

TICHA: *Caseidyneën Saën*—Learning Together

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Introduction: Zapotec are tonal languages with approximately 50 closely related indigenous Mesoamerican languages belonging to the Oto-Manguean family. Zapotec is spoken in the southwestern-central highlands of Mexico. The majority of speakers are found in the state of Oaxaca and in Zapotec-neighboring speaking communities, such as Puebla, Veracruz, and Guerrero. According to the 2020 census, nearly half a million (490,000) people speak Zapotec, with the majority inhabiting the state of Oaxaca. Additionally, labor migration brought a good number of native speakers of Zapotec to California and New Jersey in the United States. It is difficult to classify all Zapotec varieties since they have several names and are not well studied (Ethnologue).

Ethnologue lists 58 different categories which fall under broad groups, such as Northern Zapotec (spoken in the northern mountainous region of Oaxaca), Valley Zapotec (spoken in the Valley region of Oaxaca), Southern Zapotec (spoken in the Southern Sierra Madres mountain ranges of Oaxaca), Isthmus Zapotec (spoken in Isthmus of Tehuantepec). All variants of Zapotec are considered endangered with some being critically endangered, severely endangered, or definitely endangered. According to Lillenhagen, the variety spoken in Tlacolula de Matamoros is critically endangered, with only about 100 elderly speakers remaining. Valley Zapotec (the variety for this project) falls under the definitely endangered category, which reflects the need to document and preserve the language. All varieties of Zapotec share some basic phonological and structural similarities, but there are multiple differences and some of them are mutually unintelligible. The Zapotec script is one of the earliest writing systems in Central America dating back to 500 B.C.E. Early Zapotec writing used a logographic system, but it was not until the end of the 16th century that people began writing Zapotec languages using the Latin alphabet (e.g. writing system for Spanish or English).

Most speakers of Zapotec are bilingual (Zapotec, Spanish), in which they can navigate between “two different linguistic worlds.” There has been a shift in language use since many speakers have opted to switch to a global tongue (Spanish) to avoid issues of prejudice and discrimination. These speakers are actively resisting linguistic and cultural threats that endanger their native languages, such as discriminatory beliefs and behavior that deny, devalorize and jeopardize the Zapotec language, people, culture, and knowledge. Chávez Santiago, a Zapotec speaker, mentions during a project interview about the prospect of Zapotec language endangerment how many families have left the community “for economic or family issues...and now they don’t speak Zapotec anymore” (Felker, 2016).

Previous Work on Zapotec: There are a plethora of resources on the Zapotec language, such as dictionaries and grammar, books, texts, recordings, etc. that provide a basic understanding of the language. As previously mentioned, it is difficult to capture every aspect of Zapotec languages since they are tonal languages and there are no specific writing systems to distinguish between all phonetic, grammatical, and lexical features. I compiled an extensive list of different resources that can contribute to language teaching as well as language revitalization. (See Appendix A for a full list of resources) (See Appendix B for works written in Colonial Valley Zapotec)

TICHA Project: The TICHA project was founded and is funded by Haverford College, Tri-Co Digital Humanities, National Endowment for the Humanities, Hurford Center for the Arts and Humanities, American Council of Learned Societies, and the American Philosophical Society. This current project is named TICHA, which means word, language, and text in Colonial Valley Zapotec. During the colonial time of Mexico (1521-1821), the Zapotec people wrote their wills, receipts, religious materials, deeds, letters, and other legal documents in their own language. Native Zapotec speakers wrote many of these documents by other native speakers (e.g. local administrative texts). Additionally, many texts were written to be used by Spanish-speaking priests and could have been created in collaboration with Spanish speakers. Many of the colonial texts are still in existence, preserved and scattered around the world in archives and libraries. Even though there are hundreds of documents in Zapotec, they are difficult to find because they are not accessible. Also, many of the manuscripts are not located where they were originally written. Many are stored and preserved in archives in Mexico City and in the United States. This is problematic since the metadata does not mention the language in these documents were written. As a result, it is difficult to find and locate texts written in the Zapotec language in an archives catalog.

