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Orthography Choice in Indigenous Language CALL Courses

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Article abstract

For many Indigenous Nations and organizations, computer-assisted language learning (CALL) courses have become an effective means to support Indigenous language revitalization and reclamation (ILR) efforts. Engaging a methodology of storywork and highlighting relationships between relevant fields of ILR, CALL, and applied linguistics, this article focuses on orthography choice and use in Indigenous language CALL courses. As contributors to three North American Indigenous language courses—Chikashshanompa' (Chickasaw) on Rosetta Stone, Kwakwala on 7000 Languages, and Southern Michif for Beginners on 7000 Languages, we offer reflections on community-led processes which addressed tensions and challenges in representing written language in CALL courses. Through reflections, we illuminate the complexity of orthography choice and use in Indigenous language CALL courses and share strategies with others creating their own Indigenous language courses.

Orthography Choice in Indigenous Language CALL Courses

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Abstract

For many Indigenous Nations and organizations, computer-assisted language learning (CALL) courses have become an effective means to support Indigenous language revitalization and reclamation (ILR) efforts. Engaging a methodology of storywork and highlighting relationships between relevant fields of ILR, CALL, and applied linguistics, this article focuses on orthography choice and use in Indigenous language CALL courses. As contributors to three North American Indigenous language courses—Chikashshanompa' (Chickasaw) on Rosetta Stone, Kwakwala on 7000 Languages, and Southern Michif for Beginners on 7000 Languages, we offer reflections on community-led processes which addressed tensions and challenges in representing written language in CALL courses. Through reflections, we illuminate the complexity of orthography choice and use in Indigenous language CALL courses and share strategies with others creating their own Indigenous language courses.

Résumé

Pour de nombreuses nations et organisations autochtones, les cours d'apprentissage des langues assisté par ordinateur (ALAO) sont devenus un moyen efficace de soutenir les efforts de revitalisation et de récupération des langues autochtones (RRA). En s'appuyant sur une méthodologie de travail narratif et en mettant en évidence les relations entre les domaines pertinents de l'RRA, de l'ALAO et de la linguistique appliquée, cet article se

concentre sur le choix et l'utilisation de l'orthographe dans les cours d'ALAO en langues autochtones. En tant que contributeurs à trois cours de langues autochtones d'Amérique du Nord – Chikashshanompa' (Chickasaw) sur Rosetta Stone, Kwak̓wala sur 7000 Languages, et Southern Michif for Beginners sur 7000 Languages – nous proposons des réflexions sur les processus menés par les communautés qui ont abordé les tensions et les défis liés à la représentation de la langue écrite dans les cours d'ALAO. À travers ces réflexions, nous éclairons la complexité du choix et de l'utilisation de l'orthographe dans les cours d'ALAO en langues autochtones et partageons des stratégies avec d'autres personnes qui créent leurs propres cours de langues autochtones.

Orthography Choice in Indigenous Language CALL Courses

Prologue

We begin with our introductions to share who we are and our relationships to each other and to our shared work:

> Taanshi, Jackie Dormer d-ishinihkaashoon. Winnipeg, Manitoba oschi niya. Michif gishkeehteen. My name is Jackie Dormer. I am from Winnipeg, Manitoba. I am learning Michif. I am a citizen of the Manitoba Métis Federation and I also have German, Polish, and Irish ancestry. I first connected with Heather as a student in her Michif course at the University of Manitoba. During this research, I worked as a research coordinator for NEƮOLN̲EW̲.
>
> Chokma, saholhchifoat Kari A. B. Chew. Chikashsha sa'yacha Chikashshanompa' ithanali. Chikashsh̲iyaakni' attali. Greetings, my name is Kari A. B. Chew. I am a citizen of the Chickasaw Nation and a Chikashshanompa' learner. I live in the Chickasaw Nation. With Lokosh and Juliet, I work on the Rosetta Stone Chickasaw course, among other Chikashshanompa' revitalization projects. I connected with my co-authors while a postdoctoral fellow and later researcher with NEƮOLN̲EW̲.
>
> G̲ilakas'la, nugwa'a̲m Anitsała. My name is "she who is an aunt" or Colette Child. G̲ilakas'la, nugwa'a̲m T'łakwama'ogwa. Gatutl̲an la̲x̲ gukwas Nagedzi Yaławad. My name is copper-eating woman or Sara Child. I come from the house of Hereditary Chief Tommy Hunt. I have ties to the Kwagu'ł, Gusgimukw, Nuuchanulth, Scot and English. I am Colette's mother. We (Sara and Colette) work with the Hase' Language Revitalization Society and helped to develop the Kwak̓wala course on 7000 languages to support parents of children in our language nest. We are passionate about the possibilities of growing our language revitalization efforts by drawing on innovative technologies.
>
> Chokma, Lokosh sahochifo. Kowishto' Iksa' micha Imatapo Inchokka-chaffa'ko̲ ishtaaoncholololili. Chikashsha sa'yacha Chikashsh̲iyaakni' attalit Chikashshanompa' anompolili. Division of language preservation imishkoboka' saya. Kari, Juliet iicho'maat Rosetta Stone Chickasaw ilibaaholissochi. Hello, my name is Gourd. I descend from the Panther Clan and the Their-Lean-To People house. I am Chickasaw, live on the reservation, and speak Chikashshanompa'. I am the executive officer of the division of language preservation. Kari, Juliet and I are writing Rosetta Stone Chickasaw together.
>
> Hello, my name is Juliet Morgan. I am of mostly French but also Italian, Portuguese, and Irish ancestry. I work for the Chickasaw Nation as the senior linguist in the Language Preservation Division. Lokosh is my boss and we have worked together with Kari since 2015 on Rosetta Stone Chickasaw. Lokosh invited both Kari and I to work on the Rosetta Stone course.
>
> Taanshi kiyawaaw. Olivia Sammons d-ishinihkaashon. A First Nations University of Canada d-atoshkaan. Hi everyone. My name is Olivia Sammons. I work at the First Nations University of Canada. I am a settler-ally and am

grateful to have been involved in Michif language work since 2009. I have been a member of the Prairies to Woodlands Indigenous Language Revitalization Circle (P2WILRC) since 2019.

Taanshi, Heather Souter d-ishinihkaashon. En Michif (aeñ zhaañ di Manitoba Métis Federation) niya. Ni-miyeeyihten chi-kakwee-kishkeehtamaan ma laañg-inaan di Michif. Greetings, my name is Heather Souter. I am a Michif (citizen of the Manitoba Métis Federation). I enjoy learning our Michif language. Together with Ma Taañt Verna Demontigny, Ma Taañt Grace Zoldy, Connie Henry and Dr. Olivia Sammons, we developed a set of online Southern Michif language courses offered through 7000 Languages. I also work for the University of Winnipeg.

As Indigenous and allied researcher-practitioners based in what is currently Canada and the United States, we come together around shared interest in and experience creating computer-assisted language learning (CALL) courses to support Indigenous language revitalization and reclamation (ILR). We have collaborated on other projects about Indigenous language CALL courses. From 2020-2022, Kari co-led a participatory action research project, about creating Indigenous language courses as decolonizing praxis (Chew et al., 2023), between the NEȾOLṈEW̱ "one mind, one people" Indigenous language research partnership at the University of Victoria (McIvor & Jacobs, 2018) and the ILR-focused CALL provider 7000 Languages. This research included community partners P2WILRC (Heather and Olivia) and Hase' (Sara and Colette), as well as Jackie, who worked as a research coordinator. In 2022, this research group joined with Lokosh and Juliet to present a webinar about how Indigenous language course creators centre cultural values in their courses (Chew et al., 2022b). During our work, Jackie identified a gap in literature concerning the choice and use of Indigenous language orthographies in Indigenous language CALL courses—an issue we had grappled with in work on our respective Indigenous language courses. We recognized that our experiences could offer support for other Indigenous Nations and organizations beginning their courses, and decided to write together.

