Accommodating Indigenous People When Using Technology to Learn Their Ancestral Language

Delaney Lothian
Department of Computing Science
University of Alberta
Edmonton, Alberta, Canada
dlothian@ualberta.ca

Gökçe Akçayır
Department of Computing Science
University of Alberta
Edmonton, Alberta, Canada
akcayir@ualberta.ca

Carrie Demmans Epp
Department of Computing Science
University of Alberta
Edmonton, Alberta, Canada
demmanse@ualberta.ca

ABSTRACT

This study explores the needs and expectations of Indigenous people of Western Canada with respect to learning their ancestral language through technology. Using a qualitative phenomenological research design, we conducted focus groups. Content analysis of the collected data revealed they face various barriers that inhibit their learning of their ancestral language. A lack of exposure to practice and limited resources are among these barriers. Our findings demonstrate the importance of using the community dialect in technological tools to support learning ancestral languages instead of focusing only on vocabulary. Indigenous peoples' ancestral language learning is associated with several socio-cultural and political aspects. However, it should be possible to promote this lifelong-learning practice with the help of technologies that are designed to support individual learner needs and expectations.

CCS CONCEPTS

• **Computer Uses in Education**; • **Information interfaces and presentation (e.g., HCI)**;

KEYWORDS

Computer Assisted Language Learning (CALL), Language Revitalization, Ancestral Language, Indigenous, Informal Learning

1 INTRODUCTION

For generations, the Indigenous peoples of Canada have been losing their languages through forced assimilation as a result of government programs such as the Indian Residential School system. Recent changes and recognition of the harm that was done through these programs has resulted in reconciliation efforts that focus, in-part, on the reclamation and re-learning of these almost lost languages.

However, the historical and current social context of the majority of those who want to learn these languages means they will have to do so outside of formal learning environments. Moreover, the revitalization of these languages and their learning by members of geographically-distributed communities means that technologies, specifically adaptive computer assisted language learning (CALL) tools, are well suited to supporting the independent and long-term needs of these language learners. In this paper, we explore how Indigenous Canadians need and want to be accommodated in learning their ancestral language through technology as a lifelong-learning practice.

1.1 Computer Assisted Language Learning

Many Indigenous languages fall under the banner of less commonly taught languages. These languages currently suffer from a lack of resources. This lack of resources can be attributed to low enrolment rates, few trained instructors, and a lack of textbooks [14]. Although CALL could provide access to trained instructors, it currently suffers from a lack of already made resources and funding. This lack of effective and engaging resources is a common barrier to language learning [18]. It is possible to increase the accessibility of these kinds of resources with CALL by enhancing access efficiency through digital multimedia technologies, authenticity using video and the Internet, and comprehensibility through learner control and multimedia annotations [24]. One advantage of multimedia technologies for CALL is their allowance for the creation of stronger memory links and for faster completion of learning tasks [20]. Using video and the Internet for language learning can provide up to date and culturally-relevant learning material [9], as well as support the improvement of listening comprehension and oral production [10][8]. Lastly, giving the user control through multimedia annotations allows them to adapt said resources to their current level. However, there is still a lack of research surrounding when certain types of CALL technologies are appropriate for certain users and contexts [11][19].

1.2 Indigenous Language Learning

It is common for an Indigenous person of North American to be reluctant to learn or pass on their ancestral language because English (or French, depending on their location) is the language of safety and success. This attitude can be a result of the everyday experience of living in an English dominated society that requires English fluency and conformity for social and financial success. This results in "Native Americans who desire to succeed in professional careers or who feel an attraction to popular culture or non-native religions often come to identify with the language of

those pursuits" [5]. Alongside internal pressures, this attitude is supported by external pressures in the form of "policies and attitudes in the majority society" [4]. This attitude is often the result of compulsory historical systems that were put in place, largely to eradicate Indigenous languages and cultures. In a survey done in a Navajo community in America, one respondent stated, in reference to their experience at an Indian Residential School, "if they caught us speaking Navajo, they would wash our mouths out with soap. I did not teach my sons Navajo. I did not want them to go through that. It was awful. English is the language to get ahead. I taught them English" [1]. Like America, Canada has a history of residential schools which were only fully closed "in 1996 after a duration of almost 150 years" [15].

