TWENTY-FIVE STRONG: THE CURRENT STATE AND POTENTIAL FUTURE OF ARARÁHIH (THE KARUK LANGUAGE)

by

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DEDICATION

This thesis is dedicated to the Karuk language community and the future generations of Karuk people and speakers of Araráhih (the Karuk language).

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AMERICAN INDIAN HERITAGE

Tanner Barney is an enrolled descendant of the Karuk Tribe located in Happy Camp, California.

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ABSTRACT

Research on various language apps, app building, language learning, Indigenous methodologies, and American Indian law and policy has made for a sound argument to kickstart the support of a Karuk dictionary app, eventual language learning app, and Karuk data sovereignty. The purpose of this work is to take in the broad academic discussion to think critically about it and build upon it in order to determine an Indigenous methodology for language apps and raise up Karuk community language regeneration efforts. In this paper, the themes addressed include Indigenous methodologies, the influence of language in life, legal implications for Native American Tribes in the United States wishing to practice data sovereignty, developing themes in Indigenous Methodologies for language apps, discussion on both Tribal and Western language apps, and app construction. To ensure wide reception, this work is written with the intention of being discussed by Karuk scholars and community members, and the broader academic and general audience of both Native and non-Native backgrounds.

INTRODUCTION

MY PLACEMENT IN, AND THE STORY, OF ARARÁHIH

Some Native languages of this country have been lost to the European and United States' attempted genocide of Native peoples while the Germanic and Romantic noise has just drowned out living Native languages. The tribes with those languages still kicking are using healing methods like classes, immersion programs, and apprenticeships to rebuild their language group. While some have accomplished this goal, others are well on their way.

The Navajo (Diné) have roughly 170,000 speakers worldwide, the largest number of speakers of all Native American tribes. To express how large that number is, the second spot is held by the Yup'ik with just over 10,000 speakers. My community has roughly twenty-five conversant speakers today, of whom five are masters, and Araráhih has been labeled "severely endangered" by the United Nations Education, Scientific, and Cultural Organization (UNESCO, 2021).

As many know, boarding schools have had a massive impact on Native American tribes, especially language. These "schools" were run in a strict military fashion, and speaking any language other than English was discouraged with extreme prejudice and often violence. This, along with other well-studied issues, were common occurrences until the 70's. World War II holds another importance because it saw the mass movement of Native people out of the United States and was an unintentional assimilative method for Native people, as Native Americans entered the war at a faster rate than any other demographic and had the highest rate of voluntary enlistment (DeSimone, 2021). For the northern California region, with the men gone, the women

went to work in San Francisco in shipyards, doing their part in the war too (Julian Lang, *Personal Communication,* December 2022).

After these impacts, Araráhih in the 60's and 70's was still present, but few people spoke it out loud. To the young people at the time, there seemed to be a lack of interest in speaking it. People seemed to still know it but after boarding school influence saw little reason to speak it as Indigenous knowledge had been heavily devalued, and English seemed universal. However, during the late 60's Tom Parsons would become the head of the Indian Community Development Center of Humboldt State University (known today as Cal Poly Humboldt). Parsons developed language programs for local tribes, such as the Tolowa Tribe in Crescent City and the Karuk Tribe in Happy Camp, where they paid community elders to teach classes in order to keep the languages going (Julian Lang, *Personal Communication,* December 2022).

In 1985, the Karuk Tribe adopted their constitution, following the trends of Indian Reorganization, and at this time, the town of Orleans was developing their own local effort for language. They went about this effort using English-based knowledge and Western teaching methods, contrary to Parson's community-based methods. In 1986, William 'Bill' Bright, a retired UCLA Linguist who had previously done work with the Karuk people, was invited to return by language activists and helped develop the practical spelling system and taught local people documentation practices. He also worked with Susan Gehr, our previous language director, to develop the Karuk dictionary in 1997. (Julian Lang, *Personal Communication,* December 2022).

As of now, all the language programs I'm aware of are run by individuals in the community with little to no involvement from the Karuk Tribal Government. The language was,

at one time, being taught in schools, but within recent years that has come to a halt, and the Tribal Council's main push is to return it to classrooms. As described, we have a plethora of resources to pull from, and different areas of the community have different ideas on what should be done. In my time working on this thesis and reconnecting with the community, I think a language app, a dictionary app, would be a step in the right direction to link the community and Tribal Council, implement the language in homes, pave the way for future Karuk Language Regeneration work, and safeguard the Karuk community in future research.

Contained in this thesis are the following chapters: *Tanner's Karuk Paradigm*, *Bridging the Gap Between Indigenous Methods and Western Tools: A Literature Review*, *An Indigenous Methodology for Language Apps*, and *The App Building Process*.

