy it.

## RECOMMENDATIONS

The Word by Word system was well received by all participants. Participants found the system to not only be fun but effective. All participants thought they learned from the system and were willing to recommend it to others. While the system was well received and received positive feedback, there are many areas of improvement for the usability and opportunity for future research.

### Usability and Design

Moving forward, the Word by Word team should look to fix simple coding errors related to placement and overlap. For some participants, the browser windows were smaller, causing the answers and timer to overlap. The overlap made it difficult to read the question answers. Another placement error was the clock. The clock moved depending on the viewer's screen size.

Another coding improvement the team should look to improve is the transition between questions and the word page. The team should explore how to make the transition smoother. Participants suggested the word pages transition from questions to word page without opening a new window. This would help lower the stress on browsers and make the process more seamless for the users.

The team must also research better ways to incorporate multiple languages. Participants were slightly confused with the English and Spanish translated questions. The balance between the English and Spanish language should be improved to afford better understanding.

### Further Research

Once creating a fully functional site, the team should look to expand the test to measure the actual retention of participants and usability. The test should look to test a wider range of users for an extended period of time. This test could include all levels of Spanish knowledge and test functions that were not available in this test beta version. The test could also be operated over a longer period of time to ensure vocabulary is retained longer than one week. For vocabulary retention testing, the team would need to test around 250+ participants for at least a month period. Such a test would be able to statistically predict the impact on a user's vocabulary knowledge. The completed usability and perceived value test offered the team valuable feedback and serves as a strong proponent for further development and research.

## Appendix

---

### 1.1 MODERATOR SCRIPT

#### Part 1:

##### *Start recording*

Thank you for volunteering for this usability test. During this test you are free to stop or leave when ever you would like. Each part of this test will be recorded for research purposes as well as responses . All data will be recorded anonymously and not shared beyond the team members. No names will be present in the final report.

This usability test is to better understand how users interact with the system. Throughout this test you will be working with a system called Word by Word. Word by Word is a foreign language vocabulary learning system that teaches users new vocabulary through individualized and integrative learning methods. Users will find that their foreign vocabulary will grow word by word, leaving them feeling confident in their chosen foreign language.

This usability test will take place in three sections, today, tomorrow and five days from today. Each part should take around 30 minutes. As you work through each aspect of this test, please verbalize your thoughts and actions. For example: I am choosing this because... *(Be sure to schedule future tests)*

All of the tests will ask for your Participant number, please enter #, when you see this.

The first task will be completing this Spanish Pre-Test. You will have unlimited time to complete this test. You will be shown ten words, some of which are real Spanish words, while others are fake.

Send link: [https://lvc.qualtrics.com/jfe/form/SV\\_6KxjyFA65bTva5L](https://lvc.qualtrics.com/jfe/form/SV_6KxjyFA65bTva5L)

Please select "Spanish" if the word is real, "not Spanish" if you do not think the word is Spanish. If you do not know, please select the "I do not know" option.

Please begin the test now.

##### *Once finished Recognition Test*

The next task is to complete the Spanish Pre-test. Please answer each question to the best of your knowledge, again there is a "I do not know" option, please use this if you truly do not know. We prefer you use I do not know.

Send link: [https://lvc.qualtrics.com/jfe/form/SV\\_4SKVQLxeqbgvp1r](https://lvc.qualtrics.com/jfe/form/SV_4SKVQLxeqbgvp1r)

##### *Once finished Pre-Test*

Now please navigate to the Word by Word site, using this link. This link is unique to you and should not be shared or used outside of these testing time periods.

Please select a 15 min, study session and work through the system until your session is complete.

*Once finished with session, ask the participant the following question and write down their response.*

- How was your session?
- What is your impression of the system so far?

Thank you for participating in part one of this usability test. We will meet again tomorrow at \_\_\_\_ for the next part of this test.

### **Part 2:**

Thank you for participating in part 2 of this usability test. Your first task is to complete this quiz.

Send link: [https://lvc.qualtrics.com/jfe/form/SV\\_5btRIR1nLTB95ml](https://lvc.qualtrics.com/jfe/form/SV_5btRIR1nLTB95ml)

Today you will be completing a 10 minute session on Word by Word. Please follow your link and select a 10 minute session.