A key issue surrounding language revitalization is the integration of Indigenous languages into established educational systems. The concerns surrounding this endeavour mainly stem from the mainstream education system and how its approaches differ from those traditionally used by Indigenous peoples when teaching their younger generation. For example, in the last 100 years, many Indigenous languages have been written down using either roman orthography or a newly created alphabet of their own. However, most of these languages were traditionally strictly oral which has lead to "controversy in some Aboriginal communities concerning whether the Aboriginal language should be written at all" [4].

Often in Indigenous communities, it is traditional for their ancestral language to be passed on from older generations to younger ones. Moreover, this practice includes cultural teachings. Thus, it naturally arises that a key desire for Indigenous people is that school-based language learning include "cultural teaching, for the involvement of elders, for the goal to be real fluency" [4]. Although the attitudes Indigenous peoples have towards learning their ancestral language may be nuanced and contain negative elements, there are some that are strictly positive. As found in a survey of the Echota people of northern Alabama; they were interested in learning their ancestral language because they value their ancestry, their language, and their cultural tradition. Simply put, "respondents ranked having Cherokee ancestors and keeping Cherokee tradition alive most frequently as their primary incentive" [16].

1.3 Technology and Indigenous Language Revitalization

CALL programs can be classified into three activity types: facilitative, collaborative, and instructional [23]. Facilitative programs focus on providing language basics without any formal instruction (e.g., dictionaries, songs). Collaborative programs aim to promote "the inclusion of more than one student into the language instruction", and instructional technologies aim to explicitly teach learners one or more subsystems of the language.

With an increase of federal funding support programs, Indigenous language-learning technologies have become more numerous in Canada. These instances of language-learning technologies often take the form of websites and mobile applications. While there is increasing support and attention towards these technologies, they regularly encounter technical issues due to their reliance on "minimal grant funds as well as volunteer help" [23]. Some examples of these websites and their activity types are the Mohegan

Language Project (facilitative), Cheyenne Dictionary (facilitative), Learn Cree Online (collaborative), Talk Sauk (collaborative), Anishinaabemda (instructional), and East Cree (instructional). As can be seen, each of the three activity types has an exemplar. However, the full distribution of these websites across these activity types is unbalanced. Currently there is an "emphasis on memorization of isolated vocabulary, as well as limited contexts of language use" [23].

1.4 Research Questions

As can be seen above, Indigenous peoples' attitudes towards learning their ancestral language can be mixed due the historical context of their community. These attitudes contribute to the barriers faced by those who wish to learn their ancestral language. The current state of technologies that aim to support the learning of Indigenous languages also present a barrier. These technologies predominantly employ dictionary-like approaches rather than personalized approaches that support individual learner needs within their context.

Given this understanding we ask "How do members of Indigenous communities view the use of technology to support language revitalization?" and "How do Indigenous language learners want a CALL system to accommodate their language-learning journey?"

2 METHODS

This study was conducted in a phenomenological tradition, which is defined as "a description of the meaning of the lived experiences for several individuals about a concept or a particular phenomenon" [6]. This is reflected in the focus group questions as they elicit participants' personal experiences with ancestral language and technology.

2.1 Participants

This study consisted of two focus groups, each with four participants, for eight participants total. In this paper, participants have been given pseudonyms for readability. Participants were recruited through community contacts. All participants were from provinces in Western Canada. Over half of participants had learned Michif or Cree in a formal classroom setting. The most recent generation in the participants' family to attend Indian Residential Schools was a parent for one participant; for three participants, it was their grandparents; for two, it was their great-grandparent. Two had never had a relative attend. For a detailed breakdown of the above demographics, see Table 1.

It is worth noting that two pairs of participants (Jessica and Tim as well as Shirley and Richard) are in romantic relationships and three participants have familial ties to each other: a pair of sisters (Ashley and Amanda) and their distant relative (Shirley). Limiting factors may have arisen from these relationships, such as a potential reluctance to express an opinion within the focus group. While this can limit the diversity of ideas, avoiding these types of tight ties is difficult because they are commonly encountered when working with members of this population.

