

Educational Mobile Application for Self-Learning the Mayan language

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Abstract: Teaching and learning indigenous languages using technology has been a very poorly addressed topic, there are only a few tools that exist in this regard, despite the efforts that have been made to preserve and strengthen the Mayan culture, mainly in the State of Yucatan, Mexico. This paper describes the development of an educational software designed to assist in the learning of the Mayan language in an autodidact and interactive way, through a mobile application that incorporates text, image and audio, with vocabulary, grammar and pronunciation activities. The objective of this work is to describe a methodology to develop educational mobile applications incorporating an element of gamification: history. With this new tool is intended to teach Mayan as a second language at an early age, since humans beings acquire their most significant and transcendent knowledge during childhood.

Keywords: Educational Software, Mayan Language, Mobile Application, Gamification.

I. INTRODUCTION

Currently, the globalization phenomenon has permeated all corners and has made a large portion of cultures to evolve. However, just as there are cultures that revolutionize and cross borders, some others are disappearing. And since language is the medium that allows us to communicate with others and interpret the world, it is very important to preserve it. The great influence that technology has in all areas and geographical corners is evident. The didactic tools that promote learning from playful and interactive environments have been widely accepted and have a potential still to be fully exploited. According to Quero and Ruiz (2001), the use of computers in education has a highly motivating effect for the achievement of learning. Thus, Information and Communication Technologies (ICT) could be very useful for the goal of preserving the Mayan language. Today there are dictionaries in electronic format, automatic translators, computerized linguistic atlases, educational software of various kinds (Cox, 2010), although very few of these materials are oriented to learn the Mayan language. Likewise, there is a prevailing necessity to preserve and promote the autochthonous languages that constitutes a humanity heritage, so that they do not get lost as it has been happening with other indigenous languages (UNESCO, 2011) cited by (Ucán and Montalvo, 2012), which add up to more than 3000 worldwide, among which is the Mayan language. In Mexico, of the 62 original languages, it is estimated that 20 are in the process of disappearing, which is why in November 1999, at the "International Mother Language Day", UNESCO proclaimed that one of the primary objectives of the nations must be the practice and preservation of their native languages (Victorio, 2010). According to a census (INEGI, 2010), in Yucatan there were 537,516 persons over the age of 5 years who spoke the Mayan language. Among the indigenous languages that exist in the country, the Mayan language has some priority since its long history of writing and literature is a unique case, due to all the richness that the Mayan culture contains (Brody, 2007).

II. THEORETICAL FRAMEWORK

A. *Mayan Language*

In Mexico, intercultural bilingual education became official in 1978, and since then the indigenous mother tongue of students has been used and typical elements of their culture have been rescued to adapt the educational process to their characteristics and needs. However, the scarcity of applied research that guides educational actions is a limitation to the progress that have been achieved (Zúñiga, 1989). Thus, the pursuit for the integral development of students continues through quality processes for the development of their own cultural identity (Guatemala, 2009). In this sense, much remains to be done to improve overall productivity and to achieve a more effective and inclusive school. Books such as Popol Vuh, the Chilam Balam books, the Ritual of the Bacabes, the Book of the Dzibalché Songs, are examples of texts that demonstrate the high degree of development that has been achieved regarding the use of the Mayan language (Gómez Navarrete, 2005).

B. *ICTs as supporting tools*

ICTs become an indispensable element for educational institutions (Marqués Graells, 2012) as a result of being a means of expression, a communication channel or an instrument to process information. In some countries such as Chile, software and ICTs are considered new pedagogical strategies to promote the use and conservation of indigenous languages, since they strengthen the identity and improve the learning of children (Claro, 2011). In other countries such

as Guatemala, it has been produced software that translates into Mayan languages, and virtual guides, in order to avoid the disappearance of more mother tongues, mainly the Mayan language (Sandoval, 2012).

In Mexico, software of this nature has also been developed, particularly in Yucatan, the videogame "Mayan kambal" was created, which stimulates among children simultaneously the learning of the Mayan language and basic concepts of crystallography (UNION, 2015).

Another similar tool that is oriented towards social networks is called "MayaWhatsApp", which proposes mini classes by means of brief recorded videos that are intended to be shared on the web (El Chilam Balam, 2015).