The Zapotec corpus has numerous texts—the first being from 1565. They are not accessible to people in other parts of the country (Mexico) or the world since they are paper documents and are not digitized. This project faces multiple challenges. For example, some of the documents are damaged, deteriorated with tears, and exposed to humidity. Ticha has a corpus composed of scanned documents with a range of low, mid, and high resolution. Furthermore, reading Zapotec texts can be quite difficult even for modern native speakers of Zapotec languages. These texts are handwritten in cursive which is hard to decipher because the languages have evolved and changed in the past 500 years.

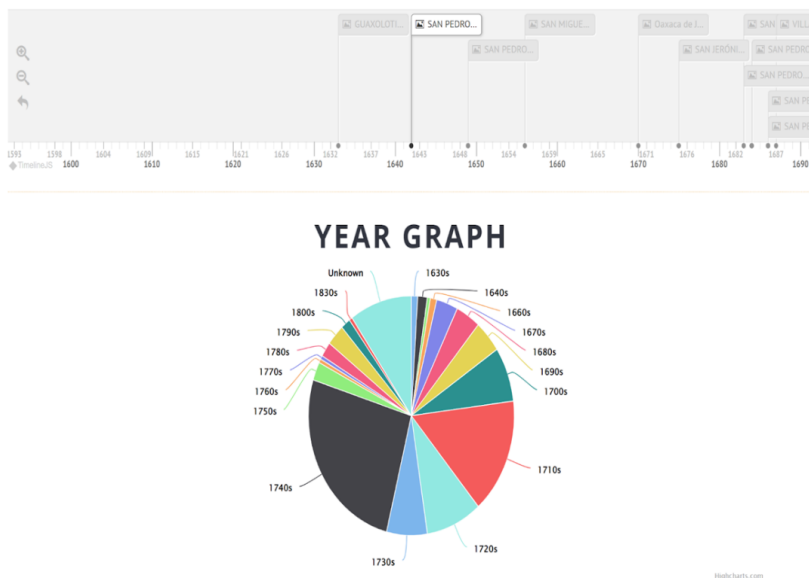
The TICHA project was founded with the main goal of making these historic documents more accessible to the community. This corpus is important to document since it contains rich linguistic, historical, and anthropological information. The project provides images of various documents accompanied by metadata, transcriptions, translations, and other contextual information. On TICHA, an image and metadata are provided for each page of a manuscript. The metadata of each document provides information, such as the type of the document, language, when and where it was written, people cited in the manuscript, and the archive where it is stored.

The current TICHA website under Haverford College is active and anyone can access it online. Users have open access to all documents and can navigate through all the tabs to see translations, transcriptions, metadata information, and downloadable PDFs of original documents. Additionally, the website is user-friendly since it provides various ways to find other documents or specific ones. Users can click on the top-center ‘Explore’ tab to find specific details about the project or documents and filter them by time period using a timeline or by location using a map. In the ‘Text’ tab, users can access a full list of all available manuscripts, and they can sort them out by metadata, specific labels, or another type of criteria. Under the same tab, users can view books written in or about Zapotec, such as the *Arte en Lengua Zapoteca*, and a *Grammar of Colonial Valley Zapotec* written by a Spanish priest. Readers can select any of these larger texts and explore using the outline feature, and look between the original text and a modern Spanish or English version of the same text. Furthermore, users can locate Zapotec words in the transcription of the text and see translations, pronunciation, and more details about each word.

TICHA allows users to access and explore many interlinked layers of these manuscripts, which includes images of the original documents, transcriptions, and translations into English and modern Spanish. It also includes a linguistic analysis of morphological and interlinearization as well as commentary. TICHA incorporates data analyzed in FLEx (Fieldworks Language Explorer), which is a system for lexical and grammatical analysis. This project also uses TEI standards (Text Encoding Initiative) for paleographic and translational representation of texts.