Introduction

ILR is concerned both with decolonization and supporting Indigenous Peoples to learn and teach their languages. It is resistance – to coerced removals from homelands and forced assimilation at residential and boarding schools, among other settler-colonial projects (Tuck & Yang, 2012) – toward the continuance of Indigenous languages for generations to come. In ILR contexts, in-person language programming is a critical means of creating new speakers (see Hinton et al., 2018), and, increasingly, virtual programming is complementing and strengthening these efforts. Some Indigenous Nations and organizations have turned to CALL as a key strategy for teaching language (Alexander, 2018; Bishop, 2019; Bontogon et al., 2018). As contributors to three North American Indigenous language CALL courses, we are interested in the potential of CALL as an effective support for ILR. There are over 100 Indigenous language CALL courses across platforms like 7000 Languages, which uses the Transparent Language platform; Duolingo; Drops; Mango Languages; Memrise; and Rosetta Stone (Chew, 2022). CALL courses can be useful in ILR contexts because they enable learners to connect to language across time zones and geographic locations and for a limited

number of language teachers to reach hundreds and even thousands of learners through a single course (Galla, 2016).

Indigenous language courses are typically created by sovereign Nations, like the Chickasaw Nation, or Indigenous-led led non-profit organizations, like P2WILRC or Hase' Language Revitalization Society. Indigenous Nations and organizations work with a CALL provider to create a language course. Notably, 7000 Languages is the only non-profit CALL provider for Indigenous and minority languages and has supported the development of 60 courses in 33 languages. Other providers, like Rosetta Stone, are for-profit companies focused on teaching dominant languages, like English, Spanish, or French, but also create some Indigenous language courses. Through its Endangered Language Program, Rosetta Stone has supported the development of nine Indigenous language courses including Chikashshanompa'. Across CALL providers, courses use a combination of instructional modalities, including video, images, audio, and text, though not every provider offers all modalities. For example, Duolingo emphasizes gamified learning with text, audio, and graphics, while Rosetta Stone lessons are built around immersive videos supplemented by other modalities (Chew, 2022).

The study of CALL as a tool in ILR is at the intersection of multiple related fields. Though ILR has relationships with other areas of research, we agree with McIvor (2020) that it is "necessarily autonomous, and rather than being subsumed by another field, the [Indigenous] languages and communities involved are better served by the creation of interdisciplinary space for collaboration and partnership from independent places of strength" (p. 79; see also Daniels & Sterzuk, 2022). Therefore, we ground our work in ILR, while seeking connections to the additional relevant and interrelated fields of applied linguistics and CALL. We engage storywork as an Indigenous methodology (Archibald, 2008) to consider the representation of Indigenous language orthographies in text-components of our CALL courses. We offer insights into choices, made with care and community guidance, about how to represent both oral and written forms of language in Indigenous language CALL courses. We illuminate the complexity of orthography use in Indigenous language CALL courses and offer strategies that others may use when creating their own Indigenous language courses. Our aim is to support others by sharing personal experiences and offering a realistic insight into the possible obstacles and solutions regarding orthography choice.

The Creation and Use of Indigenous Language Orthographies

In what are currently Canada and the United States, Indigenous languages have long been passed down orally from generation to generation. Ancient oral traditions often included graphic elements, like "tattoos, pictographs, petroglyphs, birchbark libraries of knowledge, land forms and markings and placements of stones, in medicine wheels or wampum" and more (Battiste & Henderson, 2021, p. xii). However, formal representations of script, or writing systems, through orthographies are more recent developments (Schillo & Turin, 2020). Indigenous language orthographies may be Roman-based alphabets, such as for Chikashshanompa', Kwak̓wala, and Michif, in which characters represent sounds, or syllabaries, such as for Cree, Inuktitut, and Ojibwe, in which characters represent syllables. There are also logograms, in which characters represent words, like Ojibwe wiigwaasabakoon bark scrolls and L'nuk (Mi'kmaw) komqwejwi'kasikl sucker fish writings (Geniusz, 2009; Ramoo, 2021; Sylliboy, 2019).

Colonial legacies of trauma and harm to Indigenous language speakers have led to tensions in some communities over how to write language and the role of written

language in teaching and learning (Carpenter et al., 2016; De Korne & Weinberg, 2021; Hinton, 2014). Conflicts are especially common in situations where missionaries, academics, and other outsiders created and imposed orthographies on Indigenous Nations. Orthographies have functioned as tools of colonization, supporting efforts to convert and assimilate (Pennycook & Makoni, 2005) or to document and extract knowledge from Indigenous Peoples (Barrett-Mills, 2019). As Leonard (2017) states, orthographies are "connected to people and power structures" and therefore "never neutral" (p. 26). Orthographies created by outsiders are often attempts to standardize language (Baraby, 2002; Limerick, 2018) and advance Western notions of literacy (Browning, 2016; Rivett, 2017) that are at odds with Indigenous ways of knowing and being. L'nu artist, poet, and scholar Michelle Sylliboy (2022) shares an especially egregious case of a French missionary who claimed and appropriated L'nuk komqwejwi'kasikl sucker fish writings in order to convert L'nuk to Christianity. An act of resistance, Sylliboy is reclaiming komqwejwi'kasikl as a thought process and living language.

Given the intertwining of Indigenous language orthography development with colonization, the creation of Indigenous language orthographies is an area of study that benefits from interdisciplinary perspectives. While linguistics and related fields may be concerned with the utility of the orthography itself, ILR offers an additional lens to critique power structures and position orthography reclamation as decolonization. From an ILR perspective, the creation and reclamation of orthographies by Indigenous Peoples both supports ILR and exemplifies linguistic sovereignty (Schillo & Turin, 2020). Orthography development by Indigenous Nations has been underway for decades and in some cases much longer. In the early 1800s, in Cherokee homelands in the southeastern United States, Sequoyah designed the ᏣᎳᎩ ᎦᏬᏂᎯᏍᏗ (Cherokee language) syllabary, which was later printed in the *Cherokee Phoenix* newspaper (Cushman, 2011). Similarly, in 1978, after studying with a linguist, Dave Elliot created the SENĆOŦEN alphabet, now in use by the W̱SÁNEĆ School Board in Brentwood Bay, British Columbia to teach the language. The time Elliot spent working on the orthography is considered sacred and the orthography itself is regarded as a gift to the community (Underwood, 2011).

Other efforts to establish an orthography have been undertaken by collectives. Growing out of an effort to standardize Indigenous languages in Canada, the 1993 Mohawk Language Standardisation Project was a Kanien'kehá:ka (Mohawk)-led effort to establish, through consensus by six Kanien'kehá:ka Nations, a standardized Roman-based orthography for Kanien'kéha (Mohawk language) (Mohawk Language Steering Committee, 1993). Similarly, two hundred Anishinaabe Elders, teachers, and other language advocates came together in 1996 to choose a common Anishinaabemowin orthography. They established the "Double Vowel" system as the International Anishinaabe orthography (Ningewance, 1996). The examples of ᏣᎳᎩ ᎦᏬᏂᎯᏍᏗ, SENĆOŦEN, Kanien'kéha, and Anishinaabemowin orthography development underscore the necessity of Indigenous leadership in orthography creation. Research has shown that a trusting relationship between the creator of the orthography and the community has a greater impact on the implementation and acceptance of an orthography than the characteristics of the orthography itself (Hinton, 2014; Stebbins et al., 2017).