There are also dictionaries in electronic format, automatic translators, computerized linguistic atlases, educational software and some web pages that allow to achieve a certain level of communication with the Mayan speaking people. However, these tools lack interactive environments designed specifically for mobile devices and do not have a didactic sequence with gradual advances, as is desirable given the characteristics of today's society in which all subjects are in constant movement and with multiple occupations.

In addition, having such powerful mobile smart devices available anytime and anywhere offers enormous opportunities for educational use. And as long as portable audio-video and computer devices exist, there will continue to be interest in exploring their use in language learning, as pointed out by Robert Godwin-Jones (2011).

In this sense, teachers are increasingly aware of the need to attract the attention of students during the teaching of a topic to achieve the greatest possible understanding; on the other hand, students tend to look for more efficient and easily acquired study methods. This leads to creating methodological strategies that cover the needs of both teachers and students. Technological advances can help to effectively achieve their objectives with methods that are innovative, attractive and easy to implement (de los Santos, Fonseca, Pérez, y Pérez Torres, 2014).

A study carried out in 2013 by researchers from the National University Heredia of Costa Rica indicates that with the use of ICTs, students and teachers of programs that work with a second language are more likely to effectively learn (Chacón & Badilla, 2013).

C. Learning a second language

Until a few decades ago, the tradition of teaching the dominant indigenous language was notorious in the Yucatan Peninsula, where Mayan was learned within the family as part of their culture of rural communities, and was strengthened by the systematic education of schools. However, this has changed very much in recent years, schools stopped giving certain classes in the Mayan language, and families stopped using it as the main language at home.

This study mentions some observations made by the author that, in almost all the communities of the State as well as in their cities, there is a refusal of parents to have their children speak an indigenous language since they believe it is a setback to civilization, to life and culture, even worse if their children are interested in the literature of the indigenous language, likewise in the State there are teachers with a negative towards the culture, who encourage in children the idea of inferiority of the Mayan language (Pat Tzab, 2007).

A study conducted on children between 9 and 13 years of age, in 1995, in the community of Hunucmá, Yucatán, mentions that it is in childhood when the teaching of a second language is more successful, due to "the lack of knowledge", such as the author calls the learning that occurs naturally at the beginning of our life.

The process of early teaching a second language gives children the possibility of developing greater freedom of expression.

Due to the above, it has been considered to guide the mobile application created for learning the Mayan language towards a child audience.

III. DEVELOPMENT

The developed application that this paper describes starts from considering that learning a second language, such as Mayan, requires a combination of textual and audible elements, which is why in the area of computer sciences is desirable to develop an application that has visual, sound and interactive elements.

The design and development of the application followed the RAD methodology, based on the use of iterations and the handling of prototypes. It is an adaptation of the sequential linear model for periods of time generally short, subdivided into small sections, which will be progressively optimized so that the development advances much faster (Pressman, 2002).

The carried-out development followed a recognized process as part of its software development life cycle, which consists of the stages described below.

A. Analysis of Requirements

An investigation was made about the current situation of the Mayan culture, as well as the way of attracting the attention of children towards the learning of this. Android studio was used during the design and programming of the application, since it was considered as the most suitable tool for the development of the application, due to its graphic interface and available libraries that are already incorporated in that software.

B. Study and approval of topics

The selection of topics was made based on the suggestions made by Collí (1975). The most common topics were used, such as: family, body parts, animals, cities and time. Among them the teaching of vocabulary, pronunciation and writing was considered and included. Some other activities were included too, such as: word identification exercises in Mayan or Spanish, completing sentences by selecting the correct word or writing it, as well as audio identification exercises, in which a word are pronounced by the software, then the user listens, recognizes and writes it.

C. Design

During the design phase, different interfaces were sketched, for which there were used images designed with the free software Inkscape 0.91. It was taken into account that the application would be easy-to-use for users, which includes its accessibility and usability, as well as a user-centered design.

Figure 1 shows some screens designed for the application, and Figure 2 illustrates the components of the same.