Manuscripts Metadata: The TICHA website allows to have all metadata organized by categories of manuscripts (e.g. year, language). The following section will provide a breakdown of how these categories are displayed.

Timeline: This feature allows users to navigate through all completed and checked manuscripts and pinpoint where they were originally written based on the document's metadata. The project uses HighCharts for the timeline and the pie chart. *Figure 1* shows how the years are displayed on the website.

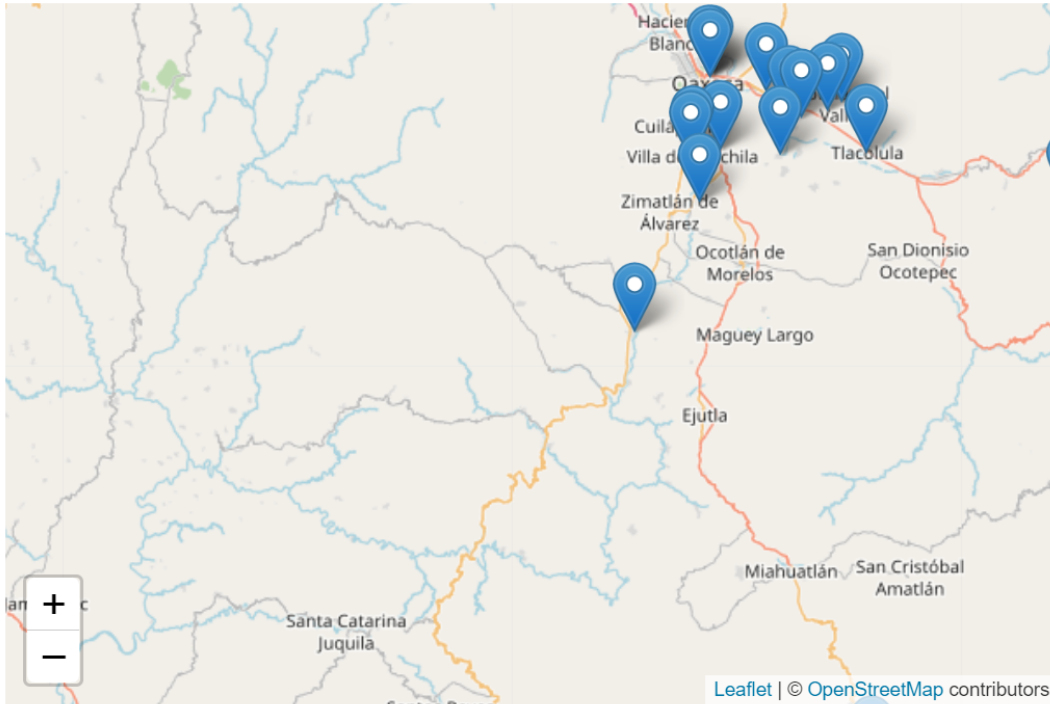


Year Statistics

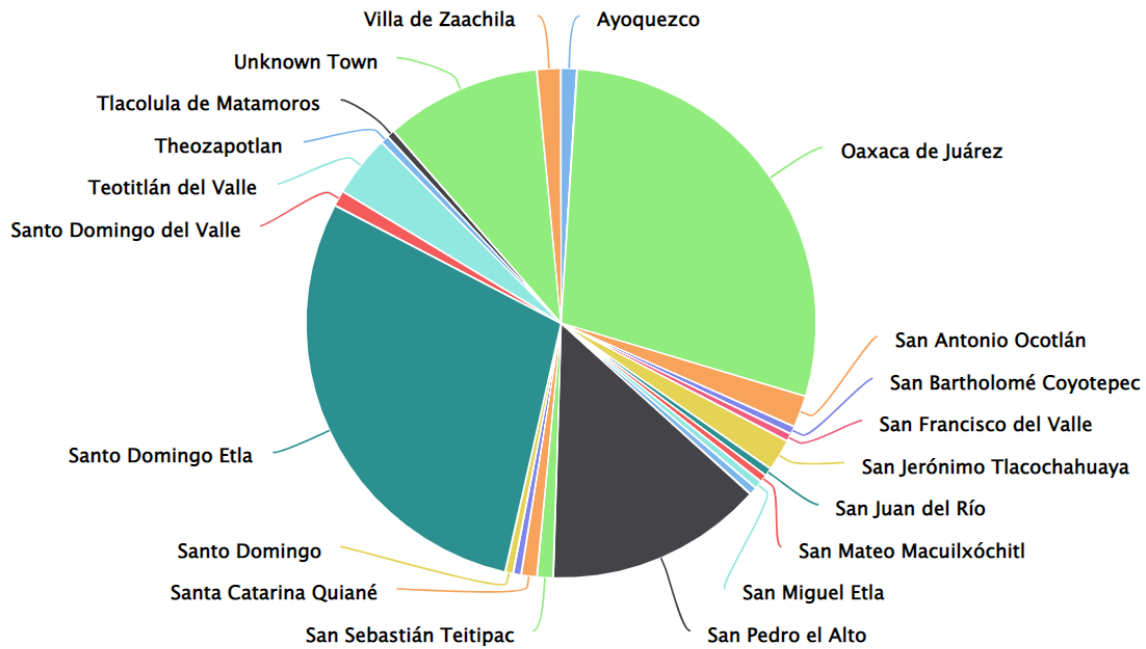
- 1630s: 2/204, 1.0% of manuscripts are from this decade.
- 1640s: 3/204, 1.5% of manuscripts are from this decade.
- 1650s: 1/204, 0.5% of manuscripts are from this decade.
- 1660s: 2/204, 1.0% of manuscripts are from this decade.
- 1670s: 7/204, 3.4% of manuscripts are from this decade.
- 1680s: 8/204, 3.9% of manuscripts are from this decade.
- 1690s: 9/204, 4.4% of manuscripts are from this decade.
- 1700s: 15/204, 7.4% of manuscripts are from this decade.
- 1710s: 32/204, 15.7% of manuscripts are from this decade.
- 1720s: 18/204, 8.8% of manuscripts are from this decade.
- 1730s: 13/204, 6.4% of manuscripts are from this decade.
- 1740s: 53/204, 26.0% of manuscripts are from this decade.
- 1750s: 5/204, 2.5% of manuscripts are from this decade.
- 1760s: 1/204, 0.5% of manuscripts are from this decade.
- 1770s: 1/204, 0.5% of manuscripts are from this decade.
- 1780s: 4/204, 2.0% of manuscripts are from this decade.
- 1790s: 6/204, 2.9% of manuscripts are from this decade.
- 1800s: 3/204, 1.5% of manuscripts are from this decade.
- 1830s: 1/204, 0.5% of manuscripts are from this decade.
- Unknown: 20/204, 9.8% of manuscripts are from an unknown year.

Figure 1 - Year In Which Manuscripts Were Written

Map: This feature provides a map of places and communities that produced texts of Colonial Valley Zapotec. Users can click on the map and explore the manuscripts by area. The interactive map has Colonial Zapotec names as well as modern town and community names. Users can click on a specific location on the map and see the origin (town) of different manuscripts. The pop-up feature has links linked to the project documents in Colonial Zapotec and Colonial Spanish. The project uses a leaflet map and HighCharts for the pie chart of the different locations. *Figure 2* shows how the locations are displayed on the website.



