Relationality in Online Indigenous Language Courses

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Relationality in Online Indigenous Language Courses

This article considers ways Indigenous Peoples enact relational epistemologies in online Indigenous language courses which support Indigenous language education. We give an overview of popular platforms and their key features, including audio, images, video, text-based instruction, and assessment. Based on our reviews of Indigenous language courses, we discuss how course creators used these features to enact relational epistemologies. Audio represented the voices of learners and speakers across generations. Images, whether photographs or graphics, offered visual representations of community life and cultural teachings. Videos showed interactions between community members engaged in cultural activities and shared stories. Text-based instruction wove together grammar teaching with culture. Some communities have also pushed against the rigid conventions of formal assessment to prepare learners through culturally appropriate measures. Through the intentional use of the course features, community-led Indigenous language courses are centering relational epistemologies and decolonizing digital language learning spaces.

Keywords: Indigenous Peoples; language revitalization; language education; online courses; relationality

Introduction

In Indigenous epistemologies, relationships between humans, land, plants, animals, spirits, and languages "do not merely shape reality, they are reality" (Wilson, 2008, p. 7). For this reason, Indigenous language education is not just about learning and teaching languages effectively; it also requires upholding "the worldview and understandings within the language– …the spirit of the language" (Rosborough et al., 2017, p. 430). For Indigenous Peoples, especially those disconnected from homelands and with diasporic populations, computer assisted language learning (CALL) technologies, have great potential to facilitate connection and support Indigenous language education. Currently, however, the "Western-dominated digital landscape" privileges Western views of language as "decontextualized and disembodied from the land,

community, or local territory" (Meighan, 2022, p. 33). Honoring the spirit of languages in both on- and off-line spaces entails re-emplacing it in a relational epistemology (Henne-Ochoa et al., 2020) that "holds language in a particular way, one that binds generations to land, and is an anchor in retaining a relational balance with the rest of the natural and spiritual world" (Hermes et al., 2022, p. 4).

This article, based on an open-access digital guide created by the authors (Chew, 2022), focuses on ways Indigenous Peoples enact relational epistemologies in Indigenous language CALL courses. We give an overview of popular platforms and their key features, including audio, images, video, text-based instruction, and assessment. Based on our reviews of Indigenous language courses, we discuss how course creators used these features to enact relational epistemologies. Through the intentional use of the CALL course features, community-led Indigenous language courses are centering relational epistemologies and decolonizing digital language learning spaces.

Resisting (Digital) Colonization

Settler colonial projects, including the forced removal of Indigenous Peoples from homelands and assimilation through boarding and residential schooling, have disrupted relationships and threatened the continuance of Indigenous languages (Greendeer & Weston, 2021). For Indigenous Peoples displaced from their territories, with large diasporic populations, and/or few or no speakers, digital technologies can be powerful tools for sharing language (Alexander, 2018; Hermes et al., 2012). Because they are generally created by Western companies (Meighan, 2022), CALL technologies can be a "double-edged sword" with the potential both to benefit and undermine Indigenous language education (Galla, 2016, p. 1139). Technology is "the extension

of the knowledge and belief system which has led to its creation" (Meighan, 2021, p. 2) and can therefore act as "yet another form of colonization that reinforces the Western-based dominant modes of knowledge systems and worldviews" (Galla, 2018, p. 104).

There are growing efforts to decolonize digital technologies, including CALL courses, to better meet the needs and goals of Indigenous language education (Brinklow, 2021; Meighan, 2021). Indigenous language course creators find ways to "exploit" (Galla, 2018) existing technologies by finding creative solutions within the confines of the technology to center cultural values, teach unique linguistic features of the language, and build relationships with learners. Ideally, rather than taking existing technologies as a starting point, new technologies will be designed in ways that center Indigenous relational epistemologies and support language use in ways that meet community goals (Lewis, 2020; Taylor et al., 2019). Importantly, decolonizing digital technologies requires Indigenous leadership in "all aspects of technology development" (Brinklow, 2021, p. 240) to ensure that the needs, values, and aspirations of Indigenous Peoples are prioritized.

Indigenous Language Courses on Popular Platforms

To create an Indigenous language CALL course, Indigenous Peoples typically partner with established technology providers. There are over 100 Indigenous language CALL courses across various platforms. Figure 1 shows a map, created by the authors, of these courses and platforms (https://maphub.net/onlineILR/indigenous-language-courses). A small number of platforms were developed specifically for learning and teaching Indigenous languages, such as Oahpa! for Saami (Antonsen et al., 2009) or Bloom for ᏣᎳᎩ ᎦᏬᏂᎯᏍᏗ (Cherokee) (Alexander, 2018). Most Indigenous language CALL courses are on 7000 Languages, Cudoo, Duolingo, Drops, Mango

Languages, Memrise, or Rosetta Stone. Except for 7000 Languages, these are for-profit

companies specializing in the teaching of dominant languages (like English, Spanish, and

French). This section provides an overview of these platforms with a focus on their Indigenous

language courses.

Figure 1

Map of Indigenous Language Courses

7000 Languages

Established in 2016, 7000 Languages is an independent non-profit organization that supports

Indigenous language revitalization efforts through free online language courses. With a platform

donated by Transparent Language, 7000 Languages offers 55 courses in 29 languages from

across the world, including Hän, Kwak̓wala, Kaqchikel, Nahuatl, Sisseton Dakotah, Michif. All

courses were created in partnership with communities. 7000 Languages honors data sovereignty, holding that the data and language content belong to their community partners.