Thank you for a participating in part 2 of this usability test. Part 3 will happen on \_\_\_\_\_.

### **Part 3:**

Thank you for participating in part 3 of this usability test. Your first task is to complete this quiz.

Send Link: [https://lvc.qualtrics.com/jfe/form/SV\\_03uFCCeGoUALWC1](https://lvc.qualtrics.com/jfe/form/SV_03uFCCeGoUALWC1)

Next you will be completing a 5 minute session on Word by Word. Please follow your link and select 5 minute session.

Your final task for the test will be completing your Post-Test.

Send link: [https://lvc.qualtrics.com/jfe/form/SV\\_1GtoUQeLj8Cz45n](https://lvc.qualtrics.com/jfe/form/SV_1GtoUQeLj8Cz45n)

Thank you for completing this usability test.

Please fill out this experience questionnaire. Please answer truthfully and honestly. Your feedback is greatly appreciated.

Send link: [https://lvc.qualtrics.com/jfe/form/SV\\_9LIT5P5Ji38CrY1](https://lvc.qualtrics.com/jfe/form/SV_9LIT5P5Ji38CrY1)

Thank you for participating in this usability test.



## 1.2 SPANISH LEVEL TEST WORDS

5 NEW real ones: joven, decir, después, la fecha, la montaña

5 FAKE ones: la wocána, el tobulo, feber, harpar, esalarmente

## 1.3 Spanish Vocabulary Pre-test and Post-test Questions

1. Choose the item which best fits in the blank space.

She would always carry her things with her in her backpack.

Ella siempre llevaba sus cosas con ella en su \_\_\_\_\_.

- a. **mochila**
- b. taza
- c. libro
- d. I don't know

2. Choose the letter of the definition which comes closest in meaning to the word *la casa*.

- a. small carved or wooden figure
- b. large piece of material used as a bed covering or other covering for warmth
- c. **building for human habitation and shelter**
- d. I don't know

3. Which situation is the most appropriate to be *silencioso*?

- a. dancing at a party
- b. hanging out with a friend
- c. **taking a test**
- d. I don't know

4. Choose the item which best fits in the blank space.

It is a good idea to get outside for some Vitamin D once in a while.

Es una \_\_\_\_\_ idea salir a tomar algo de vitamina D de vez en cuando.

- a. bonita
- b. **buena**
- c. triste
- d. I don't know

5. In order to *abrir* a jar of peanut butter, you must:

- a. put the lid back on
- b. **take off the lid**
- c. examine the jar thoroughly
- d. I don't know

6. What could be considered a synonym for *comer*?
- consumir**
  - habitar
  - enfermarse
  - I don't know
7. What could be considered a synonym for *rápidamente*?
- lentamente
  - espacio
  - aprisa**
  - I don't know
8. Choose the item which best fits in the blank space.
- Leave your tooth out there for the tooth fairy.
- Deja tu diente ahí \_\_\_\_ para el hada de los dientes.
- lejos
  - muy
  - fuera**
  - I don't know
9. Choose the item which best fits in the blank space.
- This is where I have worked for the past ten years.
- Aquí es \_\_\_\_ he trabajado durante los últimos diez años.
- quien
  - donde**
  - que
  - I don't know
10. How is the word *quien* typically used?
- to question one's thought process
  - to state one's location
  - to indicate one's identity**
  - I don't know

## 1.4 VOCABULARY RECALL TEST QUESTIONS

Real ones (used already in WbW): la mochila, la casa, silencioso, bueno, abrir, comer, rápidamente, fuera, dónde/donde, quién/quien

5 NEW real ones: dibujar, sano, la galleta, el jefe, antes

## 1.5 VOCABULARY MEMORY TEST QUESTIONS

**La mochila:** a bag with shoulder straps that allows it to be carried on one's back

**Dónde/donde:** in or to what place or position

**Rápidamente:** at a fast speed

**Fuera:** situated or moving beyond the boundaries or confines of

**Bueno:** to be desired or approved of

**La casa:** a building for human habitation and shelter

**Abrir:** to move or adjust so as to leave a space allowing access and view

**Quién/quien:** what or which person or people

**Silencioso:** not making or accompanied by any sound

**Comer:** to put food into the mouth and eat and swallow it