# Designing a Digital Keyboard for Itunyoso Triqui

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## Abstract

In this paper, I outline the process of creating a mobile keyboard for Itunyoso Triqui, an endangered indigenous language of Southern Mexico. Literacy in Itunyoso Triqui is low, and speakers do most of their texting and typing in Spanish. The language's complex lexical tone system and many multigraphs make typing on a typical QWERTY mobile keyboard difficult. This keyboard offers several innovative features to make typing in Triqui more idiomatic, including multigraph keys and several options for tone input. By allowing for more convenient typing in Triqui, this keyboard enables speakers to use Triqui over Spanish in day-to-day typing and texting, which helps bolster language vitality and literacy. The case of Triqui is not unique. Many minority language speakers use a dominant language for typing and texting; dominant languages have better language tools, due to having a larger potential userbase and therefore more resources for development. By creating tools for minority languages that are idiomatic to each language and convenient to use, we can encourage their use in digital contexts, increasing literacy and vitality of minority languages more broadly.

## 1 Introduction

As technology use increases and more and more communication is done online through text, there is an increased demand for digital tools that serve endangered language communities. In this paper, I discuss the process of developing a mobile keyboard for Itunyoso Triqui, a minority language spoken in Southern Mexico.

Itunyoso Triqui is one of three Triqui varieties, spoken by roughly 2500 speakers in and around San Martín Itunyoso, Oaxaca, Mexico (DiCanio, 2010). Its orthography uses a modified Latin script, with many multigraphs and accent marks to represent its complex tone system.

Fluent literacy in Itunyoso Triqui is low (1-2%). There have been recent efforts to establish literacy programs, but they are currently on hiatus due to political and economic conditions in the area. Many speakers use at least some digital technology (usually a smartphone), and day-to-day writing and texting is usually done in Spanish, due to low literacy and the relative difficulty of texting in the language.

In creating a digital keyboard for Itunyoso Triqui, we aim to help speakers to practice literacy and use the language in everyday texting and writing. This project is inspired by the TZ'IB'MA project (Mateo Toledo 2022), which created mobile keyboards for several Mayan languages, including Q'anjob'al, Kaqchikel, and Mam, which helped speakers text more easily in their languages.

## 2 Digital Tools for Minority Languages

Modern language technology development exists in a feedback loop. Because dominant languages have a larger userbase, language technology more likely to be developed for them. Subsequently, bilinguals gravitate toward dominant languages in texting due to their higher-quality, more convenient tools (van Esch et al., 2019). Creating tools for minority languages allows to use their language in text as well as speech, helping both literacy and language vitality.

Texting is an essential part of modern literacy; for many people, the majority of their day-to-day writing is over text. A well-designed keyboard that is idiomatic to a language is helpful for both literacy and language revitalization programs, as it

allows students to practice the written language in day-to-day, spontaneous conversation.

Creating tools for marginalized languages also helps to chip away at the feedback loop, by creating an existing user base for these languages. While private companies currently have little economic incentive to make these tools, academic projects can help fill that gap and seed further development. Digital language technology is another way that linguists can contribute materially to the communities of languages they document.

In designing language tools, one should make them convenient and idiomatic to a language, in order for speakers to want to use them. The desire to use one's native language can only overcome so much frustration with poorly made tools. Therefore, a language's orthography and linguistic structure should be taken into account when making language tools.

## 3 Keyboard Development

In creating this keyboard, there were several requirements aimed at making the keyboard easy for speakers to adopt. First, the keyboard should be easy to access and install, without advanced technical knowledge. Second, the keyboard should be beginner-friendly; it should be easy and intuitive to use, even without technical knowledge, and it should be usable even without perfect literacy, as part of its use case is in teaching literacy. Lastly, it should be convenient and idiomatic to Triqui; the multigraphs and accent marks that are easy to input.

The keyboard was made using Keyman by SIL, a program for creation of custom keyboards. To install, users download the Keyman mobile app from the App Store or Google Play Store. (The keyboard is only designed for mobile use, as mobile phones are much more common than computers in the community). Users can install the keyboard within the Keyman app, without a technical installation process, and the keyboard works system-wide. The keyboard also includes a predictive text feature, trained on corpus data.

Itunyoso Triqui has a highly complex tone system, contrasting five level tones and four contour tones. The five level tones /$a^5$ $a^4$ $a^3$ $a^2$ $a^1$/ are written with single vowels <á á a à à>, and the four contour tones /$a^{43}$ $a^{32}$ $a^{31}$ $a^{13}$/ are written with double vowels

<áa aa aà àa> (Note that the pairs /$a^5$ $a^4$/ and /$a^1$ $a^2$/ are not distinguished in the orthography). Because of the high functional load of tone, nearly every word has one or more accent marks, and accents cannot be omitted without sacrificing comprehensibility.

A standard QWERTY mobile keyboard requires long-presses to input accents. This keyboard offers long-press accent input as well as several other options that are more idiomatic. These include deadkeys, swiping up and down on vowel keys, a predictive text feature, and a novel method for inputting and correcting accents on already-typed words. We expect the predictive text to be the main input method for accents, and the accent correction feature allows for manually adding accents to words that the predictive text could not predict correctly, without having to delete the entire word.

Many common segments are written with digraphs, with <kw nd ngw ngw ts ch chr cn> representing /$k^w$ $^nd$ $^ŋg$ $^ŋg^w$ $\widehat{ts}$ $t\int$ $\widehat{t\underset{\sim}{s}}$ $^c\rm{n}$/, respectively. This keyboard includes keys that input a multigraph in its entirety, replacing keys in the QWERTY layout for letters that are not used in Triqui (e.g. <kw> replacing <w>, <ch> replacing <c>). This phonemic layout with multigraph keys was inspired by a similar approach used in the TZ'IB'MA project (Mateo Toledo 2022).

In addition, most consonants can be geminated, indicated with a double letter. While this is straightforward to type for unigraph consonants (e.g. /k~k:, β~β:/ <k~kk, b~bb>), this can be cumbersome when the singleton consonant is already a multigraph (<kw~kkw, ch~cch, chr~cchr>). This keyboard has a text replacement feature that allows for typing of any geminate with a double tap, including multigraphs (e.g. <kw><kw> to type <kkw>).

## 4 Distribution Efforts and Future Goals

As of May 2025, the keyboard has 272 downloads, representing roughly 11% of Itunyoso Triqui speakers. In the future, the keyboard will also be incorporated into the literacy program when it resumes, and continually updated based on user feedback.

By designing the keyboard around the orthography and linguistic structure of Itunyoso Triqui, and giving users multiple options to find what works

best for them, this project aims to make typing in Triqui as convenient as typing in Spanish, even with limited resources and funding. We hope that the availability of this keyboard will increase the use of Triqui in day-to-day texting and writing, improving literacy and language vitality.

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