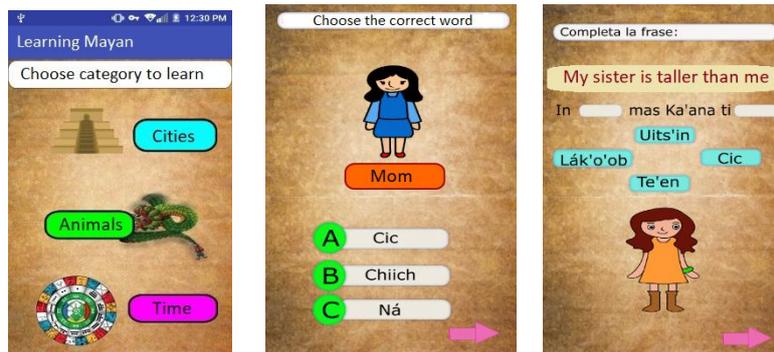


Fig. 1. Application screens, in which some vocabulary teaching activities can be appreciated.

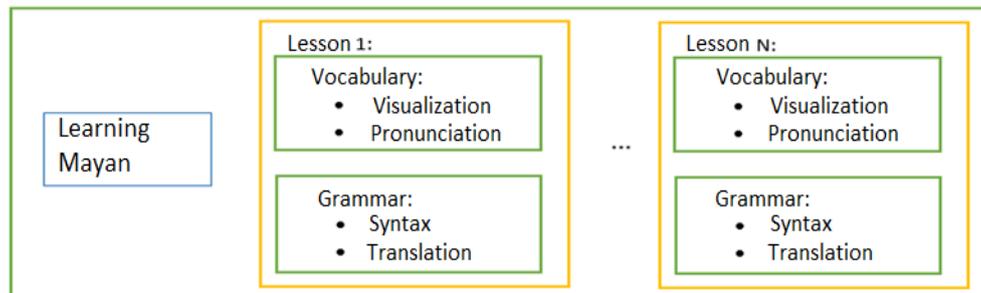


Fig. 2. Each lesson includes a vocabulary and a grammar, whose complexity level increase as the user advances in the application.

D. History

To improve the learning process of infants, it was decided to incorporate a story, such as it is suggested when working with elements of gamification (Foncubierta y Rodríguez, 2015). Therefore, in order to keep their attention, the story of a child named "Huicho" was created and implemented. In the story, Huicho is a boy from Zací (Valladolid), who recently met "Wiro", a boy from the city who came to live in the town. Wiro does not know how to speak the Mayan language, in contrast with all the other children of the town, so his friend Huicho will teach him. The user will accompany Huicho in his adventure of teaching the Mayan language to his friend.

E. Development of the application

For the development of the mobile application, Android Studio version 2.1.2 was used, which is an IDE (Integrated Development Environment) to program for the Android platform. The images used were designed with Inkscape 0.91. Upon entering the application, the user is presented with the opportunity to choose the lesson that he/she wants to learn, then the levels of learning are shown with enumerated circles, of which 1 is the vocabulary, 2 is choosing the correct words, 3 is to complete sentences by choosing the missing word, 4 is completing sentences writing the missing word by choosing letters, and 5 is to listen the word and choosing it among those shown.



Fig. 3. Screens of the application, level of vocabulary.

Currently there are 5 lessons implemented: family, body parts, animals, cities and time. Subsequently, it is intended to continue incorporating more lessons according to the themes suggested by Collí (1975) and maintaining the playful approach that the application incorporates.

IV. CONCLUSIONS AND FUTURE WORK

This work has presented a software that helps in the teaching of indigenous languages, specifically the Mayan language, learned as a second language. The software was implemented as a mobile application, which includes a combination of elements, conjugating visual, sound and interactive elements. With this tool is intended to contribute in the preservation and dissemination of the Mayan language. Likewise, this tool is intended to be useful both for Mayan speakers and for Spanish speakers, promoting communication between them. The described methodology incorporates a characteristic element of gamification: history, which aims to encourage users and give them a meaning or reason for their interaction. As future work is considered the inclusion of a database for the management of sound files, images and text related to the used words, in such a way that the growth of the application is facilitated, with the inclusion of new words and new lessons to learn.

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