Cudoo

Cudoo began in 2016 as a start-up focused on online skill-based education including but not limited to languages. Cudoo offers over 160 languages, including some Indigenous and less commonly taught languages, like Diné bizaad (Navajo), Hawaiian, and Saami. Cudoo is unique because of its focus on teaching language for business, including a Māori for Business. Cudoo does not provide information about community partnerships or data sovereignty and charges for use of Indigenous language courses.

Drops

Drops was founded in 2015 and acquired by Kahoot in 2020. With both free and ad-free paid versions, Drops teaches language as five-minute bites of game-based content, aiming to replicate the experience of scrolling social media to maintain learner engagement. Drops offers 37 languages, including Indigenous and endangered languages like Ainu, 'ōlelo Hawai'i (Hawaiian), Gagana fa'a Sāmoa (Samoan), and te reo Māori. Drops does not provide information about how it chooses community partners or approaches data sovereignty.

Duolingo

Duolingo was established in 2011 and takes a gamified approach to learning. It offers free and paid access to over 30 language courses. In 2018, Duolingo added its first Indigenous languages– 'ōlelo Hawai'i (Hawaiian) and Diné bizaad (Navajo)–to celebrate Indigenous People's Day. The

company recently released isiZulu and plans to offer additional Indigenous language courses in the future. While Duolingo has relied on a crowdsourced volunteer model in the past, Indigenous language courses were created in partnership with organizations.

Mango Languages

Founded in 2007, Mango Languages has over 70 language courses, including Indigenous and languages like ᏣᎳᎩ ᎦᏬᏂᎯᏍᏗ (Cherokee language), ʻōlelo Hawaiʻi (Hawaiian), Neshnabémwen (Potawatomi), and Tuvan. The company supports language revitalization by offering Indigenous language courses for free. While the company does not have specific policies about Indigenous data sovereignty, it makes it clear to communities that it does not own the language and works to provide copies of all data back to partners.

Memrise

Memrise, established in 2010, offers both courses created by Memrise and community-created courses developed by individual users. While the company itself does not offer Indigenous language courses, there are many community-created Indigenous language courses. Because anyone can create a course for free by uploading their own content, there is little consistency in terms of the quality of courses (Daigneault, 2020). Memrise's Terms of Use raise concerns about data sovereignty. When creating a course, the user grants Memrise license to any uploaded content and there are no protocols in place to ensure that individual users have permission from Indigenous Nations to share language content. In some cases, courses indicate that they are created by an Indigenous Nation's language program.

Rosetta Stone

Founded in 1992, Rosetta Stone has courses in 25 commonly spoken languages. It has also created courses for several Indigenous languages in partnership with Indigenous Peoples through its Endangered Language Program, established in 2004. These languages include Chamtéela, Chikashshanompa' (Chickasaw), Diné bizaad (Navajo), Inuttitut, Iñupiaq (Coastal, Kobuk/Selawik, and North Slope varieties), Ojibwe, Kanien'kéha (Mohawk), and Sitimaxa (Chitimacha). Indigenous partners work with Rosetta Stone to create custom courses and retain sales and distribution rights. Rosetta Stone has taken steps to respect Indigenous partners' intellectual property rights.

Comparison of Course Features

CALL platforms offer key features, including audio, images, video, text-based instruction, and assessment, to support language learning and teaching. Table 1 shows a comparison of course features by provider. Audio refers to recordings of language speakers. Text-based instruction refers to the use of text (usually in English) to explain grammar and/or cultural concepts. Images may be stock or custom photography, branded graphics, or community-created artwork. Videos are either uploaded directly to the platform or embedded from a website like YouTube to share language. Courses that do not have text-based instruction may still include text, such as for translations. Assessments include tests and quizzes, games, or gamified approaches to tracking learners' progress and providing feedback. As shown in the table, not every platform offers all the features.

Table 1

Comparison of Course Features by Provider

	Audio	Images	Video	Text-Based	Assessment
7000 Languages	yes	yes	yes (embedded)	yes	yes
Cudoo	yes	yes (graphics)	yes (limited)	no	yes
Drops	yes	yes (graphics)	no	no	yes
Duolingo	yes	yes (graphics)	no	no	yes
Mango Languages	yes	no	no	yes	yes
Memrise	yes	yes	yes (embedded)	no	yes
Rosetta Stone	yes	yes	yes	yes	yes

Research Methodology

Our research used a decolonizing research methodology (Smith, 2012) grounded in relational

epistemologies. We begin by sharing our personal interest in Indigenous language CALL courses

and how we came together to do this research. Chew (Chickasaw) contributed to the creation of

Chickasaw Rosetta Stone (see Chew et al., 2022a), and, through this experience, recognized a

need for resources to support Indigenous Peoples creating CALL courses for their languages.

While working as a professor at the University of Oklahoma, she initiated this research project to

help meet this need. Tennell (Cherokee) is a doctoral candidate at the University of Oklahoma

studying special education and postsecondary transition and a language learner who utilizes the

Cherokee Nation's online synchronous and asynchronous language resources. She and Melvin

Calls Him Jr. (Ponca and Muscogee Creek) supported the project as graduate research assistants.

We engaged in two years of research to 1) document existing online Indigenous language

courses, 2) analyze courses for examples of centering relationality, and 3) co-create knowledge

with those who have created (or are creating) online Indigenous language courses. The research included a review of Indigenous language courses, interviews with Indigenous language course creators, and a virtual gathering for scholars and practitioners using technology to support Indigenous language education. With additional research findings shared in *Learning in relation: A guide to creating online Indigenous language courses that center Indigenous ways of knowing and being* (Chew, 2022), this article focuses on the course review component of the research.

