

Digital Technology within Language Revitalization

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Indigenous languages across the globe are increasingly at risk of being displaced by more widely spoken languages, such as English, Spanish, and Mandarin Chinese. The world's languages are inextricably linked to an intricate social, cultural, and ecological complex in the region where they are spoken and thus encode generations of knowledge and perspectives about humanity. Despite the metaphors of life and death that pervade discourses on language endangerment, language revitalization efforts speak to the tenacity and resilience of Indigenous communities to combat the encroaching threat to their way of life.

Today, language maintenance and revitalization efforts range from enacting language policies at the local and non-local levels to grassroots efforts that involve teaching the language. Since the beginning of the digital era, digital technology has played an increasingly prominent role in language revitalization, taking on several forms and used in varied and creative ways. In cases of dormant ("sleeping") languages, where there are no longer any fluent speakers but where there is still a community that identifies with the language, the use of technology plays an even more crucial role. Without fluent speakers, the only direct source of information about the sounds of the language are through audio recordings (assuming they exist), which provide a model for how to speak the language and thus represent rich, authentic input for learners.

My interests in language revitalization emerged when I was working as part of a group led by Professor Catherine O'Connor at Boston University to build a collection of online learning tools for Northern Pomo, a dormant language of Northern California, which includes an audio dictionary and a searchable corpus of phrases and sentences. Since arriving at Berkeley, I have been involved in several other projects. In collaboration with Professor Anna Berge of the University of Alaska Fairbanks, I travelled to St. Paul Island, Alaska to work with speakers of Aleut to video record oral narratives and histories tied to specific places on the island. I extended the methodologies used in these efforts to my primary field site in Montana with speakers of Crow. The data that came out of this work were then placed onto an interactive mapping platform so that learners can listen to stories while exploring the land. Over time, my interests grew from developing digital resources to also studying how learners actually use these resources which can then lead to more effective tools to better serve their needs and values.

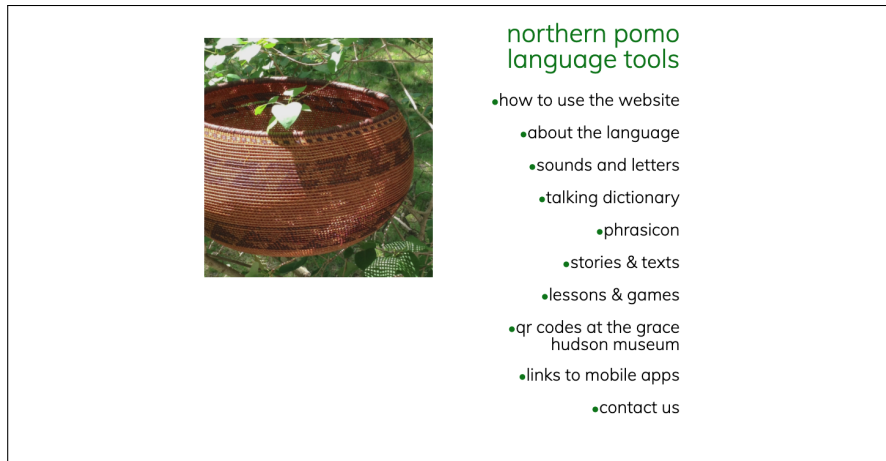


Figure 1: The home page of the Northern Pomo language learning website called *Northern Pomo Language Tools*.



Figure 2: A landmark of St. Paul Island, Alaska called Southwest Point which is associated with stories about *Kusuuluŕ* ‘The place where they argued’, so-called devil fires, fox hunting, and berry picking.

The role of digital technology within language revitalization has been a topic of considerable interest among language revitalization practitioners and scholars from a wide range of academic disciplines that include linguistics, anthropology, sociology, education, and computer science, and among others. Despite the attraction of digital technology and its ostensibly innumerable possibilities, there is a consensus that it is not a panacea – technology alone cannot ‘save’ a language. Rather, language revitalization depends on the investment and commitment of the community, and digital technology is one of many available tools

that can be used to support these endeavors (Dauenhauer and Dauenhauer 1998, Rice and Thieberger 2018). As we attempt to learn more about how to revalorize, reclaim, and revitalize endangered languages in effective and appropriate ways, the issue of digital technology comes to the fore: is the use of digital technology even helpful in language revitalization or is it not?