TOWN GRAPH



Town Statistics

- Ayoquezco: 2/204, 1.0% of manuscripts are from this town.
- Guaxolotitlan Santo Domingo: 0/204, 0.0% of manuscripts are from this town.
- Oaxaca de Juárez: 58/204, 28.4% of manuscripts are from this town.
- San Antonio Ocotlán: 4/204, 2.0% of manuscripts are from this town.
- San Bartholomé Coyotepec: 1/204, 0.5% of manuscripts are from this town.
- San Francisco del Valle: 1/204, 0.5% of manuscripts are from this town.
- San Jerónimo Tlacoahuaya: 4/204, 2.0% of manuscripts are from this town.
- San Juan del Río: 1/204, 0.5% of manuscripts are from this town.
- San Mateo Macuilxóchitl: 1/204, 0.5% of manuscripts are from this town.
- San Miguel Etla: 1/204, 0.5% of manuscripts are from this town.
- San Miguel Talistaca: 1/204, 0.5% of manuscripts are from this town.
- San Pedro el Alto: 28/204, 13.7% of manuscripts are from this town.
- San Sebastián Teitipac: 2/204, 1.0% of manuscripts are from this town.
- Santa Catarina Quiané: 2/204, 1.0% of manuscripts are from this town.
- Santa María La Asunción Etla: 1/204, 0.5% of manuscripts are from this town.
- Santiago Ixtaltepec Santiago de los Angel: 0/204, 0.0% of manuscripts are from this town.
- Santo Domingo: 1/204, 0.5% of manuscripts are from this town.
- Santo Domingo Etla: 59/204, 28.9% of manuscripts are from this town.
- Santo Domingo del Valle: 2/204, 1.0% of manuscripts are from this town.
- Teotitlán del Valle: 8/204, 3.9% of manuscripts are from this town.
- Theozapotlan: 1/204, 0.5% of manuscripts are from this town.
- Tlacolula de Matamoros: 1/204, 0.5% of manuscripts are from this town.
- Unknown Town: 20/204, 9.8% de manuscritos son de un pueblo indeterminado.
- Villa de Zaachila: 3/204, 1.5% of manuscripts are from this town.

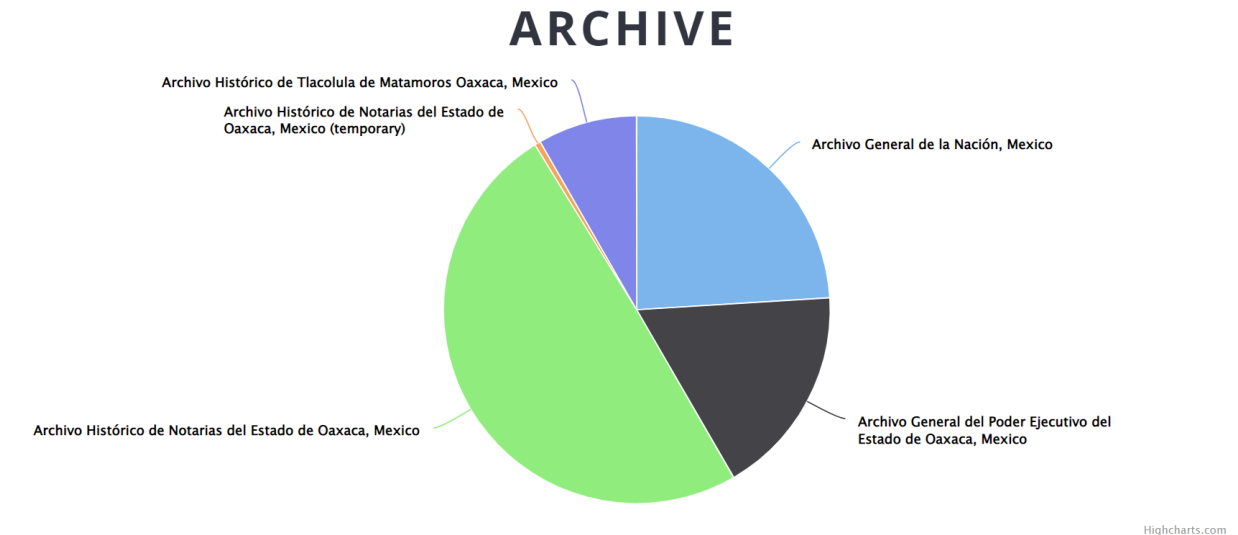
Figure 2 - Location of Towns Based on Written Manuscripts

Personography: This feature provides the names of persons mentioned in the Zapotec and Spanish documents. *Figure 3* shows a snapshot of how they are displayed on the website.