Our first step was to create a spreadsheet documenting existing online Indigenous language courses. Because we were based in Oklahoma, we began by looking at technology-focused language revitalization programming for each of the thirty-nine Indigenous Nations in the state. We created entries for CALL courses on popular platforms as well as efforts to teach language online using websites and apps, learning management systems, and sequenced YouTube videos. Because creating CALL courses can require significant resources, in terms of funds, persons with specialized knowledge, and time, we wanted to include smaller-scale, grass-roots efforts to use CALL to support Indigenous language education. In cases where Indigenous Nations did not have information online, this involved calling language programs to ask about their work. This first phase of course documentation helped us to connect with Indigenous community members interested in CALL for Indigenous language education, which was important to our overall project. As we expanded our search nationally and then globally, we focused on the following platforms which offered Indigenous language courses: 7000 Languages, Cudoo, Duolingo, Drops, Mango Languages, Memrise, and Rosetta Stone. The map in Figure 1 shows the courses we documented.

Next, we used the spreadsheet to select courses to review for examples of relationality. We reviewed twenty-three Indigenous languages across the seven platforms (see Table 2). We

chose courses that were accessible using current technologies and available for public use. For example, while Rosetta Stone has created courses for nine Indigenous languages and dialects, only the three courses we reviewed used up-to-date technology and offered user licenses to the public. In cases where a platform had many courses, such as on Memrise, we prioritized those created by Indigenous Nations. We also sought representation of languages from around the world. Our goal was not to evaluate the courses' or platforms' effectiveness or style, as Indigenous course creators may not have control over these aspects of the technology. Our reviews focused on examples of how course creators enacted relational epistemologies no matter which platform they were using.

Using a review template we created, the research team considered courses holistically and identified examples of how course creators used key course features– audio, images, video, text-based instruction, and assessment–to enact relationality. We then compiled and analyzed examples by course features. We chose to focus on the use of course features to express relational epistemologies because we wanted outcomes of the research to be useful to Indigenous Peoples creating CALL courses on any platform. Further, based on our initial documentation of small-scale, grass-roots efforts to use technology to teach language, we wanted to be able to share ideas about creating audio, images, video, text-based instruction, and assessment materials with Indigenous communities that may be engaged in these language documentation activities but not necessarily creating a CALL course.

Table 2

Courses Reviewed

	Indigenous Nation or Organization	**Language**
7000 Languages	Sisseton Wahpeton Oyate Dakotah Language Institute	Sisseton Dakotah
	Doyon Foundation	Hän
	Hase' Language Revitalization Society	Kwak'wala
	Langscape	Kaqchikel
	Prairies to Woodlands Indigenous Language Revitalization Circle	Southern Michif
	Tlahtoltapazolli	Nahuatl
Cudoo	Navajo Nation	Diné bizaad (Navajo)
	Māori	te reo Māori (Māori)
	Saami	Saami
Drops	Ainu	Ainu
	Hawai'i	'ōlelo Hawai'i (Hawaiian)
	Māori	te reo Māori (Māori)
Duolingo	Kanaeokana and Kamehameha Schools	'ōlelo Hawai'i (Hawaiian)
	San Juan School District, Utah	Diné bizaad (Navajo)
Mango Languages	Cherokee Nation & Tulsa Public Libraries	ᎠᏫᏯ ᏕᎶᎯᎠᏫᏗᎫ (Cherokee)
	Hawai'i (individual speakers)	'ōlelo Hawai'i (Hawaiian)
	Pokagon Band of Potawatomi	Neshnabémwen (Potawatomi)
Memrise	Comanche Nation of Oklahoma	Nʉmʉ Tekwapʉ̱ (Comanche)
	Citizen Potawatomi Nation	Neshnabémwen (Potawatomi)
	Mississippi Band of Choctaw Indians	Chahta Anumpa (Choctaw)
Rosetta Stone	Chickasaw Nation	Chikashshanompa' (Chickasaw)
	Mille Lacs Band of Ojibwe	Ojibwe
	Navajo Renaissance	Diné bizaad (Navajo)

Relationality in Indigenous Language CALL Courses

The following sections share examples of how Indigenous language courses enacted relationality

using the following course features: audio, images, video, text-based instruction, and assessment.

Audio

The creation of audio content is a major part of the work to create an Indigenous language CALL

course. CALL courses typically include, at minimum, audio recordings of key examples and

vocabulary words, and many also include other features like read along and pronunciation

feedback. The use of audio in CALL courses has many benefits to learners, including

pronunciation improvements (Bajorek, 2017) and reducing anxiety about practicing in front of

other people (Galla, 2016). This section offers some approaches for and examples of how

Indigenous course creators centered relationality in audio components of courses.

Complete Sentences in Culturally Relevant Contexts

Recordings of individual vocabulary words are important for language learners, and also critical

are recordings of the words used in complete sentences and in a variety of culturally relevant

contexts. For example, in Chickasaw Rosetta Stone, the word inakfi' (brother) is introduced as a

vocabulary word in a lesson focused on kinship terms. In other parts of this lesson, the term is

used in complete sentences like, "Yappat anakfi'" ("This is my brother"). This lesson teaches

learners about how noun affixes are used to express relationships and how different types of

relationships are understood through the historic clan system. By using the term repeatedly and

in different contexts throughout the course, learners become prepared to use the term in different

genres of speech, from everyday conversation to storytelling.