Indigenous Language Orthographies in Digital Spaces

The digital age has brought a new need for orthographic representation (Brinklow, 2021; Soria et al., 2014) and also raised issues of how to render different orthographies in online spaces. These developments bring additional fields concerned with language and technology, such as CALL, into conversations about orthography development and use. Indigenous language orthographies may use characters that are not represented on Roman-alphabet keyboards (Schillo & Turin, 2020). In situations where an orthography uses non-Roman characters, orthography development may also require keyboard development. In Canada, First Peoples' Cultural Council, through the FirstVoices suite of web-based tools, has created over 100 Indigenous language keyboards representing the various orthographies (Chase & Borland, 2022). Even when a keyboard exists, using complex orthographies in digital spaces can present problems if characters do not display correctly (Littell et al., 2018). One solution is for orthographies to be incorporated into Unicode, an encoding standard that ensures characters can be used across devices, programs, and platforms. In 2004, the Osage Nation developed a new Osage orthography, which was accepted into Unicode in 2016 (Barrett-Mills, 2019). Having Unicode-compliant orthographies and corresponding keyboards creates new opportunities for typing, texting, posting, and creating online Indigenous language learning resources, including CALL courses.

With English currently considered the Internet's universal language, meaning that about sixty percent of websites are in English (Richter, 2024), Indigenous language writing systems can allow language users to express their identities in online spaces. In the case of Cherokee, the syllabary embodies spirituality, land, history, and language (Cushman, 2011), and so the ability to use it online is a means to "decolonize [the] experience" of technology and assert identity (Kemper, 2016, p. 248). For Sakha, a North Siberian Turkic language, some dialectal features have come to symbolize home, comfort, familiarity, and solidarity for rural speakers who have moved into the metropolitan areas (Ferguson, 2020). When writing in Sakha online, speakers may use local dialects with word initial [h] rather than the standard [s] to perform authenticity and foster a sense of belonging, despite concerns that not conforming to a standard may threaten language maintenance (Ferguson, 2020). Importantly, while ideas and strategies can be shared to support ILR, each Nation will make decisions about orthography creation and use in alignment with specific needs and aspirations for their language.

When Indigenous Nations and organizations work with a CALL provider to create a language course, they typically use the CALL providers proprietary technology and therefore do not have control over the interface or a choice about whether to include written language in their courses. Working within the constraints of the CALL provider's technology, Indigenous language course creators must seek solutions that work best for their community (Chew, 2022). When text is included in courses, course creators may use just one orthography. A course called nêhiyawêtân (Let's Speak Cree), based on the open source Oahpa! app first developed for Northern Saami, uses the Standard Roman Orthography for nêhiyawêwin (Plains Cree) with course-specific variations. In this case, use of this orthography aligns the course with existing materials and makes it consistent in regard to writing conventions (Bontogon, 2016). While some learners may struggle when orthography use and spelling is not consistent (Bontogon, 2016), others find that orthographies, especially when not phonetically transparent, can make learning more difficult (Lothian et al., 2019). For course creators, the use of a consistent orthography makes writing content for a CALL course less time-consuming

and resource intensive, which is critical when working with an under-resourced language. As noted by Soria et al. (2014), standardization helps "to assure 'a long electronic life' to linguistic resources and to allow a real and easy exchange of information, resources and technologies" (p. 2). This interoperability helps to support the development of larger collections of teaching and learning resources and facilitates reciprocal sharing of resources between language programs.

While there can be benefits to the use of a single standardized orthography, not all communities desire standardization, and digital resources offer increased possibilities for including variation. Advocating for balance and respect of different views, Genee and Junker (2018; see also Genee, 2020) explain that the Blackfoot Language Resources and Digital Dictionary, a suite of online language learning and teaching resources, uses a "relaxed search" that de-emphasizes spelling by recognizing both standardized spellings in an official orthography and alternatives. In another example, the Jeju-eo Talking Dictionary project, for the Jeju-eo language spoken on Jeju Island in South Korea, uses the orthography of the most recent lexicographic materials and lists headwords and regional variants as they are in the reference materials (Saltzman, 2017). The Northern Paiute Language Project, an online language learning resource including a lexicon and text database, allows the user to select their community's spelling system when searching the database. This approach avoids privileging one orthography over another and provides an advantage over print dictionaries in which one spelling will be given priority (Garrett, 2008; Genee, 2020; Genee & Junker, 2018). While these approaches require additional effort, declining to adopt a standardized writing system may actually encourage writing in the languages, as learners can write freely without mistakes (Lillehaugen, 2016).

Representing written and oral language in online spaces is a potential area for increased collaboration between the fields of ILR, CALL, and applied linguistics. While the majority of CALL platforms offering Indigenous language courses were initially designed for dominant languages, some have been designed specifically for Indigenous languages (Alexander, 2018; Antonsen et al., 2009; Bontogon et al., 2018). These Indigenous language-focused CALL platforms take differing approaches to the inclusion of text. Some create space for the inclusion of multiple orthographies, while others eschew text. For example, developers of a CALL tool for Yajarra Nganka Nyikina, spoken in Western Australia, completely redesigned the tool, based on community input, to focus on oral rather than written language (Westwood & Jackson-Barrett, 2013). Future collaborations between ILR, CALL, and applied linguistics researchers may focus on new strategies for sharing language in ways that respond to a diversity of community needs.

Methodology

Our collective writing is grounded in decolonizing and Indigenous methodologies privileging self-inquiry and relational knowledge (Archibald, 2008; Kovach, 2021; Smith, 2021; Wilson, 2008). Of storywork as a methodology, Archibald (2008) writes, "Sharing what one has learned is an important Indigenous tradition. This type of sharing can take the form of a story of personal life experience and is done with a compassionate mind and love for others" (p. 2). While Western approaches to research have sought to distance the researcher from the research, Indigenous methodologies do not require researchers to "leave ourselves, our communities, and our cultural context out of our research" (Gaudet, 2019, p. 51). On the contrary, research is rigorous *because* we situate ourselves with in it. Kovach (2021) affirms that "knowing the storyteller as

an active agent within a relational world, situated in a particular time and context, is pivotal in gaining insight into the story being told" (p. 158). Our self-reflexivity, grounded in our own knowledges and cultural contexts, enables us to produce knowledge from within and for others to learn from it.

The process of crafting our stories began with our review, led by Jackie, of existing scholarship focused on Indigenous language orthographies in CALL. Reflecting on key ideas and themes within the literature, Jackie worked to create a set of questions for course creators to guide a process of self-reflection and sharing the stories of the Indigenous language CALL courses. The questions were: 1) Why do you think it is important to include a written form of your language? 2) Did your community have an existing standard orthography? 3) Did you use one or multiple orthographies? 4) What resources exist and in which orthography? 5) How did you consider relationships in the decision to use a particular orthography? Creators of the Chikashshanompa', Kwakwala, and Michif courses then worked together to reflect on and respond to the questions. The questions prompted course creators to consider their community contexts, choices around orthography use, and implications of these choices. While each group of course creators reflected on the same set of questions, the reflections offered by course creators ultimately take their own form.