In particular, there has been a national conversation that has been quite controversial. On the one hand, some researchers argue that digital technology undermines interpersonal relationships and promotes loneliness and isolation (e.g. McPherson et al. 2006, Turkle 2011, 2015, Adler 2017). On the other hand, there are scholars who have been picking apart these claims to reveal that there is no such epidemic at all; instead of destroying relationships or increasing interpersonal alienation, digital technology, especially communications technologies such as smartphones and online social networks, helps us feel more connected to each other than ever before (e.g. Hampton et al. 2009, Fischer 2011, Klinenberg 2012, boyd 2014).

Nevertheless, digital technology has been in the center of debates in language endangerment and language revitalization. For instance, the late Michael Krauss (1992:6), who played a pivotal role in refocusing the field of linguistics on documenting endangered languages, refers to television and radio as forms of “cultural nerve gas [...] odorless, painless, tasteless. And deadly.” Furthermore, new technologies, such as the television and the internet, have been met with skepticism and outright resistance at its inception, and framed as antithetical to relationship building and anti-traditional, diluting and degrading traditional ways of learning and knowing (e.g. Mander 1992, Warner 1998, Real Bird 2001, as cited in Wiburg 2003, Monroe 2002, Whiteley 2003, among others). Despite these negative sentiments, McHenry (2002) and Eisenlohr (2004) discuss how digital technology helps to assert the place of Indigenous languages as part of our modern life and relevant for the future, rather than as a fixed part of history – a veritable archaeological artifact.

As Indigenous languages shift towards the dominant language, the use of the Indigenous language decreases in essentially all social domains. To provide opportunities to listen to the language, tribal radio stations have been established in various Indigenous communities. For example, the Navajo Nation has a number of radio stations that broadcast in the Navajo language. On the Hopi Reservation in Northern Arizona, KUYI has shared the Hopi language through their airwaves and has even partnered with local groups, such as the Hopi Head Start Program, to create radio programs for specific purposes. Therefore, these radio stations help to create authentic language immersion experiences to listeners on a daily basis.

Although digital tools can have the unintended consequence of severing language from the physical and social context, digital technology can provide new and enriching ways of learning. When a person is speaking, we often pay attention to visual cues such as lip movement, not just auditory information. In language learning, these cues can be helpful for learners who want to improve their pronunciation. But in languages such as SENĆOŦEN, Secwepemc, and Halq'emeylem, three critically endangered languages spoken in British Columbia, Canada, certain sounds which are not found in English are produced with the tongue raised in areas at the back of the mouth (e.g. the uvula). To aid learners in their pronunciation of these sounds, Heather Bliss and her team (2018) use ultrasound imaging technology to create videos that demonstrate how these sounds are articulated in the back of the mouth by fluent speakers. In this way, learners do not just hear the language; they also see it.

In addition, certain documentation records fall short in providing sufficient contextual information to understand the information therein. For example, audio recordings of stories that are associated with place can be complemented with photos or videos of the speaker talking about the location in-situ, historical photos, and even street maps and satellite imagery (Berge and Ko 2019). In other words, documentation records need not only consist of the spoken word, which is sometimes the case. These materials can then be assembled into a single location online in an interactive multimedia format, such as a mapping platform, to recontextualize narratives and stories that are intimately linked to geography, history, and knowledge and practices that are embedded within the local community. The relationship between language and land is an important one for many Indigenous communities; the land takes care of us and we, in turn, take care of the land. Consequently, the use of digital mapping tools to communicate information that arises from place names or place-based narratives has been part of a growing trend not only to learn about the land but also aspects of the language that involve directionals and other spatial terms.



Figure 3: A screenshot of the *Mapping Crow Oral Histories* project featuring a narrative given in Crow by Jack Real Bird about *Isaxpúatahcheeashe* ‘Little Bighorn River’.