Table 1: Participant Demographics

Participant	Self-Identification	Age (years)	Gender	Last Generation in Residential School	English	French	Cree	Michif
Sarah	First Nations	20-29	Female	Parent	✓		✓	✓
Kim	First Nations	20-29	Female	Grandparent		✓	✓	✓
Jessica	Métis	20-29	Female	Grandparent	✓		✓	✓
Tim	First Nations	20-29	Male	Grandparent	✓		✓	
Shirley	Métis	70-79	Female	None	✓	✓	✓	
Ashley	Métis	50-59	Female	Great Grandparent	✓			✓
Amanda	Métis	50-59	Female	Great Grandparent	✓	✓	✓	✓
Richard	Métis	70-79	Male	None	✓	✓	✓	

2.2 Data Collection

Data was collected during two focus groups consisting of four people each. Participants were asked questions relating to their current and familial relationship to their ancestral language(s), their experience learning their ancestral language(s) through technology and non-technology-based resources, and their desires and expectations for technologies that would teach their ancestral language(s). Note a semi-structured approach [21] was employed so these are not an exhaustive list of the topics that were discussed, and there was variability across focus groups since follow-up questions were often asked at the discretion of the interviewer.

2.3 Data Analysis

The recordings of the focus group interviews were transcribed and analyzed using content analysis, without any coding scheme or pre-made template, by two researchers (Author 1 and 2). During the analysis, a three stage process was employed [12]: review of data, determining codes, and identifying themes. After going through all stages of the process multiple times to validate findings, the data analysis was finalized.

3 FINDINGS

3.1 Languages and Fluency

The participants cited English, French, Cree, and Michif[1] as their ancestral languages. Seven participants cited English, seven cited Cree, four cited French, and five cited a variant of Michif. See Table 1 for the language distributions of participants.

Of the above languages Indigenous to Canada (Cree and Michif variants) two participants spoke or understood minimal Michif. Sarah described it as learning through interactions with her grandfather and Amanda described her fluency as "a little tiny bit of Cree Michif". Five participants said they spoke or understood minimal to intermediate Cree, with Jessica stating her "reading and writing is more proficient than [her] actual oral". Two participants spoke neither Cree or any variant of Michif. Of the participants who claimed some knowledge of Cree or any variant of Michif, five said they had been or are currently learning Cree or Michif formally through a class. Even for the participants who claimed no knowledge of Cree or Michif, all participants cited at least hearing or being spoken to in Cree or Michif by family members.

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[1] "Michif is a mixed language historically derived from French and Cree" [22]

3.2 Ancestral Language and Identity

When asked about how their ability to speak their ancestral language is tied to their sense of self and to their sense of belonging in their community, most participants cited that learning or knowing their ancestral language would give them a sense of connection to their family, community, and culture. Amanda said, "language is culture", and Ashley said, "it's that connection. For me, it's history". Tim also mentioned that learning Cree would help him connect with his grandfather, citing "my mosôm [grandfather in Cree] speaks like very little English…so there's that like communication divide". Kim cited that given the chance to practice and use what she had learned, she felt more connected: "It felt so good, like I just felt so proud and connected and it just made, like it help me feel like a stronger connection to it and just more like this is my identity."

At least half of the participants indicated or implied that knowing more about their ancestral language gave them pride in their culture. The younger participants were more likely to cite learning their ancestral language as a way of discovering and reclaiming their cultural identity, with Sarah stating "it's like a step closer to learning your identity" and Tim stating that learning Cree was a "reclamation of culture and identity".

Older participants were more likely to cite learning or knowing their ancestral language gave them a greater feeling of connection with family, especially family from their childhood. Amanda said that hearing Cree or Michif "reminds me of all the people of my childhood…so I feel like they're with- connected when I hear it".

3.3 Language Transmission within Families

The last generation in the participants' families to speak Cree or Michif fluently was a parent for half of the participants and a grandparent for the other half of the participants.

It is worth noting that five participants also considered themselves or non-fluent parents when asked who was the last generation in their family to speak the language. Children that were being taught were included in that consideration, with Sarah stating that it has been "every generation for me so far because I'm going and then my son will go" and Kim stating "I think like me learning Cree and like teaching it to my daughter".