The following section consists of a brief introduction to each of the courses followed by storied reflections from each team of course creators. These stories are, as Kovach (2021) writes, "both method and meaning" (p. 175). For this reason, we choose not to include a formal analysis section, but rather to invite the reader in as a listener with agency and responsibility. Wilson (2008) explains that:

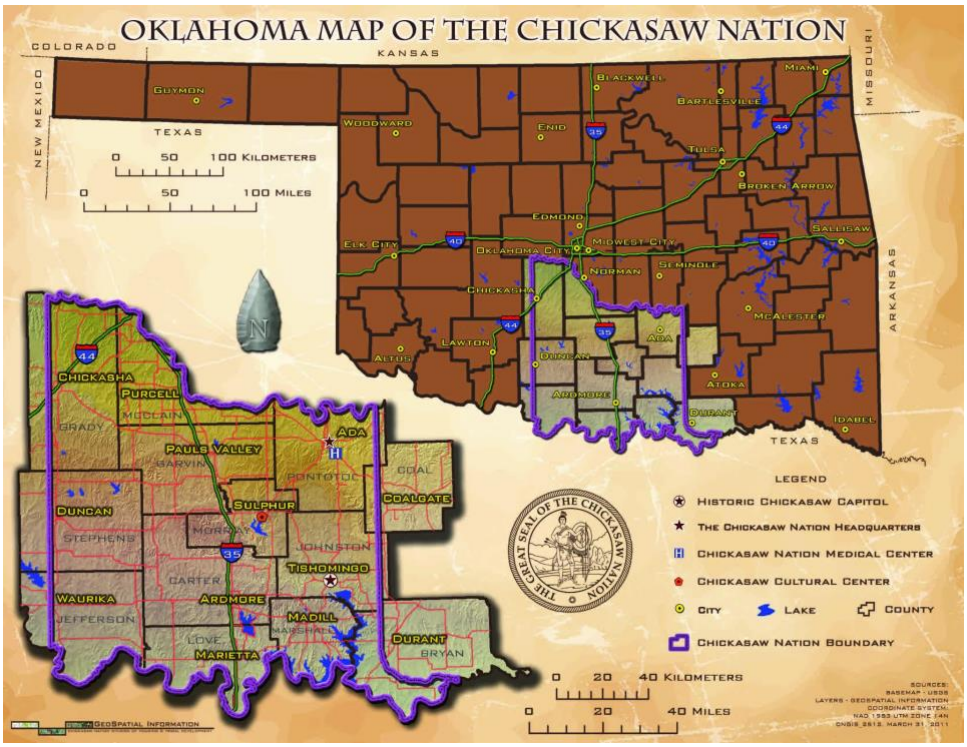
> For the storyteller to explain too much is not honouring you as the listener… The main point of Indigenous discourse is to provide a foundation or platform from which to grow, without putting a ceiling of limit on the amount or direction of that growth. It is your responsibility as a listener to learn and to grow, as you too are accountable to all our relations. (p. 135)

Reflections

Chikashshanompa' (Kari, Lokosh, and Juliet)

Chikashshanompa' is a Muskogean language spoken on the Chickasaw Reservation in southcentral Oklahoma (see Figure 1). The Chickasaw Nation, under the leadership of Governor Bill Anoatubby, founded the Chickasaw Language Revitalization Program in 2007, which came under a dedicated Division of Language Preservation in 2021. The Division of Language Preservation oversees a number of in-person and online programs and projects aimed both at the documentation and continuance of Chikashshanompa' (Chew & Hinson, 2022). Currently, there are less than 30 anompí'shi' (first language speakers), most of whom are Elders of the great-grandparental generation. A result of language revitalization and reclamation efforts, there is a growing number of proficient anompa' shaali' (additional language learners), some of whom are raising their children as a new generation of anompí'shi'.

Figure 1
Oklahoma Map of the Chickasaw Nation (Chickasaw Nation Geographic Information, 2011)



Technology has been important for Chikashshanompa' revitalization because approximately two-thirds of over seventy-thousand Chickasaw citizens live off-reservation (Chew & Hinson, 2022). The Chickasaw Nation chose to work with Rosetta Stone, a computer-assisted language learning company, to create an online language course because of the company's previous work with Indigenous Nations through its Endangered Languages Program and custom product featuring video-based lessons. The Chickasaw Nation is committed to providing high quality language learning products to all Chickasaw citizens, regardless of where they live.

There are four levels of Rosetta Stone Chickasaw, each with forty lessons. The lessons feature a Chikashsha family doing activities together in the language. Each lesson has the following sections:

- Holba' Kanalli' (Video): a 2–4-minute immersive video
- Anompa (Words): vocabulary flashcards
- Pisa (Watch): a short video offering additional grammar or culture information
- Ithana (Learn): cards with example sentences, grammar explanations, and cultural information
- Imaabalhchi (Practice): a practice assessment with questions about lesson content
- Ittimanompoli (Read): an optional reading aloud activity in which learners listen to audio of a speaker and then record themselves for comparison
- Holissochi (Write): an optional writing practice activity for learners to listen to audio and then use the orthography to type what they hear
- Ishtalhpisa' (Test): a scored assessment with additional questions about lesson content

The Rosetta Stone Chickasaw project began in 2015 with work on Level 1 and has an anticipated completion date of Level 4 in 2025. Kari, Juliet, and Lokosh were the primary course authors and worked with Marion Bittinger of Rosetta Stone. Instrumental to this developmental process were the anompí'shi' members of the Rosetta Stone Chickasaw subcommittee, the late Jerry Imotichey, the late Pauline Brown, the late Stanley Smith, Rose Shields Jefferson, and Luther John.

Chikashshanompa' Orthographies

There are two recognized Chikashshanompa' orthographies. One is the Humes orthography, by anompí'shi' Vinnie May Humes and Reverend Jesse J. Humes, used in *A Chickasaw Dictionary* (Humes & Humes, 1972) to record over 8,000 entries. In creating their orthography, Mrs. and Reverend Humes "made an effort to spell the words as they sound, in the hope that anyone using the list could pronounce them" (p. ix). They included a spelling in the orthography and a pronunciation spelling (e.g., three - tuchina - tooch-e-nah). The only special characters used in the Humes orthography are italics to represent nasalized vowels (the pronunciation spelling uses several diacritics on vowels to capture different pronunciations of long, short, accented, and unstressed vowels). The Humes orthography is a treasured resource within Chikashshanompa' revitalization work, most often used as a reference and learning tool. The dictionary, with Mrs. Humes' audio recordings for entries, is available online (Chickasaw Nation, 2020). The orthography is generally not used productively to write new words or sentences in the language. This is because the Humes dictionary contains only entries and no example sentences. It does not have examples of how to write full sentences or conjugate verbs.

The other orthography, by linguist Pamela Munro and the late anompí'shi' Catherine Pickens Willmond, was first used in *Chickasaw: An Analytical Dictionary* (Munro & Willmond, 1994). In the Munro-Willmond orthography, "each Chickasaw sound has just one spelling, and each spelling has one standard pronunciation" (p. ix). Additionally, Munro and Willmond published *Let's Speak Chickasaw: Chikashshanompa' Kilanompoli'* (2008), a grammar-based textbook currently used for university and community courses and for self-study. The Munro-Willmond orthography uses underlining for nasalization, double vowels for long vowels, double consonants for geminates, an acute accent for pitch accent, and a circumflex for falling tone (e.g., three - tochchí'na). While anompa' shaali' tend to prefer the Munro-Willmond orthography for its consistency, anompí'shi' often point out that it has limitations in terms of capturing variation in the language. This is because the Munro-Willmond materials tend to privilege Mrs. Willmond's variety of the language and do not always represent the varieties of anompí'shi' active in Chikashshanompa' revitalization efforts.

The Chickasaw Nation does not have an official orthography. Because our language was entirely oral for thousands of years, "the Chickasaw Nation encourages its citizens to engage with the language in a way that feels right for them, signalling openness to any form of writing or to the choice to not write the language down" (Chew et al., 2022a, p. 242). The Division of Language Preservation is not interested in putting limits on language expression, nor does it want to engage in "orthography wars" (Hinton, 2014). When possible, the Division of Language Preservation will also use both orthographies. For example, in the 2015 reprinting of the Humes dictionary (Hinson, 2015), Munro-Willmond spellings are included alongside the Humes original entries.