In *Tanner's Karuk Paradigm,* I will discuss all of the pieces of positionality through personal story. Some might argue that pages of positionality is excessive, but I use this chapter to allow readers to gain insight into who I am, where I come from, and where I'm at. All while discussing ontology, epistemology, and axiology with Karuk tradition and the use of abstract coding. In this way, we start the thesis off by building a relationship - a pillar of Indigenous values.

In *Bridging the Gap Between Indigenous Methods and Western Tools: A Literature Review*, I display a synthesis of knowledge surrounding the way I go about my work and some of the current material out there regarding data sovereignty, Indigenous methodologies in research, Indigenous methodologies in language technology, and the agency of language and protection of the immaterial.

Following this is the chapter *An Indigenous Methodology for Language Apps*, where I outline and establish a methodology for a Karuk language app. This chapter builds upon themes discussed in chapter two and overall discusses an optimal direction for Indigenizing a Western tool in a Karuk way. It should also serve future students interested in language regeneration work through technology by being a sounding board for their initial thoughts and directions by asking some important and hard-hitting questions.

The final chapter on *The App-building Process* puts it all together by discussing what needs to happen to go from loose resources to a functioning language app. Here is where I'll discuss an outline for the basic building blocks required when thinking about programming and building an app, as well as looking at other existing language apps both by companies and tribes and pulling from them what I'd like to see in a Karuk language app.

Some of the information found in Chapter Four can also be found in the Appendix of this thesis, where you'll find pieces of a draft grant proposal, to be submitted in the future, in an effort to start building a language app after my Master's work.

TANNER'S KARUK PARADIGM

I had already written and submitted a paper on this topic as a usable chapter for my thesis before August of 2023, but a note during one of my meetings came up that said something to the effect of: "If you're Western assimilated, then there will be misinterpretations." This was striking and initially hurt me, but I didn't respond. I sat on it for a good six months and then attended dance (ceremony, for a more widely understood term) for the first time. I revisited the paper and didn't like how any of it sounded/read, I found some of those misinterpretations that were alluded to before, and my work was so consumed with a professional voice that all of it became lost in translation for me. It didn't feel genuine - it felt like I wrote something that the academy would want me to write, and in the end, I had to ask myself "To whom should I hold myself more accountable?" While the academy is the medium in which I do my work, my community, my family, and myself are who this work is intended to be for and with.

When I wrote this chapter before, I had my positionality separate and written out in a list format stating directly what my Epistemology, Ontology, and Axiology were. After reading back over it, it felt like what I wrote would be set in stone, once this work was published, which goes against my personal ideology. One's way of thinking about and knowing the world and their position in it is constantly changing. That said, this paper has better flow and leaves some things open-ended in order to anticipate the inevitable growth that I will go through.

I attribute this method of explaining my paradigm to Sean Wilson's *Research is Ceremony* where he constructs and explains what an Indigenous research paradigm looks like. Part of me feels like this section may be too open or too up for interpretation to be acceptable, but I feel that this is the right way, and best way, to start my thesis.

I'm going to discuss my experiences as an individual, in a story-like setting, in an effort to display how my work is informed, and to build a sense of relationality with readers. I will do so by covering my ways of being (Ontology - What is real?), my ways of knowing (Epistemology - How do I know what is real?), my ways of navigating the world (Methodology - How do I find out more about this reality?), and my values (Axiology - What part of this reality is worth finding out more about, and what is the ethical approach?). By discussing these in a story-based format, I'm leaving the reader room to relate and find these academic values, or lessons, in ways that may also shape their lives (Wilson, 2008). The four values of research paradigms might not be explicitly stated and lined out, but it's visible with the critical eye and more importantly the Karuk eye. I'm not asking you to read my mind, but rather to think deeply about this chapter. Those who know my actions and my work have a leg up, but what I write should be enough to assess wholly who I am. Take time after each paragraph or each page and think about what you've read, think about how you *can* relate, how these events are similar or different to some of yours, and how these events would affect you or anyone else. There are avenues of relationality between Indigenous and Non-Indigenous communities in this work.

As a final disclaimer, the thoughts outlined here are entirely my own, and if you use this work, you're citing me only. Some people may have similar stories to mine, but I cannot and will not speak for the entirety of the Karuk people or the Karuk Tribe.

From World War II until the late 90s to the early 2000s, the Barney family (one of the bigger families along the Klamath) was making a slow exit from Karuk country. Not on purpose, but because life took them in other directions, and they also stopped having kids, or as many kids. To put it in a Western lens, whether you subscribe to that or not, as of right now I'm the last

one to carry on the Barney name. One day when visiting the Karuk People's Center in 2020, Grandpa, my Uncle Josh, and I walked in, and we announced who we were. The lady at the front desk seemed shocked and said, "Barneys? We [whoever *we* was, I'm not sure] thought all of the Barneys died off!" Yet, there we were. Three generations of us standing in front of her. We hadn't died. We had just been away for a long time is how I like to see it.