As alluded to in the statements of Sarah and Kim, there are also instances of learning and teaching. At least half of the participants mentioned teaching what they are learning to their children.

3.4 Contributors to Language Loss

Participants cited a number of reasons for loss of ancestral language inheritance within their family or communities. For the participants who were 50 years of age and above, they were more likely to cite the societal climate of the 20th century in Western Canada. This group was also more likely to credit regular day school or residential school attendance with the loss of their language. Richard said, "[Cree] was a dangerous language at one time" and "[my parents] wouldn't teach me any language because they had such a hard time at school". Shirley, who is of the same generation, confirmed "[my parents] had such a hard time but my mother, when she went to school, they didn't know the language". Similarly, Ashley stated that "I remember my grandma even saying like 'it's just too hard for you', and I think that was their fear".

All of those aged 20-29 mentioned or alluded to being put in French Immersion school programs for the benefit of better job prospects. Jessica stated that initially her parents' goal was for her to go into government. Sarah, Kim, and Tim all concurred that they had similar experiences with their parents. For the participants who reported growing up around their ancestral language, a common reason for not practicing the language was not being aware as a child that their parents or grandparents were speaking a different language. Amanda cited that "I didn't know [my mother] was speaking Cree" and Ashley agreed by stating "when you're raised with it, you don't realize ... so to me it wasn't another language. It was, that was, my mother".

Five participants said another reason they did not inherit their ancestral language was due to family members marrying non-Indigenous people. The reason being, specifically, the desire not to alienate non-Indigenous spouses by speaking their ancestral language. Sarah stated that "my grandmother on [my mother's] side married an Italian so she grew up learning Italian", and Kim said "[my grandmother] was gonna teach me Cree when I was a kid but it just didn't happen because [my grandfather] didn't know Cree so...you don't wanna alienate them".

3.5 Challenges in Learning Ancestral Languages

When asked about the challenges they faced trying to learn Cree or Michif, the most cited challenge was a lack of exposure to the language and lacking opportunities for practice. This problem existed both for those who had taken formal classes and those learning in informal environments. For example, Sarah cited not having the class every day as a barrier. Four others specifically discussed how they were not able to continue practicing or using their language. As Richard said "if you don't use it, you lose it".

Related to this challenge is a lack of resources that left participants feeling as though they did not have the opportunity to further their language learning by challenging themselves with independent learning activities. One participant (Kim) said "not having the opportunity to challenge myself with like new words" was an issue. Specifically mentioned by Jessica and Tim were a lack of resources that help you learn the structure of the language and promote the ability to have a spoken conversation. Tim stated that "there is a pretty distinct lack of resources besides just like definitional dictionaries and things online". As well, Sarah mentioned a lack of resources that promote oral proficiency, stating that "we're only taught to write and translate".

From the perspective of adult language learning, a common challenge cited by those who had taken formal classes in Cree or Michif was the difficulty of interacting with fluent speakers who learned the language as a child. The main difficulty appeared to be a difference in understanding of the language, along with the words used to describe that understanding. Kim stated that "you can't mention conjugating verbs because [my grandmother]'s like 'I don't know what the hell you're talking about'", and Jessica stated that "it's really difficult when you're trying to articulate a problem you're having and their like 'what are you talking about?'".

Another notable challenge was that of those being taught Cree or Michif in a classroom setting; the dialect they were taught was often a standard dialect and not the same as the community dialect spoken by friends and family members. Kim shared that "me and my grandma don't necessarily speak the same dialect", which can further hinder the informal language-learning and practice opportunities that are inherent to communicating with other speakers. Speaking a different dialect as a learner can also influence one's confidence because there is a mismatch between what you know and what is spoken within your community. Consistent with this, participants widely cited a lack of confidence. This could take the shape of being too intimidated to attend conversational groups or feeling as though they were encroaching on a space if they were to attend a conversational group or class hosted by an outside community. Along with this, five participants cited one or more instances of being laughed at or a fear of being laughed at. Sarah stated that "I feel intimidated sometimes...I don't wanna say nothing because what if I really mess it up". There was also mention of "Indigenous humour" referencing the phenomenon of cultural teasing which may impede learners' willingness to take public risks with respect to their language learning. Jessica said "it's definitely a common thing among like Indigenous communities to like make fun, poke fun" and Richard stated, referencing family and community members, that "they used to laugh at me, the way I pronounced things".