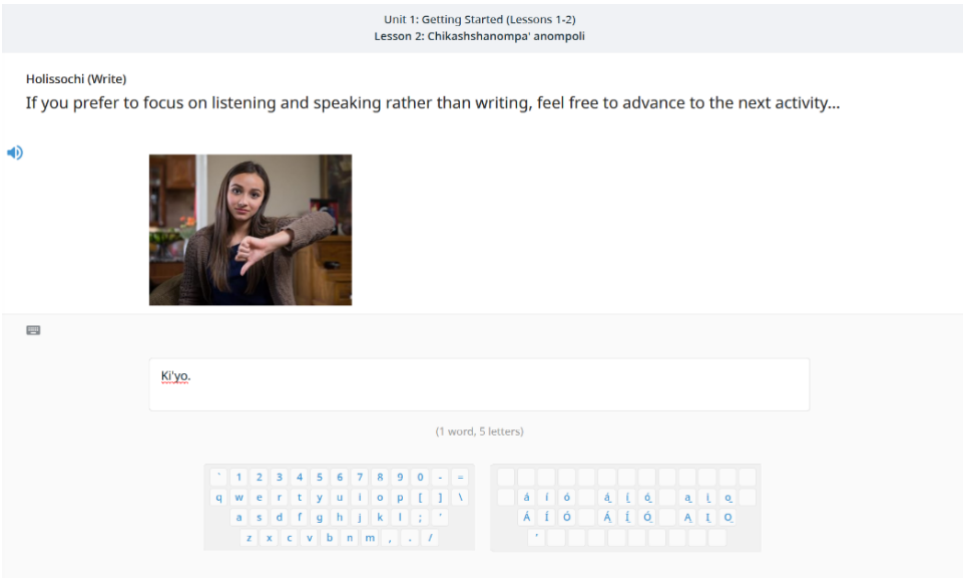
The Division of Language Preservation has made decisions about the use of each orthography in different spheres. For example, the name of Chickasaw people in the language is represented as Chikasha in the Humes orthography and Chikashsha (with a geminate *sh*) in the Munro-Willmond orthography. The Humes spelling is usually preferred in community spaces, though not always. When buildings or programs are named, either orthography may be used. For example, the Chuka Chukmasi (Beautiful Home) Home Loan Program is in the Humes orthography while the Aalhakoffichi' (A Place for Healing) Adolescent Transitional Living Facility is in the Munro-Willmond orthography. The Division of Language Preservation primarily uses the Munro-Willmond orthography for language documentation, teaching materials, and publications. The Munro-Willmond is also the primary orthography used in Rosetta Stone Chickasaw.

Representing Orthographies in Rosetta Stone Chickasaw

Rosetta Stone Chickasaw is a custom product, with an interface created by Rosetta Stone. The interface required the inclusion of Chikashshanompa' text, but this was not a major source of conflict. Many learners want to learn to read and write Chikashshanompa', especially in the Munro-Willmond orthography, so that they can use written forms of the language in email, text, social media posts, and more. We decided to present lesson content in the Munro-Willmond orthography, but learners are never required to write the language.

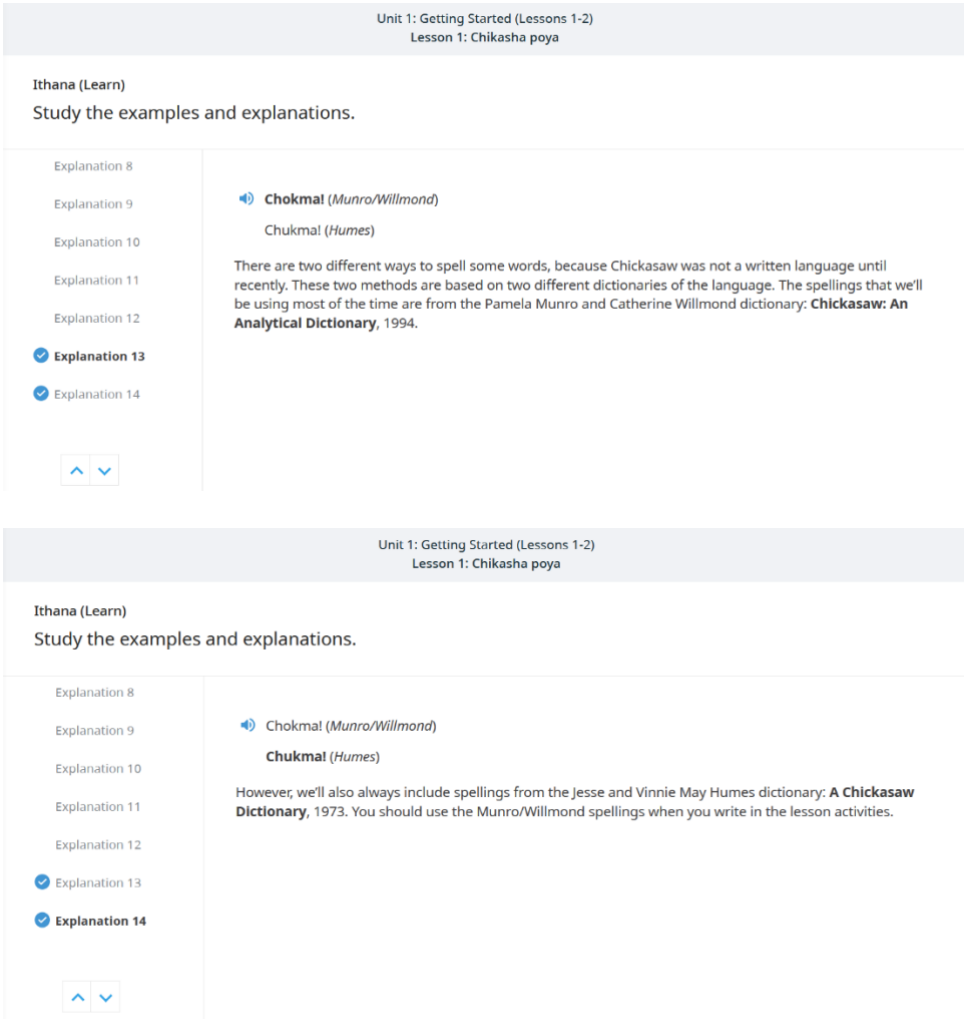
The optional Holissochi activity is included in each lesson so that learners can practice their spelling if they desire. Before beginning Holissochi, learners see a screen stating: “If you prefer to focus on listening and speaking rather than writing, feel free to advance to the next activity. Otherwise, write what you hear. Don’t forget to use the keyboard at the lower right.” Because the Munro-Willmond orthography uses special characters a keyboard appears on screen for learners to use (see Figure 2). A recent update to the Rosetta Stone Chickasaw interface also aligns the special characters used in the course with the iOS Chikashshanompa' keyboard, enabling learners to use the keyboard on their Apple phones, tablets, laptops, and computers.

Figure 2
Rosetta Stone Chickasaw Holissochi Activity



While we primarily used the Munro-Willmond orthography in Rosetta Stone Chickasaw, it was important to have some representation of the Humes orthography. The Humes dictionary is of great significance to the Chickasaw Nation because it was created solely by anompí'shi' to preserve Chikashshanompa' for future generations. The Humes dictionary tends to be preferred by other anompí'shi', who find this orthography easiest to use and read. When anompí'shi' write Chikashshanompa', their usage looks most like the Humes orthography. Out of respect for anompí'shi', we worked to explain our decisions about orthography use. For example, Figure 3 shows two Ithana cards comparing Munro-Willmond and Humes spellings, paired with an explanation of how the orthographies will be used in the course.