*** * ***

Growing up, my dad was in the Air Force, and served for twenty-seven years, making it to Chief Master Sergeant, the top 1% of the Air Force at that time. He worked hard and continues to work hard at everything he does, both for work and for his hobbies. My mom, until dad retired, was a stay-at-home mom, and I'm ever thankful for it because she gave me the tools I needed to think deeply and critically about the world from a very young age, that knowledge is power, and was there to support me in all my endeavors. She's now a domestic violence advocate, sharing her own story and doing work to make her community a better place, and I don't think I can think of someone more qualified for the job.

Together, I believe they strike a good balance as parents. They weren't perfect, but no one couple is. I've seen them go through some of the best times of our lives and some of the hardest and heard discussions that would almost seem to separate them, rather than draw them together. They both can be stubborn in their own right, but most of the time they conclude conversations with an understanding of the other's point of view and can come together to work together.

I grew up moving around every four years or so, living (not just visiting) in places as far east as Turkey and currently as far west as Montana. I had the privilege to witness the practices

of numerous diverse cultures and become more worldly than most of my peers. Because of this, I've seen and heard much more around the world than many probably will in their lifetimes. The military was a good gig too. Dad was all about saving money, so we didn't live lavishly, but we weren't poor either. We always had food, the military kept us all insured, and at our house in Florida we even had a pool put in. A solid middle to middle-upper-class lifestyle, to put it plainly. I spent much of my high school career in JROTC and planned to get my college degree and then join the Air Force as an officer. So, what happened?

College, like for most, is a time of rapid change where everyone is trying to figure out who they are and what they want to do. My bachelor's degree is in Earth Science, and two years in I decided I didn't like it but knew I didn't have the time or money to change majors. So, I stuck it out, all while thinking about what I was going to do next. At this point, everything I knew was "provable" from the Western viewpoint, and I especially wasn't keen on introducing aspects of organized religion or spirituality into my work. I thought it was baseless and held no weight in determining what was real.

The Karuk Tribe was never foreign to me, as Dad and Grandpa used to talk about the Tribe often enough to keep it on my radar growing up, and it gave us a sense of pride, I think. During my sophomore year, a fellow Earth Science student, we will call him Pihnêefich, told me, when I began referencing the Tribe and foolishly gave my quantum, to "Stop saying 'we', like you're one of them," and "You don't look Native and, based on your quantum, you're not Native. You're not enough." The words feel a lot more guttural when they're being thrown at you; black text on a white page will never do it justice. While I understand that I have most likely received privileges, both spoken and unspoken, based on the way I look (which is White),

I don't think that this denies me my indigeneity at the end of the day. It was my most memorable moment of White ignorance and taught me to keep my quantum and the deeply personal parts of my life to myself until someone had built up that trust with me first. But it also taught me some other valuable lessons about my field at the time and pushed me onto a new, more beneficial path.

The first tattoo I got was on Halloween of that same year, in tribute to the Tribe over my heart. Dad had a similar tattoo, and I thought, "I'm Karuk, so maybe I should get one too."

Shortly after this, the Tribe gave out COVID relief money to us descendants, which blew my mind. (I heard it also blew a lot of surrounding tribes' minds!) The Tribe thought of me, it felt like, and I began thinking deeply about my presence within the Tribe. Money is a big deal, and I remember asking myself, "What makes me so deserving?" and "What have I done to earn this?"

This is where the fun begins! I took Native American Studies classes, got involved a bit with the campus' Native presence, and quickly thrust myself into the socially dynamic world of Indian Country. I also started reaching out to my community, making cold calls and cold E-mails to people that my Aunt Achvivyáas'ara knew (she worked for the Tribe for a long time), explaining that I was just wanting to learn and work to be as present as I possibly could all the way from Montana. It was great; however, I wasn't aware that the side effects would include an existential crisis every few months because you're asking yourself, "Do you really know who you are in this dynamic? Are you *really* Native? What are you doing to give back?" almost every day.

The black and grey tattoo against my pale chest became a symbol of disagreement within my mind. I understood that a large part of what makes someone Native is being involved in the community; therefore, my justification of “having Karuk blood” to get the tattoo meant nothing now. I struggled to represent myself and my community (being the only Karuk at my university) for the next couple of years. No matter what questions or dirty looks I shook off everyday, I always felt like others were passing judgment on me. I’d shave on a schedule because if my facial hair grew out too much, I wouldn’t look Native enough, and I’d only braid my hair if my face was clean-shaven to make sure I “looked the part.” Being where I am now, I think back on all of this now and laugh at these things, but they were all very real issues at the time.