Name	Info	Document
Pedro Andres	He was the Principal of San Jerónimo Tlacoahuaya in 1675 and sold land to Gregorio de Mendosa.	Translation of Bill of Sale from San Jerónimo Tlacoahuaya, 1675
Mathias (Andres)	Mentioned in the bill of sale from San Jerónimo Tlacoahuaya and was the father of Pedro Andres.	Translation of Bill of Sale from San Jerónimo Tlacoahuaya, 1675

Figure 3 - Name of Persons on Manuscripts

Archive: This feature provides a detailed description of how the documents were obtained (archive) and the number of documents per archive. The project uses HighCharts for the pie chart of the different archives. *Figure 4* shows how the archives information is displayed on the website.

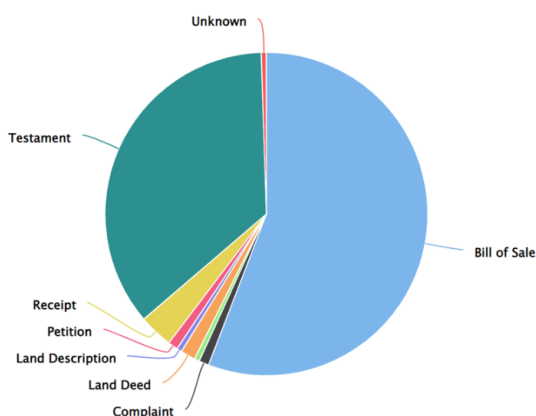


Archive Statistics

- Archivo General de la Nación, Mexico: 49/204, 24.0% of manuscripts are from this archive.
- Archivo General del Poder Ejecutivo del Estado de Oaxaca, Mexico: 36/204, 17.6% of manuscripts are from this archive.
- Archivo Histórico de Notarias del Estado de Oaxaca, Mexico: 101/204, 49.5% of manuscripts are from this archive.
- Archivo Histórico de Notarias del Estado de Oaxaca, Mexico (temporary): 1/204, 0.5% of manuscripts are from this archive.
- Archivo Histórico de Tlacolula de Matamoros Oaxaca, Mexico: 17/204, 8.3% of manuscripts are from this archive.

Figure 4 - Origin of Manuscripts by Archive

Other Statistics: This feature provides information on the type of document (e.g. bill of sale, testament, land deed, etc.), language statistics (Zapotec, Spanish), and transcription status (completed and checked, in progress, etc.). The project uses HighCharts for the pie chart of the various statistics of the project. *Figure 5* shows the type of documents.



Document Type Statistics

- Bill of Sale: 114/204, 55.9% of manuscripts are of this document type.
- Complaint: 2/204, 1.0% of manuscripts are of this document type.
- Doctrina: 1/204, 0.5% of manuscripts are of this document type.
- Land Deed: 3/204, 1.5% of manuscripts are of this document type.
- Land Description: 1/204, 0.5% of manuscripts are of this document type.
- Petition: 2/204, 1.0% of manuscripts are of this document type.
- Receipt: 7/204, 3.4% of manuscripts are of this document type.
- Testament: 73/204, 35.8% of manuscripts are of this document type.
- Unknown: 1/204, 0.5% of manuscripts are of an unknown document type.

Figure 5 - Types of Documents

Manuscript Metadata Information and Status: The TICHIA project has a total of 204 documents (82 in Spanish, 119 in Zapotec, 3 in Spanish with some Zapotec). The information provided may not be up to date since there are multiple people working on the project in various locations in the United States and Mexico.

