An Audio-Lexicon Spanish-Nahuatl: using technology to promote and disseminate a native Mexican language

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Abstract. This research focuses on the design of resources for both reappraising the knowledge of a native language for those who speak or have notions of Nahuatl, and getting familiar with terms for those who do not speak this language. An audio-lexicon Spanish-Nahuatl, ALEN, was developed taking advantage of new technologies, especially mobile devices and gadgets, as an opportunity to reach children and youth mainly. A beta version of ALEN has been tested by volunteers with very promising results. Examinations of knowledge of Nahuatl language before and after one week of use of ALEN have shown that most volunteers improved their vocabulary.

Keywords: native language learning, endangered languages, mobile devices.

1. Introduction

Nahuatl is a Native American language with the largest population of speakers in Mexico, nearly 1.5 million people – that represents 1.7% of the total population over five years (INEGI, 2000) – speak Nahuatl. As mentioned by Monzón (1990), "Nahuatl is the result of a continuous and long history of communication creativity" (p. 11). It was the dominant language in the center of Mexico before the Spanish conquest by the mid-fourteenth century. Nowadays Nahuatl is mainly spoken by marginalised groups.

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Diverse efforts are made around the world to preserve and disseminate endangered languages, since languages have a major role in the cultural heritage of mankind. For instance, the declaration of an International Mother Language Day by the United Nations Educational, Scientific and Cultural Organization (UNESCO), whose goal is to encourage linguistic and cultural diversity in the world and raise awareness about the 3,000 of the 6,000 languages spoken in the world that are endangered to a greater or lesser degree (UNESCO, 1999).

There are different ways to contribute to safeguarding endangered languages; from the promulgation of public policies and laws to preserve and promote minority languages to the generation of linguistic resources oriented to these minorities. This research deals with the latter effort, the design of resources for both, reappraising the knowledge of a native language for those who speak or have notions of Nahuatl, and getting familiar with Nahuatl terms for those who do not speak it.

Since this research aims to reach children, teenagers, and young adults, Nahuatl resources are developed taking advantage of new technologies, especially mobile devices and gadgets. For that, an Android based application called ALEN (from its Spanish acronym that means Audio-Lexicon Spanish-Nahuatl) has been developed and tested. ALEN comprises a database of 132 words in Spanish and Nahuatl, with both written and oral modalities, homemade illustrations and word-search capabilities.

As a preliminary step for testing with the intended users, a beta version of ALEN has been tested by volunteers, with aim of fine tuning it. These volunteers completed a Nahuatl knowledge examination twice, before and after the testing period. Volunteers also completed a test which revealed that the preliminary version of ALEN was useful to get familiar with Nahuatl notions.

2.   The Audio-Lexicon Spanish-Nahuatl

The application was created using Android Studio, the official IDE for mobile application development based on IntelliJ IDEA[4]. Overall, the ALEN application runs locally and once installed, it does not create files or require access to services and resources such as the phone network, WiFi or Bluetooth connectivity. There are more than twenty Nahuatl variants in Mexico, but the variant with the largest

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4. Android Studio and SDK, https://developer.android.com/intl/es/sdk/index.html

number of speakers is that of the north of Veracruz. This is the Nahuatl variant included in the project.

2.1.   Android app

The ALEN application has a simple interface, which allows the user to enter text in Nahuatl or Spanish. There are two buttons, one used to find the written word in the text box and the other to reproduce the pronunciation of the word when found. At the center of the screen, an image illustrating the concept related to the word is displayed. Figure 1 shows the interface of the application running on a cell phone and a tablet.