Some courses enacted relational epistemologies by teaching learners how to interact with other-than-human relations, such as land, water, plants, animals, and other beings. Several courses included examples of prayer and interactions with other-than-human relations, while also being mindful of protecting cultural knowledge and types of communication that may not be appropriate to share. Some courses also included stories in which other-than-human beings interact in the language with each other. In a later Chickasaw Rosetta Stone lesson, the term inakfi' is revisited to tell a shikonno'pa' (Chickasaw traditional story) about why turkey chest feathers look the way they do. Turkey interacts with Turtle and his brothers after finding a lock of Chickasaw hair, which becomes Turkey's chest feathers. In the shikonno'pa', learners see examples of Turkey and the Turtles speaking Chikashshanompa' (Chickasaw language) to each other, reflective of a time when many beings spoke the language. Figure 2 shows a screen from the lesson where learners can listen to audio recordings of sentences from the story.

Figure 2

Chickasaw Rosetta Stone

Recordings of Conversations

Beyond vocabulary words and sentences, courses also shared audio recordings of conversations

between speakers. Because listen-and-repeat approaches can inadvertently convey that there is

only one correct way to speak (Wagner, 2017), modeling conversations is a way show variation

and teach things like how to ask and answer questions, take turns talking, express interest in or

disagreement with what someone is saying, joke or tease, and more. These skills help learners to

build and strengthen relationships with other people. Many of the courses we reviewed built

lessons around scripted conversations. The Cherokee Mango Languages course includes audio of

conversations between two speakers, Cherokee National Treasures and first language speakers

John Ross and Anna Sixkiller. Figure 3 shows an example of audio of speakers conversing in the

language. Audio recordings of conversations help prepare learners to use what they are learning in their communities with other people. One drawback of including scripted conversations is that learners may not hear the spontaneous language of everyday conversations. Course creators may consider also including examples of unscripted conversations between speakers so that learners can hear the many ways people may express themselves through the language.

Figure 3

Cherokee Mango Languages

Audio From Diverse Speakers

Several courses demonstrated efforts to include audio from many speakers, including those of different ages, proficiencies, and from different regions. Some courses included the voices of both learners and first language speakers. Because first language speakers are often Elders, this approach helps to address language ideologies about speakerhood and age. When younger generations only hear Elder speakers, they may view the language as something "you start speaking… as you get older" (Meek, 2007, p. 34). Including younger speakers of varying proficiencies normalizes the everyday use of the language among younger generations. Some courses supported language teaching across regions and dialects, and therefore included speakers of multiple varieties of the language. The Kwak̓wala 7000 Languages course had speakers from different Kwakwa̱ka̱ʼwakw communities. As stated in the course description, this approach values dialectal difference to affirm Kwakwa̱ka̱ʼwakw identity. In contrast, some courses focused on just one variety (or dialect) of a language. Ojibwe Rosetta Stone was created specifically for the "long-term support of the Mille Lacs Band of Ojibwe to retain our unique identity, language (dialect) stories, and sovereignty" (Aanjibimaadizing, 2021). The course focused on the representation of speakers from this specific community.

Historic Audio Recordings

When possible Indigenous language course creators record audio specifically for the online course, but it is also possible to use high-quality historic audio recordings of speakers who have passed on. Using such recordings requires care to follow cultural protocols. This may involve working with living relatives to ensure that use of historic recordings is appropriate and honors the wishes of the speaker. The Hän 7000 Languages course, created in partnership with the

Doyon Foundation in 2019, is an example of the exceptional use of historic audio to honor the

legacy of an Elder language teacher. The course is based on 1994 recorded conversation lessons

given by the late Isaac Juneby. The course is supported by Juneby's family (Doyon Foundation,

2019). Even when creating new audio for a course, recordings should be considered part of a

historic record for the community. In some cases, Elder speakers may pass on during or after the

creation of an online course. The recordings they created for the course, with consent, provide

opportunities for present and future language learners to continue to be in relation to these

revered teachers. When speakers passed away during the creation of Chickasaw Rosetta Stone,

course creators reflected, "It is a powerful experience to be able to still practice with these

teachers who gave us so much" (Chew et al., 2022a, p. 248).

Information About the Speakers

It is important to share information about the speakers whose voices are heard in courses. In our

review, we found that many courses included audio of unidentified speakers. One reason for this

lack of identification is that the CALL platforms did not have designated places in courses for

the purpose of crediting contributors. This absence of credit to contributors is a concern in

Indigenous language education contexts because the "disembodiment of language from speakers

reifies language as [an] object" that can be separated from the people who speak it (Perley, 2012,

p. 134), a concept deeply at odds with relational epistemologies. In courses that did include

information about speakers, course creators typically re-purposed an existing course feature,

such as a text-based activity, to share credits and/or speaker biographies. In the Michif 7000

Languages course, shown in Figure 4, course creators included biographies and photographs of

all contributors. The Potawatomi Mango Languages course, created by the Pokagon Band, used a

Culture Note to briefly introduce the speakers and course creators at the end of their course.

Notably, in some cases platforms included information about speakers and course contributors in

supplemental blogs hosted on their websites and in press releases, but not in the courses

themselves.

The approaches and examples discussed above demonstrate that audio is a tool with

CALL that can be used in a multitude of ways to support Indigenous language education.