Figure 3
Comparing Munro-Willmond and Humes Spellings



We also included the Humes spelling of vocabulary words in a table at the end of each Ithana section. Figure 4 shows this table for Lesson 1. As shown, some vowels and consonants are represented differently in each orthography. As this card indicates, there are a few instances where the Humes spelling is preferred or more commonly used by the Chickasaw Nation, such as in the case of Chikasha. These noted words are used throughout Rosetta Stone Chickasaw. We could not include every vocabulary word in the table because not all words used in the course, especially those for newer concepts

like *cell phone* and *texting*, were in the Humes dictionary. Notably, while we created new spellings in the Munro-Willmond orthography for words like these, we did not create them in the Humes orthography.

Figure 4
Table with Humes Spellings

Munro/Willmond	Humes
Chokma!	Chukma!
Chikashsha	Chikasha
Taloowa’	Taloa

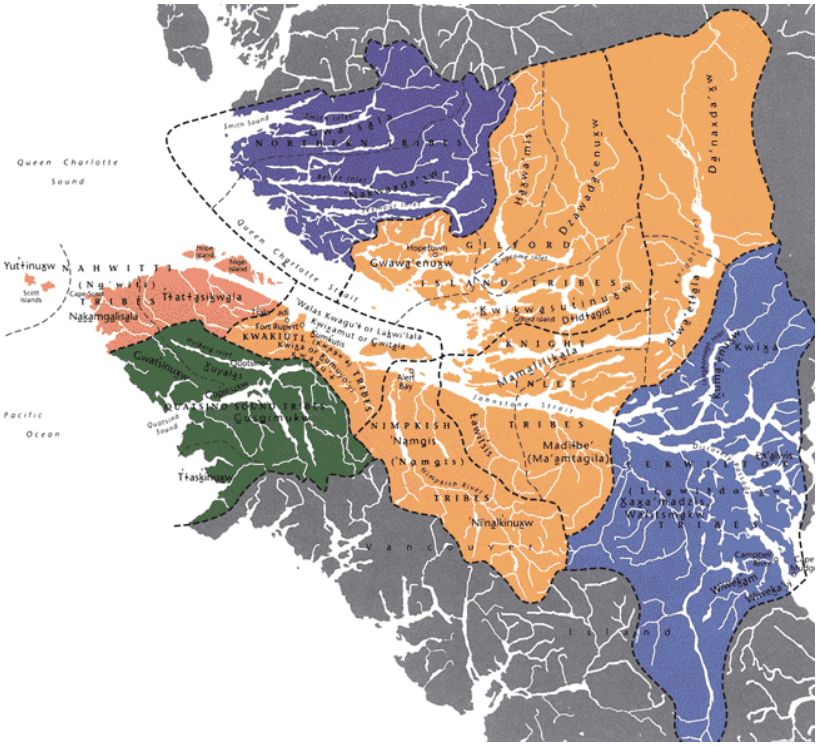
Considering Relationships

In making decisions about orthography use in Rosetta Stone Chickasaw, there were many factors to consider including relationships with anompí'shi' and anompa' shaali'. For anompí'shi', their relationship with writing is very individual. They typically write the language however they want and however it makes sense to them, capturing their own variety of the language. This works well for someone who already knows the language, whereas anompa' shaali' struggle when there is not standardization across learning materials. For example, when anompa' shaali' encounter a word they do not know in learning materials, they may look it up in the dictionary. If spellings are inconsistent, it is difficult to locate and pronounce the word. Consistent use of the Munro-Willmond orthography is a pedagogical choice to support learners. Overall, our emphasis in the course was not simply to teach writing, but to support learners to use Chikashshanompa' in oral and written form, if desired, and to support their sense of Chikasha identity and connection to community.

Kwak̓wala (Sara and Colette)

The Kwak̓wala 7000 Languages course was created by the Hase’ Language Revitalization Society. Hase’ is a family-based non-profit founded by Sara and supported by a small, intergenerational group committed to language learning. The Hase’ group works to bring the language, Kwak̓wala, back into Kwakwaka̲’wakw home and communities. Hase’ work takes place in Kwakwaka̲’wakw communities surrounding Gwa’dzi (Port Hardy, British Columbia), including the Kwagu’ł, Gusgimukw, Gwa’sala-‘Nakwaxda’xw, and Na̲mgis (see Figure 5). Hase’ aspires to support language learners who live across Vancouver Island and the lower mainland of British Columbia. Hase’ promotes collaboration across the Nation, as all communities work together to bring the language back to life.

Figure 5
Kwakwaka'wakw Territories (Leinberger for U'mista Cultural Society, 1998)



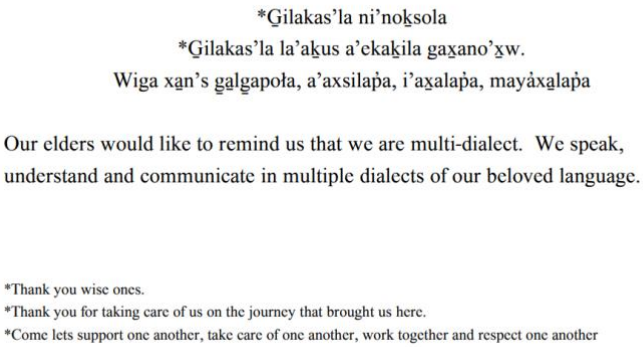
In 2019, Hase' Language Revitalization society was awarded a grant from the National Research Council of Canada (NRC) to develop a free online course. We partnered with 7000 Languages. We also put together a team to work on our course outline. Course developers Sara, Colette, Jessica Frederick, and Thomas Wamiss worked with fluent speakers, parents from their language nest, and others who had been working with Hase' society and their community. The team decided the course would:

- help parents gain the ability to communicate with their children during common activities of daily living within their homes and communities;
- help learners prepare to speak during a visit with Elders; and
- introduce vocabulary to help learners ask and answer questions as well as learn to think about how sentences are formed in Kwak̓wala.

The developers of the Kwak̓wala course had an opportunity to draw on a multitude of writing systems and written resources for the course. In addition, we had numerous fluent speakers to support our work. To begin we sought community feedback by forming a committee of Elders and parents of children from our language nest. Collectively we chose to draw on the U'mista writing system. The writing system had been adopted by Elders and Knowledge Holders as the official writing system for our demographic area making our decision an easy one. Our committee chose the writing system to honour our Elders, many of whom are no longer with us. Added to this, most learners find the U'mista system very user friendly, practical, easy to learn and easy to use. This made our decision easier. Our group also wanted to make a decision that would put an end to local dialect and orthography debates, which, as experienced by many Indigenous Nations, can plague and stall ILR work for generations (see Hinton, 2014).

In addition, in our Kwak̓wala course, we chose to include a statement to remind learners that our community is multi-dialectal and that all dialects should be respected (see Figure 6). Our dialect is our imprint on the land, connecting us to who we are and where we come from. It also connects us to our ancestors. When we become too concerned with differences of dialects, it can lead to exclusion and division in our communities. After reflection, we realized this is not something we did to ourselves but rather it is something imposed on us by Western ways of thinking that impacts our work to revitalize our languages. As we move forward, we must ensure that we keep this in mind to decolonize our ways of thinking.

Figure 6
Kwak̓wala Welcome



Wiga' O'amx̱!: Just Do It! This is a common phrase heard among our speakers; speakers who have warned us for decades that the tide to language loss was turning and that we had to act fast. For far too long we have let debates about dialects, writing systems, and where and how our language should be taught disrupt our language learning. We made a practical, deliberate, and decisive decision to support learners and draw on advancements in technology to do so. That collective decision to support our adult language learners who wish to bring language back into their homes, among their families and on the land, gave us our vision and the Elders gave us our compass. As Sara's Mom always says, "Gilakas'la la'akus a'ekakila gaxano'xw, thank you for taking care of us on the journey that brought us here."