3.6 Experiences Using Non-Technology Resources to Learn Ancestral Languages

Participants were asked to describe their experiences using non-technology resources to learn their ancestral language. The non-technology resources cited are mostly visual resources such as picture books, labelled posters, and workbooks. Ashley cited that "Dr. Anne Anderson had the cassette tapes and the workbook, so we'd be doing that". Kids' books were described as a way to practice that was not intimidating and also something that could be done with their kids. Kids' books were also described as useful because they were often accompanied by English translations. Sarah stated that "[kids books have] short little words and it's stuff that I can say because obviously that Cree is the Cree that we're learning here". There were also mentions of learning through family members. Richard stated that "I was taught by my auntie more than anyone".

When asked what difficulties the participants faced when using these resources, there was often the complaint that they were very time consuming. Ashley stated that "life just got in the way and you didn't have time and you didn't have a set study time".

3.7 Experiences Using Technology Resources to Learn Ancestral Languages

When asked to describe technology they have used previously to help learn their ancestral language, participants often listed applications as resources, with mobile dictionaries and vocabulary-based applications dominating the list. Sarah said: "Cree Dictionary! Online!" as a likely reference to an app called Online Cree Dictionary. Jessica stated "I have two digital dictionaries on my phone. Between Cree and Michif I have like five apps…they have games on them", and Shirley cited "I have [an] app on my phone because [my relative] gave me her phone. She had all the Cree words on there and what they meant". There were also mentions of technology resources that employed audio or visual resources such as songs, radio, and recordings of conversation. Amanda mentioned recording Michif songs sung in a class on her phone, as well as listening to Cree on a radio station. Finally there were mentions of participants using social media groups for communal learning, such as on Facebook.

When asked what they did not like about the technology they have used to learn their ancestral language, participants often cited difficulties stemming from inconsistencies in spelling and dialects across technologies. Participants who had taken formal classes on their ancestral languages often cited that even when it was a familiar dialect, the spelling was often non-standardized, which impeded their learning. Kim stated that "It's hard because not all of them are like the right dialect or they don't have like the right spelling" and Jessica stated that "this isn't the word that I want to copy and paste" in reference to dictionaries and the non-standard way in which the entries are conjugated. There were also complaints regarding the standard roman orthography (SRO) that Cree is written in. The standard spellings are not necessarily phonetically transparent, which makes it difficult for those without training to create or use resources. Jessica commented that "[if you] learned it as a child, you aren't going to inherently know the SRO format but, like, for us, who are learning the SRO format, it's also like really confusing sometimes".

3.8 Expectations of Technologies for Ancestral Language Learning

The final portion of the focus groups were a kind of co-design with the participants. Participants were asked questions relating to their wants and needs for learning their ancestral language with technology. Participants were positive or neutral about seeing their culture integrated into technologies that taught their ancestral language. The responses often centered around how they did not feel there was a clear separation between language and culture. In relation to their expectations, Shirley stated "medicines would be great. Drying the fish and the way they did in the smoke house" and Amanda stated "fiddling and jigging, somehow".

When asked how they would like to see technology accommodate them in learning their ancestral language, a few participants said they would like technology that is engaging, that keeps their attention, and that provides ways to keep them interested in using it again. Ashley said "something like that, gives you an alert every day and every day you got a new word so that was really helpful. Something like that would be nice". They also expressed a desire to

see their community dialect reflected in the technology teaching their ancestral language. Ashley stated "if we could bring the speakers back with technology, the language spoken in [my community] in particular".

Many participants often spoke about wanting to be able to learn the structure of the language so that they may talk with others. Amanda wanted "an app or something that makes it easy to learn conversation". There were also mentions of desires for technology that could translate language. Ashley and Sarah cited some form of earbud or hearing aid that could translate spoken language instantaneously.