Because different CALL platforms have different possibilities and constraints, course creators

implemented varied approaches as they worked to center cultural values and relational

epistemologies. For many, audio was a meaningful way to represent the voices of learners and

speakers across generations.

Figure 4

Michif 7000 Languages
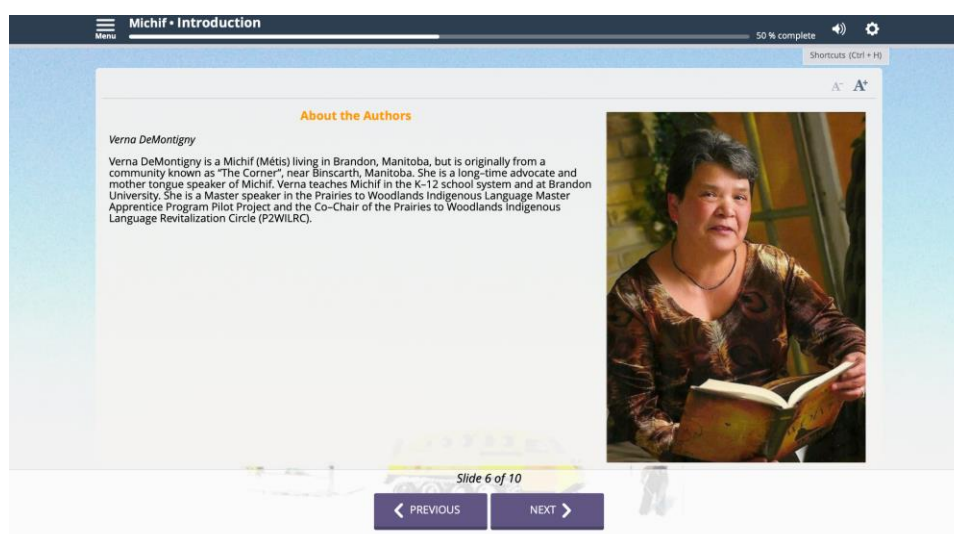
Images

Nearly all the courses we reviewed had images to visually represent the terms or ideas taught. Communities use photographs, artwork, clip art, and other graphics in their online Indigenous language courses to build relationships with learners and help learners create connections to the language they are learning.

Photographs

When creating CALL courses that require photographs, stock or custom images may be used. Stock images are existing photographs found through companies like Getty and Shutterstock. Custom images are created by the community specifically for their language course. While custom images are an ideal way to enact relationality in a course, the number of images, such as for thousands of vocabulary terms, can be difficult to source. The Rosetta Stone Chickasaw team was able to use both types of images by creating custom images for terms related to ancestral foods, cultural items and practices, and specific places significant to the community while locating stock images for more common terms such as "cat" or "apple" (Chew et al., 2022a). Notably, innovations in technology create expanded possibilities for the use of images in CALL. 7000 Languages recently unveiled interactive 360° panorama images as a new feature on the Transparent Language platform (Witkowski & Jeannette, 2022), which allows learners to interact with language and images simultaneously. This feature creates new possibilities for bringing land-based learning into virtual spaces.

Branded Images

Some platforms like Duolingo, Cudoo, and Drops use branded art for images. While these images can give the course a cohesive look, it can be difficult to enact relationality using graphics of generic places and ethnically ambiguous people. The Duolingo ʻōlelo Hawaiʻi team worked within the company's brand guidelines for artwork to produce culturally relevant images. They collaborated with a local artist to create images that used Duolingo's color palette and art style. The resulting images (see Figure 5) enact relationality by giving ʻōlelo Hawaiʻi learners a visual representation of familiar foods. This collaborative effort is an example of decolonizing praxis and centering relationality not easily recognized without knowing the stories behind the course. ʻōlelo Hawaiʻi course creators made decisions together about which plant relations were important to include and how they would be represented. These choices prioritize vocabulary relevant to community members over vocabulary related to travel and tourism, which is common in dominant language CALL courses.

Figure 5

Duolingo Hawaiian branded artwork

Clip Art

Some courses used clip art, or simple illustrations and graphics. Like stock photo images, clip art

can be found in online libraries or created by the community. As shown in Figure 6, the

Comanche Nation used The Noun Project (https://thenounproject.com), an online collection of

over 3 million icons. These icons are free to use under a Creative Commons license, giving credit

to the creator of the artwork. Course developers can also partner with a community-based

graphic designer or artist, which gives them more control over the illustrations. Having control

over the illustrations can help to ensure that depictions of cultural items and people are done in a

way that is respectful.

Figure 6

Comanche Nation Memrise

Community Created Artwork

Using custom artwork by community members ensures that the images in the course reflect the

community's values and traditions. This type of artwork appears in both the Ojibwe and

Chickasaw Rosetta Stone courses. One example in the Ojibwe course is an image for the

vocabulary word Manidoo (spirit) (see Figure 7). In this case, the word's meaning is specific to

the community, and it would not be possible to find other images to capture this meaning. While

communities can collaborate with a professional artist or graphic designer to bring their visions

to life, another option is to allow youth participating in language programs to create art, which

builds relationships between past and current learners. The Chickasaw course features youth

artwork in several lessons.

Figure 7

Ojibwe Rosetta Stone artwork (Manidoo)

Whether photographs, graphics, or artwork, images in Indigenous language CALL courses offered visual representations of community life and cultural teachings. A significant way course creators enacted relationality through images was by including and representing community members in the creation of these visual resources.