Figure 1.   ALEN interface in two devices
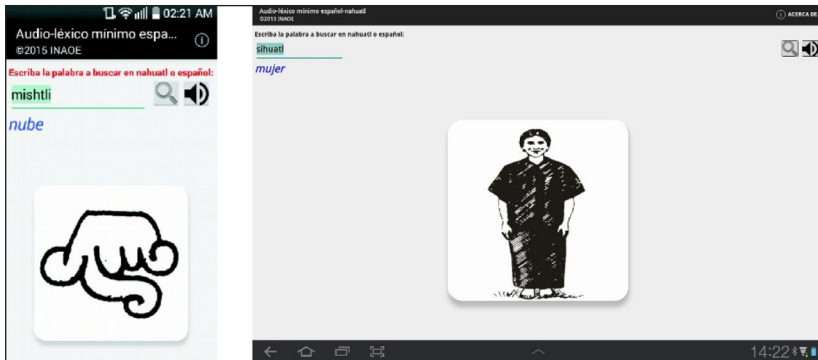
2.2.   Experimental settings and analysis results

One dimension of the ALEN application was evaluated: how useful it is for reinforcing and acquiring vocabulary of the Nahuatl language. The procedure completed by the volunteers that participated in the study was as follows: (1) creating an access account on the website of ALEN; (2) completing an initial examination of knowledge of Nahuatl language; (3) installing the application on their mobile devices; (4) using the application as many times as possible during one week; and (5) completing a second examination of knowledge of the language.

The online examination of knowledge of Nahuatl language was specially designed for this study. Nahuatl being a native Mexican language, it has been in constant contact with Spanish, the language commonly spoken in Mexico. For that, Mexicans are familiar with some Nahuatl words and it is important to measure any notion of Nahuatl that our volunteers might have.

The examination of knowledge of Nahuatl comprised 15 questions. The first ten were aimed to achieve word pair association; in the first column Nahuatl words were listed, and in a second column Spanish words were presented, sorted in a different order. The latter five questions were intended to assess listening skills. Each question included an audio recording of a native Nahuatl speaker, and a window for writing the word heard by the user. Volunteers received one point for each question properly answered and there were no time constraints to complete the examination. The set of 132 words within ALEN was used as the battery for randomly generating the examinations of knowledge of the language.

2.3.   Participants

A total of 11 volunteers participated in the evaluation of the beta version of ALEN, nine men and two women, of ages 29.6 ± 7.3 years. All the volunteers were native Spanish speakers. They gave their informed consent to participate in the study.

3.   Results

Figure 2 depicts the comparison of number of points scored by volunteers in the first and second examination of knowledge of Nahuatl. Note that most users achieved clear improvement in their Nahuatl vocabulary after one week using the mobile application. In effect, 82% of volunteers improved their knowledge of Nahuatl. This result might also be related to the frequency of use of the application, with 73% of volunteers reporting the highest values of use frequency, i.e. between ten to 30 times, meaning they used ALEN at least once every day, on average.

Figure 2.   Points scored by volunteers in first and second examination
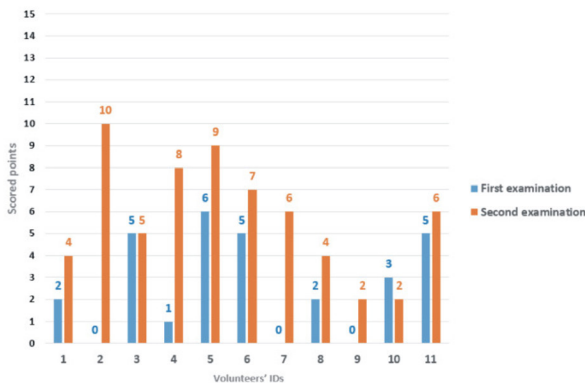
4.   Conclusions

The goal of this research is to contribute to safeguarding endangered languages, namely the Nahuatl language, by developing tools and resources for their preservation and dissemination. Also, we look to develop these resources by taking advantage of the capabilities of mobile devices that are especially popular among young people.

We have described the design of the ALEN application, an Audio-Lexicon Spanish-Nahuatl whose beta version has been evaluated by 11 volunteers with encouraging results in terms of scores of improvement of vocabulary. Most volunteer users of the ALEN application improved their Nahuatl vocabulary, and also most of them frequently used the application during the test period.

In the near future, we will extend ALEN with an option for a spoken search to improve user interaction. This extension requires the processing of audio inputs, as well as the extraction of relevant features to be compared with pre-processed models of those words in the lexicon. We will also increase the set of words of the application, and finally we will include other variants of Nahuatl.

5.   Acknowledgements

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