Breakdown per category:

- **Transcription Status**

- Documents completed: 8/204 - 3.9%
- Documents completed but not checked: 118/204 - 57.8%
- Documents in progress: 49/204 - 24%

- **Legibility Status**

- High: 88/204 - 43.14%
- Fair: 32/204 - 15.69%
- Low: 14/204 - 6.9%
- No information: 70/204 - 34.3%

The TICHIA website provides detailed manuscript metadata information organized into bundles, which include the name of the document, format available, Ticha ID, year, town, archive, type of document, language, transcription status, and legibility status. *Figure 6* shows how this information is organized by categories.

Name of Document ▲	PDF ♣	Ticha ID ♣	Year ♣	Town ♣	Archive ♣	Type of Document ♣	Language ♣	Transcription Status ♣	Legibility Status ♣
Bill of Sale from Oaxaca de Juárez, 1740	PDF	An740	1740	Oaxaca de Juárez	Archivo General del Poder Ejecutivo del Estado de Oaxaca, Mexico	Bill of Sale	Zapotec	Completed and Checked	High

Figure 6 - Zapotec Manuscript Metadata of Zapotec Bill of Sale

Vocabulary Feature: One of the resources on the TICHIA website is a built-in Colonial Valley Zapotec to English Vocabulary from the Zapotec corpus. The vocabulary presented are the most common words found in the corpus, along with their definitions and alternate spellings. The dictionary also incorporates modern lexical resources with historical vocabulary to create an engagement with the original texts. Some terms have an audio component, in which users can hear how a word is pronounced in a certain variety (e.g. San Lucas Quiavini Zapotec, Tlacoahuaya Zapotec). This project tries to incorporate and connect these lexical entries for historical forms of words with their modern counterparts. One feature that helps this dictionary be noticeable is that the project links entries in Ticha's Vocabulary with other entries in online Talking Dictionaries for various Valley Zapotec language varieties. Some examples described in (Harrison et al. 2019) are Teotitlán del Valle (Lillehaugen and Chávez, et al. 2019), San Jerónimo Tlacoahuaya (Lillehaugen and García Guzmán, et al. 2019), and San Lucas Quiavini (Lillehaugen et al. 2019). Some other features are: looking up a word, abbreviations used in this dictionary, the structure of entries, key to identification of the part of definitions, modern cognates with audio, and how to cite [the] vocabulary. The design for the dictionary feature originated during an in-person workshop in Oaxaca, Mexico. *Figure 7* shows how the vocabulary corpus is displayed.

A	B	C	E	G	H	I	L	M	N	O	P	Q	R	S	T	U	V	X	Y	Reverse Index
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---------------

=a sp. var. of =ya 'I; me'

aca no, not (negative particle). (Also attested as **acua**, **haca**.)

acua sp. var. of aca 'no, not'

alani item (used to mark items in a list). See also **alarini**.

alarini item (used to mark items in a list). See also **alani**. (Also attested as **alatini**, **latini**.)

alatini sp. var. of alarini 'item'

ana now. (Also attested as **na**, **yana**.)

anachi 'today'

Hear it in San Lucas Quiavini Zapotec: **na**  

anachi today. (Composed of **ana** 'now', **chi** 'day'.) (Also attested as **anachihi**, **anchi**, **yanachi**.)

Hear it in San Lucas Quiavini Zapotec: **nazhi**  

Hear it in Tlacoahuaya Zapotec: **an chi**  

Hear it in Teotitlán del Valle Zapotec: **nadxi**  

anachihi sp. var. of anachi 'today'

anchi sp. var. of anachi 'today'

Figure 7 Zapotec Dictionary

Team and Advisory Board: The TICHACHA project is composed of a team of scholars from various fields (e.g. linguistics, history, Chicano studies, etc.) and from various institutions in the United States and Mexico. The project also has an advisory board of native speakers of Valley Zapotec and experts in their language. They provide feedback, collaborate, and contribute to the Zapotec corpus. There are multiple undergraduate research assistants that are currently working on transcription, translation, and learning materials for the corpus. The team meets once a week to provide the status of certain tasks and updates on the corpus. As part of the methodology of TICHACHA, the team travels regularly to Oaxaca, Mexico where they solicit feedback and suggestions from people in the Zapotec community with an interest in the corpus. Also, they take these opportunities to look at Colonia Zapotec's language texts with native speakers and elicit questions about the writing system and certain linguistic patterns.