Video

Video is a useful tool for learning and teaching Indigenous languages online, yet not all CALL platforms use video. Some platforms, like 7000 Languages and Memrise, support the use of embedded videos to complement lesson content. Of the platforms and courses we reviewed, the Rosetta Stone Chickasaw and Ojibwe courses were the only ones to build lessons primarily around video content. In both the Chickasaw and Ojibwe courses, each lesson begins with a scripted and professionally produced immersive short video that introduces the lesson theme along with key vocabulary and grammar. The videos revolve around an intergenerational Indigenous family doing activities together in their home and in their Nation. All actors are community members, with varying proficiencies in and experiences with the language, and include Elders, adults, and youth. Including community members is a key strategy for getting the community excited about the course. When learners see real people in immersive videos, some of whom they may know, they can begin to envision situations where the language is spoken all the time.

Videos do not need to be professionally produced to be effective for language learning. Hermes et al. (2012) created video content for an Ojibwe course through week-long community movie camps, in which groups worked together to create semi-scripted short videos. Video

creation became a language learning activity in and of itself, and the content was also used in the software. Relatedly, Schwab-Cartas (2018) describes using cellphilm, a DIY approach to making videos on mobile technologies that are already available in communities, to bring together youth and Elders to support Zapotec reclamation. In many ways, a community-involved approach to video creation offers important opportunities to enact relationality off-screen. Video presents opportunities for learners to see non-verbal aspects of communication such as gestures, body language, and more. Both courses provide strong examples of centering relationality in videos.

Highlight Culturally Significant Activities

As with audio, videos are especially helpful learning tools when they share complete sentences and conversations in culturally relevant contexts. In both courses, videos highlight culturally significant activities like gathering and preparing traditional foods, hunting, community feasts or meals, kinship relationships, regalia, and prayer. For example, in Chickasaw Rosetta Stone, a series of videos follow the family through the process of gathering, cleaning, cooking, and eating at ofalla' imilhlha' (wild onions) (see Figure 8, video can be viewed at https://www.chickasaw.tv/episodes/rosetta-stone-chickasaw-season-3-episode-93-gathering-wild-onions). Similarly, an Ojibwe Rosetta Stone video shows the family gathering and preparing manoomin (wild rice) by knocking it into their canoe, parching it over a fire, threshing it by stepping on it, and then winnowing it to remove hulls. These videos emphasize relationships between people, land, food, water, and spirits.

Figure 8

Chickasaw Rosetta Stone Wild Onion Video
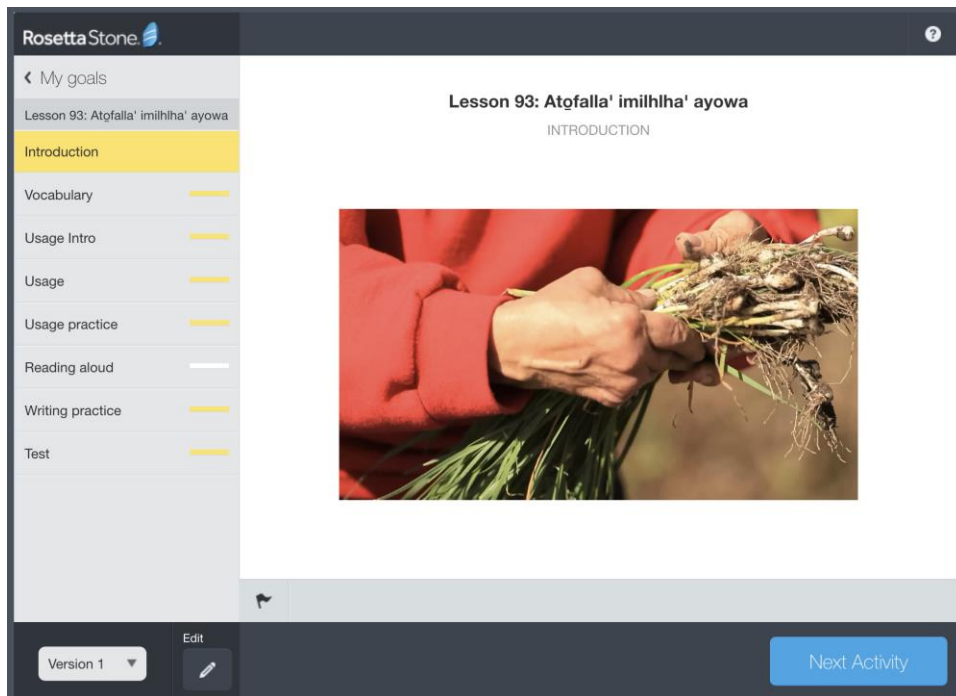
Draw on Community Stories and Narratives

Creating video content can be an intensive process with a steep learning curve. The Chickasaw

Rosetta Stone course creators met after completing Level 1 (consisting of 40 lessons) of the

course to reflect on the experience and what would come next (Chew et al., 2022a). In the next

levels of the course, they began to focus on narratives shared by Elder speakers. These narratives

included shikonno'pa' (traditional stories), as well as personal, family, and community stories and

histories–including stories of language loss and revitalization. For example, one video shares the

story of how a convening of animals agreed to divide day from night. Another video, based on

the real experiences of actor and first language speaker Rose Shields-Jefferson, depicts the

grandmother recounting her experiences attending Haskell and speaking both Chikashshanompa'

and English. This video content proved an effective approach to teaching Chickasaw values and centering Chickasaw epistemologies in the course, while also addressing the realities of Indigenous language education contexts.