In general, Indigenous people consider their homelands as part of their language communities; that is, language and land are often intertwined in such a way that language is not held only within our bodies, but also embedded within our tools, digital or otherwise, and our environment. In their work, Engman and Hermes (2021) analyze interactions between Elders and youths going on a walk in a forest on Ojibwe reservation land speaking in Ojibwe. The Elders and students are equipped with point-of-view cameras (i.e. GoPros), which record videos from the point of view of its wearer. In one instance, one of the youths inspects the ground, picks up a fern, and walks towards the Elder asking whether it is a *waagaagin* ‘fiddlehead fern’. The student’s gaze shifts between the Elder, who looks at the fern but remains silent, and the fern itself. In doing so, the student consults two knowing participants – the Elder, who has eaten *waagaagin* his entire life, and the land. As such, the land also acts as interlocutor and collaboration occurs not only between the students and the Elder, but also with the land in the identification and naming of the fern in Ojibwe. Thus, new technologies such as GoPros provide the lens through which to elucidate the role of land in interaction.

When we talk about ‘online’ and ‘offline’, we tend to juxtapose and compare them and view them as distinct spaces – one as real, the other unreal (hence the internet term *IRL* ‘in real life’). Although it has been argued that these distinctions are irrelevant to interpersonal communication (Baym 2015), they are still highly pertinent in language revitalization as we attempt to better understand individual learning styles and the effects of different learning environments. In the case of Northern Pomo, language materials exist primarily on the Internet – an irony given that the Internet only emerged recently while face-to-face communication has existed since time immemorial. Before the digital era, access to language materials, especially audio, was significantly more limited and as a result, communities have embraced the use of these tools to disseminate and preserve the language. For learners of Northern Pomo, there is a general desire to use and learn the language within the social and physical contexts where haptic and other somatosensory cues can be incorporated. In 2016, James Sbordone and colleagues placed QR codes – barcodes that, when scanned with a mobile device, send users to a website – next to objects, such as different baskets and household items, in a community museum. By scanning a QR code, users are then brought to a webpage where they can learn about the Northern Pomo word for the object in-situ.

Building on this work, my colleagues and I organized QR code scavenger hunts during the Northern Pomo weekend language revitalization camps in 2019. The goal of these scavenger hunts is to locate and scan all the QR codes, which are placed next to objects within the classroom. Scanning the QR codes brings users to a dictionary entry that is related in some way to the local environment. For instance, a QR code affixed onto a water dispenser is linked to the dictionary entry for ‘water’ while a QR code that is attached to a chair is linked to the dictionary entry for ‘sit’. Therefore, learners must make use of the two semiotic resources – the dictionary entry and the location of the QR code – to construct a meaningful relationship. In other words, learners tap into their prior knowledge and understanding of the world as they notice, interact, and make sense of their physical environment vis-à-vis the Northern Pomo word displayed in the dictionary entry. Once again, this demonstrates that language exists not within a single entity, but within much larger systems.

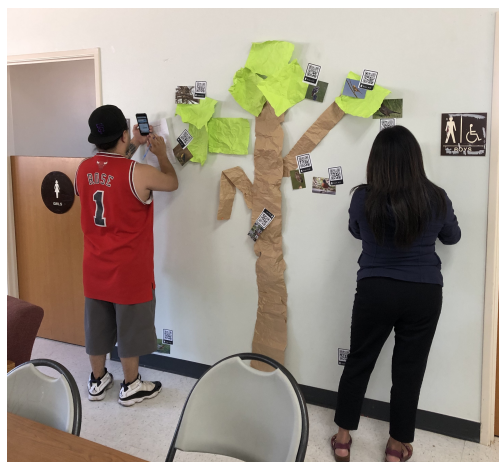


Figure 4: Two learners at the Northern Pomo language camp scanning QR codes linking to dictionary entries of different birds.

Online, individuals continually construct and re-shape their identities, persona, and representations of self, just as they would offline. In particular, while social media has played a pivotal role in supporting language use online, they have also been important sites for promoting self-representation by allowing Indigenous people to become agents in the production of their own content (Adcock 2014). In light of the history of oppression against Indigenous people worldwide, this is significant progress. At the same time, however, cyberspace represents unwelcome territory due to the abundance of information appearing in majority languages rather than in minority languages (see Kornai 2013) as well as being a hotbed for issues of privacy and ownership. Moreover, some people resist the dissemination of narratives and other Indigenous knowledge online because it takes away storyteller agency and goes against the long tradition of orality. By having a say in what does and does not get displayed online, individuals can exercise technical agency to express their identity and represent themselves to shape the technological landscape to counter the (colonial) hegemonies of the dominant actors.