Pedagogical Resources: TICHACHA has a teaching modules section for people who want to learn about the Zapotec language and history. These resources are designed for teachers to incorporate Indigenous knowledge into a classroom. *Caseidyneēn Saēn*—Learning Together is an open-access volume composed of pedagogical resources centered on the TICHACHA archival corpus of the Valley Zapotec language materials created during the Mexican Colonial period. These resources try to capture language variation in collaboration with Zapotec and non-Zapotec scholars as well as Zapotec community members. This is an ongoing project still in the making (95% completion). Zapotec people (in Mexico and the United States) were a pillar in the creation of this project since they contributed to the development of the teaching materials and served as co-editor of the volume as well as authors of the various chapters. *Caseidyneēn Saēn* is made freely available via Pressbooks through the TICHACHA project (Lillehaugen et al. 2016, Broadwell et al. 2020). *Caseidyneēn Saēn* serves as a tool to use the TICHACHA corpus in an efficient productive way while learning how to read and interpret these intricate and complicated colonial texts. These resources are available for Spanish and English speakers since the volume has a bilingual feature in which readers can read the materials in either language. *Caseidyneēn Saēn* is a celebration of Zapotec practices, knowledge, religion, language, and culture. The volume strives for the survival and recognition of Zapotec. As a result, each module and chapter of *Caseidyneēn Saēn* highlight the linguistic, historical, and cultural value of the manuscripts with the intention to promote research into Zapotec culture,

language, and history by introducing newcomers to the rich corpus of Zapotec-language archival materials.

Preservation and Future Avenues: One of the core values of TICHIA is to create a platform for scholars in diverse fields (e.g. linguistics, anthropology, sociology, history), Zapotec community members, and the general public. This corpus serves as a tool for classroom instruction making an impact on both learners and the Zapotec communities. Users have free access to all of the TICHIA resources making them accessible and available at all times.

Working on this project allowed me to have hands-on experience with the language transcription and analysis of various documents (see Appendix C). It was challenging to work on this project since many of the documents were not legible and there is no consistency in orthography and the writing of all documents I worked on. As a result, I had to decipher the meaning and transcription of many words. Collaborating and contributing to the existing Zapotec literature and corpus allowed me to have a better understanding of Valley Zapotec. During the summer, I plan to attend a Russian summer immersion program at Indiana University, which also offers a program that teaches people one of the varieties of Zapotec (Dizhsa or Western Tlacolula Valley Zapotec). I plan to visit the program to see their needs with the possibility of future collaborations and introduce them to our teaching materials. Additionally, some members of the project are planning to travel to Oaxaca, Mexico this summer to collaborate with Zapotec people and continue data documentation, transcription, and analysis.

Appendix A

Dictionaries and grammars

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- Pickett, Velma B. and others. 1959. Vocabulario zapoteco del Istmo : Castellano zapoteco, zapoteco-castellano. Serie de vocabularios indígenas "Mariano Silva y Aceves", 3. Mexico: Instituto Lingüístico de Verano. [2nd ed., revised and enlarged (1965); republished (1968, 1971)]. Fifth edition (2007) available on-line.
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Appendix C

- Escritura de venta de Santo Domingo Etla, 1688.
- Escritura de propiedad de San Pedro el Alto, 1699.
- Escritura de venta de Santo Domingo Etla, 1700.
- Escritura de venta de Santo Domingo Etla, 1701.
- Escritura de venta de Santa María la Asunción Etla, 1718.
- Escritura de venta Santo Domingo Etla, 1725.
- Escritura de venta de Santo Domingo Etla, 1740.
- Escritura de Venta de Santo Domingo, Etla, 1741.

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