Although some instances were implicit, like wishing technology could bring back fluent family members that have passed away, there was a general desire for technology that could mimic the skills of a fluent speaker that could converse with the user and also provide feedback, essentially a Cree artificial intelligence. Amanda stated "I want a Cree speaking AI, hanging out with me all the time". Similarly, Sarah cited a desire for "a 24/7 hologram tutor when you get stuck". Kim suggested providing "a feedback opportunity…like a chat bubble or something like 'how the hell do you say this?' like that would be helpful".

4 DISCUSSION

Our findings revealed that participants felt a sense of shame that existed either from personal experience or that was passed down predominantly from the last generation with respect to language and culture. This feeling presents another challenge for learners of Indigenous languages because they need to motivate, manage, and monitor their learning [3], and their shame can interfere with their ability to perform these functions of self-directed learning. It is common for previous and current generations to have been forced to learn English or French through attending either residential or public schools. This fact and learners' current attitudes should be taken into consideration when designing an Indigenous language-learning system because its intended users may have been told that learning their language would not only be unhelpful to living a successful life but may also hinder their success.

One of the biggest challenges Indigenous people face when learning their ancestral language is a lack of access to speakers to practice with. Even though people want to be able to communicate with their own family and community members, most families only have speakers who belong to the grandparents' generation. This gap in cultural and language knowledge within their families makes it difficult to learn and develop a connection with their culture, community, and family because they believe that learning their ancestral language builds this connection. This desire could be accommodated by creating a language-learning system that helps users interact with a grandparent who speaks the language. A system could, for example, teach a user to help their grandparent with a medical visit or teach a user how to ask for and understand cultural knowledge. Akin to this is the expressed desire to learn the dialect that is specific to the user's community. Achieving this goal would facilitate bridging communication gaps when speaking with community and family members.

As cited by most participants, there is an aspect of cultural teasing amongst First Nations and Métis groups in Western Canada.

An effective system for teaching Indigenous ancestral languages would be able to help a user not only gain confidence but avoid pitfalls where embarrassment could arise. For example, in Plains Cree, there are many instances of similar sounding words that have vastly different and sometimes taboo meanings. A system that highlights when such a mistake could be made, or better yet identifies when the user makes that mistake, would accommodate this user need by helping them avoid potential embarrassment. Moreover, such a system could help provide a comfortable environment to learners, thus facilitating learning [17][7].

Many participants discussed using vocabulary-based apps to support their ongoing language-learning efforts. However, language learners are often not properly trained to know whether "the translation they have chosen fits the context, or how to use the idioms in which the word appears, or how to make use of the grammatical information included with the definition" [14]. As discussed previously with regards to Indigenous languages in Canada, most language learning resources are facilitative. Creating instructional resources that focus on aiding learners in using resources outside of a classroom setting would address this gap and would also complement current resources.

Participants expressed both an implicit and explicit desire for a tool that helps create immersive language environments. As with all language learning, it is most effective with constant practice and opportunities to learn. An optimal system was described as something that would effectively engage a user daily and that could be used when and where the learner can take the time to learn so that they can fit learning into their schedules and other life demands. Tools that could aid in this endeavor could employ speech synthesis and speech recognition, to aid learners in practicing when they have no access to a speaker of the language. These tools could adapt to a user by decreasing speech rates to the level of the learner, and increasing over time in order to mimic the speed with which a fluent person would speak [7].

In terms of actual implementation of the above suggestion, as explored in recent work, this could be achieved with current CALL or intelligent tutoring system technologies [2]. Given the right resources, a system can promote ancestral language learning by employing exercise templates that simulate interactions. These templates should also integrate the acquisition of cultural knowledge since participants view their language and culture as being inseparable. Most importantly, we should design language learning technologies according to learner expectations and needs without compromising for the sake of fitting a technology [13].

5 CONCLUSION

This phenomenological investigation of the experiences of members of the First Nations and Métis population of Western Canada provided insight into their needs and expectations for learning their ancestral language through technology. Additional work will be conducted to see how representative their experiences and attitudes are to enable the development of appropriate technological supports for scaffolding language and cultural revitalization, which is a lifelong-learning pursuit.

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