Indigenous language course creators worked to center cultural values and foster relationships between people, land, and other beings, while at the same time teaching unique linguistic features of Indigenous languages in a digital format. Approaches to the use of video paralleled those used for audio. Videos showed interactions between community members engaged in cultural activities and shared stories.

Text-Based Instruction

Text-based instruction refers to the use of text in English or another language the learner already knows to explain grammar and/or cultural concepts. While immersion is often considered an ideal way to teach language, research shows that, for adult Indigenous language learners, direct grammatical instruction alongside immersion is "effective for both language acquisition and for the transmission of history, language, and cultural values across generations" (Rosborough et al., 2017, p. 430). Several of the courses we reviewed exemplify relational approaches to teaching grammar and culture through text.

Grammar Explanations

Many Indigenous languages have complex grammatical structures that are challenging to teach in an asynchronous learning environment. Grammatical explanations can help teach polysynthetic languages, in which words are composed of morphemes. Rosborough et al. (2017)

explain of Kwak̓wala that strong speakers and linguists may understand the "literal meanings expressed through morpheme rich-words" (p. 432), but learners often do not because English translations alone do not convey these deeper meanings. Teaching morphemes and offering direct grammatical instruction allows "for deeper engagement with cultural concepts and an appreciation for the beauty of Kwak̓wala [and other Indigenous language] words" (p. 432). Indigenous language courses prioritized practical and culturally relevant examples. As shown in Figure 9, the Potawatomi Mango Languages course teaches language about clan relationships using color-coding. This color-coding helps learners to understand how Potawatomi morphemes correlate to English words. This card is complemented by a Grammar Note explaining that clans are beings to which Potawatomi people are related. At the same time, course creators also expressed tensions about presenting grammar lessons in written form, as courses typically require simplified explanations that may not account for all possible ways to say something. This places pressure on course creators and undermines relational epistemologies in which knowledge is held collectively and not by a small group of experts.

Figure 9

Potawatomi Mango Languages

Who is your clan?

Wénithë o gdodém?
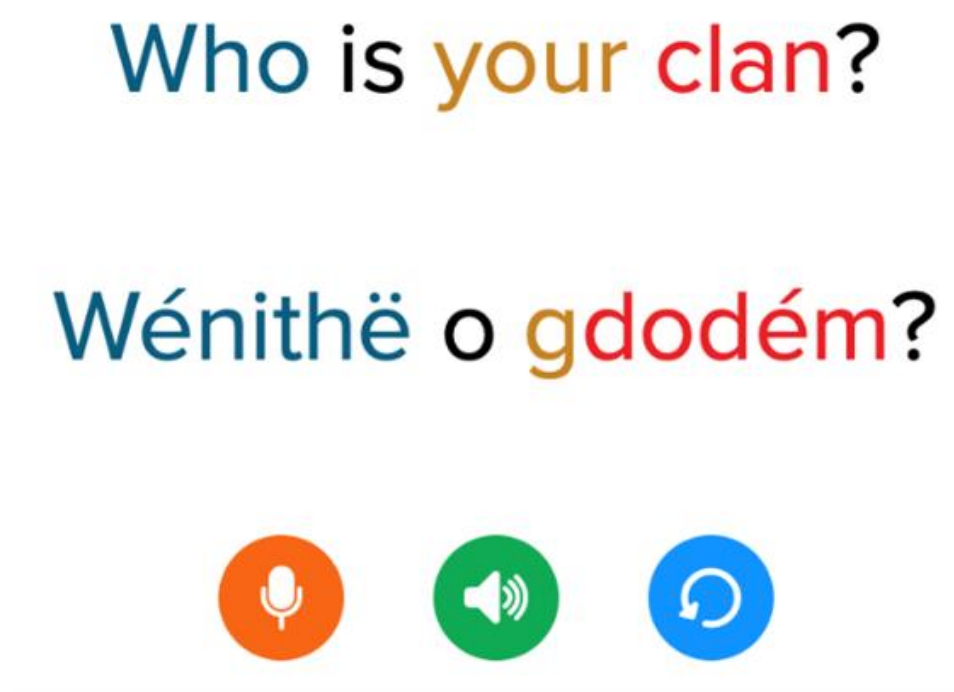
Culture Notes

In addition to sharing information about grammar usage, several courses also included cultural information and teachings as written text. In Mango Languages, these teachings appeared as Culture Notes. While other platforms, such as Rosetta Stone did not have designated space for these cultural teachings, course creators included cultural notes within the lessons. The Chickasaw Rosetta Stone creators initially included cultural notes at the recommendation of Rosetta Stone but found that it was "not ideal to separate cultural teachings from grammatical instruction" (Chew et al., 2022a, p. 251). Later in the course development process, they worked to integrate cultural teachings throughout lesson components. This approach proved successful as it pushed creators to collaborate more on course content and helped to make learning more engaging. Similarly, the Ojibwe Rosetta Stone course creators integrated cultural practice

throughout all lessons and used shorter modules to provide additional information about the culture in English. Figure 10 shows an example of sharing cultural protocols surrounding tobacco. Additional teachings related to tobacco were discussed in other parts of the course. Course creators worked with Elders to determine what cultural knowledge to share or omit. While online courses can be powerful tools for sharing knowledge, Indigenous Peoples should decide what is appropriate to share in this format.

Figure 10

Ojibwe Rosetta Stone

Text-based instruction presents both possibilities and challenges for enacting relational epistemologies. While text-based instruction can weave together grammar teaching with culture, the text-based content may still seem disembodied, as though the source of the content is a computer and not the Indigenous language course creators. Course creators found it difficult to have a sense of relationship to the learners who would eventually use the course; likewise, learners may not see themselves as in relation to the course creators. For this reason, text-based instruction in Indigenous language CALL courses is most effective when used to complement other course features.