Michif (Heather and Olivia)

Southern Michif is one of three Michif varieties spoken by the Métis. Other varieties of Michif include Michif French and Northern Michif (Sammons, 2019). With historical origins in the Red River Valley and no dedicated land base there, the Métis have settled in communities across the Canadian Prairies and across the border into the northern United States due to a history of multiple forced dispersions (Sprague & Frye, 1983). Within Canada, speakers have been concentrated in several communities throughout Manitoba and Saskatchewan, while in the United States they have been concentrated in North Dakota and Montana, as shown in Figure 7.

Figure 7
Métis Nation Homeland (Métis National Council, 2018)

Michif is a structurally complex and unique contact language with mostly Cree-sourced verb phrases and French-sourced noun phrases (Bakker, 1997; Rhodes, 1977). It is being actively revitalized and reclaimed by Métis people across the Métis homelands and currently sits between the levels of *8a Reawakened* and *8b Reintroduced* using the Revitalization Expanded Graded Intergenerational Disruption Scale (Lewis & Simons, 2010, p. 15). Notably, Michif language vitality differs from community to community. That is, Michif speakers may still be found in some Métis communities, while in others there are no longer first-language Michif speakers. While the Canadian census does report on the estimated number of speakers across Canada, these numbers are likely significantly inflated due to ambiguities around the label "Michif" and the lack of differentiation between the Michif varieties mentioned above on the census. However, based on conversations with Michif language speakers and language revitalization practitioners, there are very likely fewer than 100 speakers of the Southern Michif variety in Canada, all of whom are over sixty years of age. The motivation to create the Southern Michif for Beginners course originated out of a need to provide community members with greater access to authentic language resources. As expressed by Heather, "giving people access to language" online was "really one of the biggest keys … because we don't have a place of our own where we all live together, and we can create a physical community" for language reclamation (Chew et al., 2023). The online format was particularly appealing given that many Michif learners live outside the ancestral homeland and often do not have the opportunity to hear the language being used in their everyday lives.

The course was developed by the P2WILRC in partnership with lii Vyeu pii lii Vyee (Old Ones or Elders), 7000 Languages, and the NRC Indigenous Languages Technology Project. It was developed from 2019 until 2021 using the Transparent Language learning platform, resulting in both a version that is freely accessible online and a version that is downloadable as a mobile application. The course is focused on small conversations and features recordings made by both first- and second-language Michif speakers. It includes 20 units, with each unit containing between one and eight text and audio lessons that are accompanied by listening, speaking, and writing practice. A document listing the contents of each lesson is also included. Inspired by the Minimalist Framework (Quinn et al., 2017), the course presents short conversational exchanges that build vocabulary and allow for implicit learning of Michif grammar. This enables learners to communicate immediately, even at a basic level. There is also a focus on *learner language* or *survival phrases* (i.e., Michif words and phrases that help

learners to maintain a language immersion environment without reverting to English), as well as language around Eldercare, all of which were co-developed by the team.

Michif Orthographies

While there is currently no official standard orthography in use for Southern Michif (Gabriel Dumont Institute of Native Studies and Applied Research, 2018; Papen, 2005), the primary community orthographies that are in use across the Métis homeland include: 1. the Turtle Mountain orthography and 2. the Double Vowel orthography. The Turtle Mountain (TM) orthography was developed by Michif speakers Ida Rose Allard and Patline Laverdure in collaboration with linguist John Crawford at the Turtle Mountain Community College prior to the publication of *The Michif Dictionary: Turtle Mountain Chippewa Cree* in 1983 (Laverdure & Allard, 1983). This is understood in the Southern Michif speaking community to be one of the earliest orthographies in use for Michif and is designed to be intuitive for English speakers, although it does not consistently represent all sounds. The working Double Vowel (DV) orthography is based on the work of late Michif speaker Rita Flamand and is also influenced by the work of Ida Rose Allard, as well as discussions with linguist Robert Papen and a number of dedicated language learners. The differences between the orthographies can be seen in examples (1) and (2) (adapted from Souter et al., 2022):

(1) TM: *Datoushkawn daw la bawnk.* "I work in the bank"
DV: *D-atoshkaan daañ la baañk.*

(2) TM: *Keemiyayw larzhawn.* "S/he gave money"
DV: *Kii-miyeew l'arzhaañ.*

Including Writing in the Michif 7000 Languages Course

While our primary goal in developing the course was to support learners in the development of oral proficiency, our motivation for including the language in written form was to provide additional support for learning. Providing the written form in an internally consistent orthography allows learners to notice the many regular grammatical patterns of the language and observe and internalize the unique morphosyntax of Michif more easily. Written text that adequately represents all the sounds of the language and is internally consistent can also serve as reinforcement for pronunciation, particularly for those with a preference for visual learning. Many learners also show a strong interest in learning to write in the language, particularly when communicating with each other and with first-language speakers via text messaging and social media. This active use of written Michif is really a learner-driven phenomenon which will likely only increase in the years to come.

In addition to supporting the needs of learners, there were practical considerations as well. The choice to include written language was somewhat dictated by the format of the course platform. While an option now, picture-based learning activities on the 7000 Languages platform were not available at the time that the course was developed. Even so, there were options available which helped to minimize the emphasis on writing. Similar to the Rosetta Stone Chickasaw course, the course was designed in such a way that learners are not generally required to input text in the language, but only to recognize what is already written. Additionally, the 7000 Languages platform allows for activities that require learners to input writing to be

turned on or off depending on the needs and/or wishes of the community developers and stakeholders.

Representing Written Language

Decisions around orthography, dialectal variation, and terminology in designing an Indigenous language course, particularly one that is delivered online and potentially reaching a geographically diverse audience, must be treated with a great deal of care, reflection, and sensitivity. Decisions around these issues can have consequences not only in shaping the general direction of the course, but also in how the course is perceived by the community (Souter & Sammons, 2022). When Michif words and phrases appear in the course, we aimed to ensure that the textual representations matched speakers' pronunciations as closely as possible, and that these spellings were consistent throughout the course, so that this resource would both honour speakers' pronunciations and be easy for learners to work with.

Given these considerations--particularly in terms of consistency and transparency for learners—and as a result of ongoing consultation with Michif speakers and learners, we opted to use the DV orthography for the initial launching of the online course. Since the DV orthography is a shallow, internally consistent system, this allows learners to find patterns and sight-read words and chunks of words more easily, which facilitates faster learning (Souter et al., 2022). In addition, in crosslinguistic early literacy studies, the use of a transparent orthography has been shown to provide an "orthographic advantage" in improving reading-accuracy among learners. This is likely due, at least in part, to the lower cognitive load put on the learner (Galletly & Knight, 2004; Knight et al., 2019). The use of a transparent orthography also requires less explanation and thus less instructional support, an important consideration when working within an independent online learning context.

A description of the writing system used was provided at the beginning of the course (Figure 8), as well as a pronunciation guide listing the various orthographic representations, sounds they represent, Michif examples, and equivalent English sounds (Figure 9). While a single orthography was chosen for the initial version of this course, it is possible to expand upon this in future releases. In fact, there have been discussions with community partners and stakeholders about producing another version of the course using the TM orthography in the future.