In her investigation of digital language activism in Zapotec, a group of languages spoken in Mexico, via Twitter, Lillehaugen (2019:202) observes how Zapotec speakers present and perform their language globally in an effort to resist and counter the ideologies that “Zapotec has no relevance outside of the pueblo or in the modern world.” Most of the speakers who tweet in Zapotec are from the younger generations, pointing to the role of social media in engaging the youth to become users of their language online and activists. Furthermore, similar social movements that view language as an issue of social justice and make use of social media have also been reported for Indigenous languages in other parts of the world, such as Sámi in Sweden and Norway (Cocq 2015) and Lampung in Indonesia (Putra 2018). Thus, digital technology within language revitalization represents sites of social conflicts (Feenberg 1999) instead of simply shaping human behavior for better or for worse or being completely neutral.

Digital technology within language revitalization is exceptionally heterogeneous and serves multiple functions. Some allow for communication over great geographical distances, whereas others provide spaces to store vast amounts of data. The advancement of digital technologies has made storing copies of language materials online much more readily available. In addition to other natural forces, such as fires and floods, analog recordings wear down over time and may erase important information. By digitizing these recordings and storing multiple copies in multiple locations, we can augment their longevity and attenuate the concerns that they may someday be lost or damaged. For example, the Survey of California and Other Indian Languages, an archive and research center in the Department of Linguistics at UC Berkeley, has made significant strides to not only digitize analog recordings, such as wax cylinders and reel-to-reel tapes to ensure their preservation, but to make them accessible online to community members and other researchers.



Figure 5: Microfilms were previously used to create copies of original linguistic field notes for dissemination and preservation.

Overall, the development of cutting-edge technologies for endangered languages tends to lag behind those for more widely spoken languages. One common reason is that there are generally scarce resources in language revitalization, that is, time, money, and technical expertise. Another common reason is that endangered languages often do not have sufficient amounts of machine-readable data needed for more sophisticated tools such as automatic speech recognition and machine translation systems. With an emphasis placed on big data, endangered languages (commonly referred to as low-resource languages) are put at a distinct disadvantage (Hirschberg and Manning 2015). Furthermore, bootstrapping strategies that re-use existing methods for high-resource languages are fraught with other challenges that can involve disagreements about how the language should be spoken and written and grammatical differences exhibited by the world’s diverse languages.

Still, given the available tools, there is a pressing need to evaluate and assess how they are used within language revitalization contexts (Ward 2018). To study how children and families are using the computer software *Ojibwemodaa* to learn Ojibwe, an Algonquin language of the northern Midwestern United States and Canada, Hermes and King (2013) employ discourse analytic techniques to investigate interactions between parents and their children. What they find is that using the software supports family interactions and, at times, fosters inversion of established parental and child roles. In addition, they note that the use of technology provides just enough scaffolding to open up opportunities and to jumpstart language use that goes beyond the context of the technology and into other social domains.

In my work on Northern Pomo, I conducted micro-analysis of social interactions taking place during two language revitalization camps, where digital devices such as phones, tablets, and computers are used by learners to access the *Northern Pomo Language Tools* website. By examining language and embodied actions that emerge within different contextual frames of interactions (Goffman 1974), I explore how children and their caregivers interact when they are learning Northern Pomo using digital technologies. The finding is that, regardless of whether digital technology is used within the learning activity, the youths and caregivers take up similar positions: youths often position themselves as teacher and their caregivers as student which potentiates empowerment of younger learners as future language revitalization activists. Therefore, the works by Hermes and King and myself suggest that these inversions of position (and power) between parent and child that arise in contexts of digital technology

use may be an important aspect of the language revitalization endeavor.

Aside from the tensions that digital technology seems to cultivate between ‘modernity’ and ‘traditionality’, digital tools have been used in language revitalization in ways that promote and are compatible with Indigenous worldviews. For quite some time, Indigenous people have been re-appropriating technologies in ingenious ways to suit their own needs and values; digital technology is no different. In fact, the very same technologies that contributed towards the shift from speaking one’s ancestral language to speaking the majority language (e.g. the television) have also been utilized within language revitalization efforts. What I have discussed only touches on a select number of perspectives to showcase the diversity of potential analytic lens; the full range of analyses will surely synthesize theoretical and practical insights from additional disciplines in new and illuminating ways.

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