Assessment

The platforms we reviewed approached assessment through quizzes and tests or through games and gamification. Rosetta Stone and 7000 Languages use more formal assessments, while Drops take a game-based learning approach and Duolingo gamifies its courses, integrating assessment throughout lessons (Shortt et al., 2021). The most common types of assessment activities were matching, multiple-choice, fill-in-the-blank, drag-and-drop, spelling, and word/conversation-order questions. These types of questions can help learners memorize vocabulary, conjugate verbs, respond to questions, work on oral and written comprehension, translate between languages, and practice other skills. Some courses also included opportunities for writing and speaking practice. While assessment activities vary, questions tend to allow only one correct answer despite there being varied ways to express oneself through language. Given this rigidity, it was difficult to see the enactment of relational epistemologies through simply reviewing courses. Some approaches even seemed at odds with Indigenous values and goals of

decolonization. For example, Duolingo marked learner achievements through European imagery, like castles and crowns, suggesting that the learner's goal was to conquer the language.

Course creators centered relationality despite these kinds of limitations. Those designing assessments enacted relationality through intentional choices to share language in cultural contexts and by keeping learners in their minds when creating content. While working on Chickasaw Rosetta Stone, creators took an innovative approach to the assessment activities in lessons that conveyed traditional stories (Chew et al., 2022a). The story lessons share the same story in a variety of formats, such as through video with narration and through audio clips paired with grammar instruction. The goal of each lesson is to prepare learners to retell the story in their own words to someone else. The assessment section shares the story in shorter audio segments paired with questions that emphasize listening comprehension and critical thinking. The questions ask what happened in the story and why characters may have acted the way they did. This holistic approach supports learners as they engage with the story. Giving learners the goal of sharing the story with someone else was a way to help learners take what they learned online and bring it back into offline environments, such as the home and the community.

Overall, existing approaches to assessment on popular CALL platforms do not reflect Indigenous relational epistemologies, making assessment an area for potential growth informed by Indigenous language education. Even in off-line language learning environments, assessment often reflects Western approaches to learning. A maskiko-nehinaw (Swampy Cree) scholar, McIvor (2020) explains that "assessment tools that are created for other contexts do not work in Indigenous language learning environments," leading Indigenous communities to create their own assessment tools (p. 90). The NET̲OLṈEW̱ Assessment, for example, relies on learner self-assessment (McIvor & Jacobs, 2016). Toward centering Indigenous relational epistemologies to

support language learning, CALL courses would be an ideal space to implement self-guided models to help learners reflect on their personal development and progress over time.

Conclusions and Next Steps Forward

The creativity of Indigenous language course creators is inspiring, but also speaks to a greater need for CALL technology created for Indigenous language education, in collaboration with and under the leadership of Indigenous Peoples. Looking forward, continued work to bring the fields of CALL and Indigenous language education together is a necessary step toward designing technologies and protocols with attention to the needs of Indigenous Peoples and their languages. Indigenous language education scholars and practitioners have worked to decolonize and reclaim understandings of language (Leonard, 2017) and create new adult speakers of languages (Chew et al., 2021). Centering Indigenous relational epistemologies in the design of CALL technologies has the potential not only to benefit Indigenous language education, but to make CALL more inclusive for all language learners and teachers. Partnerships between technology providers and Indigenous Peoples can produce ideas for new features that can advance both Indigenous language education and CALL while supporting language learners. In turn, CALL research can benefit Indigenous language education, which has largely focused on in-person language learning and teaching. The onset of the COVID-19 pandemic in 2020 shifted Indigenous language education work online and many communities have opted to continue offering at least some language programming virtually (Chew et al., 2022b). CALL research offers important insights and strategies for making online learning engaging, effective, and sustainable.

This research focuses on how Indigenous Peoples enact relationality in their courses, but it is also necessary for technology providers to be in good relation to Indigenous partners by honoring Indigenous sovereignties, including data sovereignty. As Galla (2022) asks, what are the implications for Indigenous Peoples of sharing data and knowledge about language that we consider sacred on proprietary platforms? Honoring Indigenous data sovereignty must be a priority for CALL. Of the technology providers we reviewed, only 7000 Languages had a statement about Indigenous data sovereignty. Other platforms lacked policies and, concerningly, some courses showed no evidence of community partnerships or consent as they were created either by an individual user (such as on Memrise) or a technology provider based on previously published language documentation materials, often authored by non-Indigenous persons. The creation of Indigenous language CALL courses on any platform requires the sharing of Indigenous data including the language and cultural knowledge and so it is of the utmost importance that technology providers respect Indigenous data sovereignty through meaningful partnerships grounded in the principles of ownership, control, access, and possession (OCAP®), as outlined by First Nations Information Governance Centre.

When creating an Indigenous language CALL course, Indigenous Peoples have many options in terms of technology providers. Each community must decide which platform will best help them meet the visions, aspirations, and goals for their course. This decision will be informed not only by key features of the platform, but also strong data sovereignty protocols and a trusting relationship with the technology provider (Chew, 2022). As CALL to support Indigenous language education continues to gain momentum, we look forward to the continued development and design of technologies by and for Indigenous Peoples that center relational epistemologies

and create spaces for Indigenous creativity to flourish while also protecting sacred knowledge and language.

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