Figure 8

Statement about Michif Writing System in Online Course

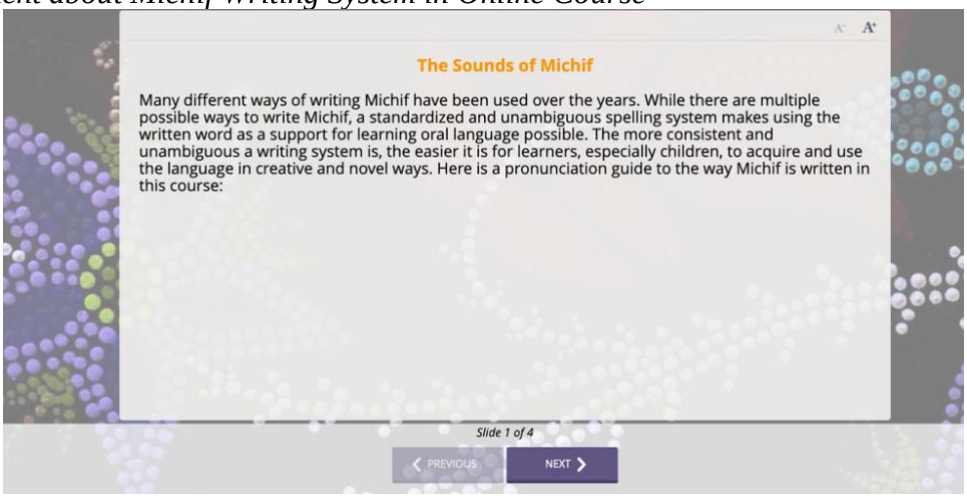
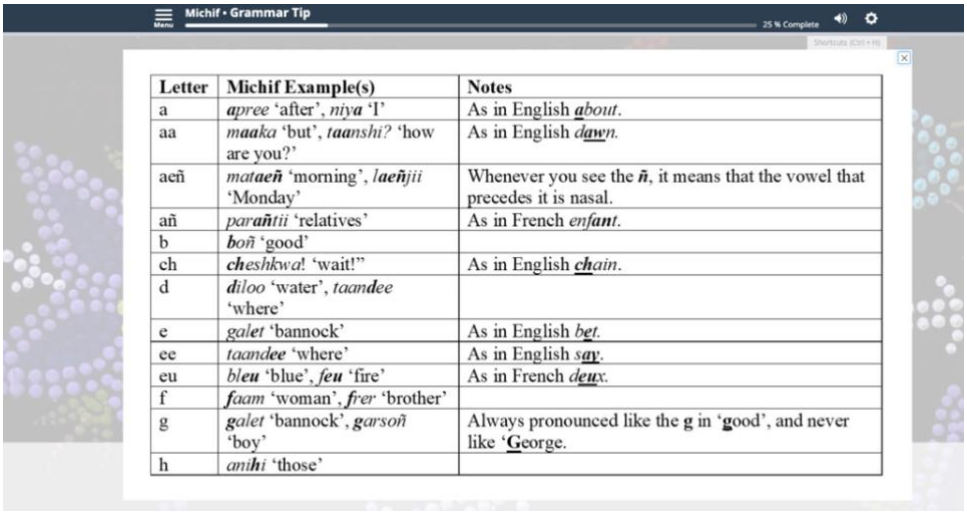


Figure 9
Sample of Pronunciation Guide Provided in Course



Letter	Michif Example(s)	Notes
a	*apree* 'after', *niya* 'I'	As in English *about*.
aa	*maaka* 'but', *taanshi?* 'how are you?'	As in English *dawn*.
aeñ	*mataeñ* 'morning', *laeñjii* 'Monday'	Whenever you see the **ñ**, it means that the vowel that precedes it is nasal.
añ	*parañtii* 'relatives'	As in French *enfant*.
b	*boñ* 'good'	
ch	*cheshkwa!* 'wait!"	As in English *chain*.
d	*diloo* 'water', *taandee* 'where'	
e	*galet* 'bannock'	As in English *bet*.
ee	*taandee* 'where'	As in English *say*.
eu	*bleu* 'blue', *feu* 'fire'	As in French *deux*.
f	*faam* 'woman', *frer* 'brother'	
g	*galet* 'bannock', *garsoñ* 'boy'	Always pronounced like the g in 'good', and never like 'George.
h	*anihi* 'those'	

Michif Resources

Michif resources can be found in both the TM orthography, the DV orthography, and in other working orthographies. *The Michif Dictionary: Turtle Mountain Chippewa Cree* (Laverdure & Allard, 1983) is the most comprehensive Michif dictionary to-date, and, as mentioned above, was written using the TM orthography. However, because this dictionary has now been out of print for several decades and is somewhat difficult to access, many learners tend to be less familiar with the TM spellings than with those found in more recently published and accessible learning resources. Some resources that employ the DV orthography include a Michif learner's manual (Rosen & Souter, 2009), a Michif online dictionary (Rosen, 2016), and two websites—southernmichif.org (Souter, Leeming et al., 2024) and michif.org (Souter, Sammons et al., 2024)—featuring Michif learning and teaching resources. Finally, numerous resources, primarily geared towards learners, have been produced in recent decades by both the Gabriel Dumont Institute and the Louis Riel Institute, two Métis organizations focused on promoting, sharing, and advancing Métis culture. Examples of the kinds of resources produced include bilingual English-Michif children's books focused on the needs of early readers of English (e.g., Burton & Patton, 2011; Panas & Whitford, 2004; Patton & Burton, 2007), an online Michif dictionary (Fleury, 2018), a book of prayers (Ledoux-Zoldy, 2010), and language lessons (Gordey & Fleury, 2011), among others. The orthography used in these resources have typically varied and at times been idiosyncratic but show influence from both the TM and the DV orthographies.

Closing Words

The course creation processes for Chikashshanompa' on Rosetta Stone, Kwak̓wala on 7000 Languages, and Southern Michif for Beginners on 7000 Languages took place in unique community contexts, yet common themes emerged from our stories and reflections. Through storywork, we illuminate how, in ILR, decisions about orthography use have social, political, and relational implications. The authors, with strong connections to the Indigenous Nations where they work, were able to navigate these decisions, as they were aware of the significance of different orthographies as well as their utility for language teaching and learning.

Notably, the teams of course creators demonstrated agency and persistence in finding ways to represent written language, in ways aligned with community needs and values, despite limitations of the CALL platforms. Because none of the platforms were designed to support the representation of multiple orthographies, course creators took the initiative to assert linguistic sovereignty and to make decisions about representing orthographic variation in the courses. CALL providers were willing to assist with creative strategies, such as the use of orthography comparison tables in Rosetta Stone Chickasaw or the possibility to create another version of a course, in a different orthography, with 7000 Languages. Looking forward, there is significant opportunity for ILR, CALL, and applied linguistics to work with CALL providers and Indigenous Nations to innovate ways to design course platforms that support the representation of multiple forms of oral and written language within a single course.

Choices about how to represent language in CALL courses take place within a larger decision-making process about how to reinvigorate intergenerational language transmission, strengthen kinship relations, and connect to ancestral wisdom. Michif course creators worked to honour Old Ones and speakers through the representation of oral language through writing, while also considering utility and ease of learning for the next generation of Michif speakers. Kwakwala course creators included a message to address tension surrounding orthography and dialect debates. The course reflects an understanding that language connects people to each other and to place. Chickasaw course creators considered ways to respect first language speakers and the creators of both Chikashshanompa' orthographies, while also supporting learners to connect more deeply to their Chickasaw identity. Significantly, in cases where orthography creators have passed on, inclusion of the orthography in the course was a way of continuing their legacy and contributions to language teaching. We hope that by engaging in and reflecting on our course creation processes we produce valuable knowledge that can be extended beyond our own experiences to benefit other communities interested in the process of creating CALL courses for Indigenous languages.

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