The tribal people here in Montana don't know who the Karuks are. They don't know that miners slaughtered all our men and left us to rebuild with just 800 people, causing us to marry out or risk incest and the animalistic stigmas the government wanted us to have. I don’t have the time to sit with each person and explain why I look the way I do, nor do I owe them that explanation. I can remember walking into the Native Student Center and instantly realizing that I was going to get along with the adults much more, or so I thought, but I soon realized that even adults in Indian Country are quick to discount you. I envied those who had the privilege of feeling comfortable in their own skin, especially those who look like me and are part of the larger tribes that attend my campus. But the thing is, I feel comfortable in my skin when I'm at Home because I know that there's an overwhelming part of my tribal community who look just like me.

My Native experience up to this point was facing judgment by Native communities and being considered a pretendian by non-Native communities. I equate the experience to being a

Half-Orc in Dungeons and Dragons, being rejected by both groups. Being well aware of the sentiments both parties hold, it takes conscious decisions, almost on a daily basis, to maintain flexibility and let their ill feelings roll off the back.

With time, I shut people out who weren't healthy and adapted to this new school of thought because I knew that this would all do myself and/or my community some good in the long run. I started attending Karuk language classes, where six or seven of us students on Thursdays and Fridays would come together to laugh and learn Karuk. This was the first connection that helped me come to grips with my identity, and I feel so passionate about it that I made it my work for the next two years in this thesis. This multi-year-long process of indulging in the current academic conversations in NAS, attending language class, understanding the legal/political positions of Native people and Native American tribes, and discussing it all with my local and tribal communities was part of the rigorous reconnecting process. It was a good one too because the work didn't feel like work. It just felt like life, and I was just getting back up to speed on all that I'd missed.

After some time, I was invited to Mountain Dance, which is currently the pinnacle of my reconnection process. I found out later that as long as you're a High Dance Tribe, you don't need to be invited, but, based on where my head was at, it would have felt wrong to me to just show up without anyone knowing who I was first. I was invited by a gentleman named Áxvaay, who had talked with me over the last couple of years, and really got to know me, and we share some experiences when it comes to the process of connecting to the community and the culture. Sometimes I thought/think he knows me better than I know myself because he's had the same

experiences and knows what I'm likely to do or say. I've never had a bad experience with him, and I couldn't be more thankful to have been in contact with him.

I was super excited, until a fire shut down the roads and stopped me from attending dance during that summer, so I changed flights and visited with people during January. I stayed with my Uncle Púufich, and he chauffeured me up and down the river to talk with people I'd only communicated with through the computer screen. The current Chairman (with whom my grandpa is a cousin), language powerhouses Tuus and Xanpuchíniishveenach, and Pathrih working in the Karuk Tribe Department of Natural Resources to bring back our traditional burning practices, to name a few. I was so excited; you would have thought I was meeting a group of celebrities! I gathered a trove of information and had a really good time.

Nothing kept me from dance in 2023. My family and friends were all super excited for me, but anxious, too. They'd ask, "So you're gonna go out in the middle of nowhere, off the grid, and camp with 50 to 150 people that you've never met before?" to which I'd reply simply, "Yes." I wasn't anxious or stressed at all. Dance wasn't a "goal" I had been working toward all of this time, but it felt more like a natural next step to things after everything I'd done up to that point.

I get to the dance grounds parking area and the forest is lush and full of life, but dead silent. It seemed like I was one of the first people to get there. I step out and walk toward another road leading deeper into the forest where I see a kid who looks like me, the same complexion, roughly the same height, but shorter shaven hair. He sees me and looks at me like he's trying to figure out who the heck I am. I said, "Ayukîi," or "Hello," and there was a slight pause, and then he said, "Ayukîi," back. That was a huge moment. I just told a stranger, in the middle of the

woods, hello in a language that is so far removed from the dominant tongue, and he knew what I was saying and said it back. If I walked up to someone in Montana and did that, they'd give me a blank stare and wonder what drugs I'd been on. I found a spot for my tent, settled down, and let myself be along for the ride, open to everything that was to come.

Daily activities consisted of playing cards, journaling, and a whole lot of talking. Most everyone was super kind and thankful that I was there and surprised that I'd come out all that way to be there. Talking with Chúufish, an Elder who has a knack for genealogy, I figured out that the Barneys are related to the two main families in the village, just super far back, and that my family most likely comes from the very village I was camping at. Could this be why it felt natural and homey to be there? Could I call it something so personal, like "Home," so soon?

After a few days, I'd seen a few dances at this point and I'd told people I wasn't going to dance this year, just watch, in order to learn the ropes. A gentleman named Xanchíifich came and sat in a camp chair next to me and asked, "So what are your reservations about dancing?" I told him straight, and said, "Stage fright." A discussion ensued about what dance is about and how people are there to pray, and they're not there to look at you. Xanchíifich ended our discussion with, "Well, I hope that one of these days you find the courage to dance at least one time, so you can take that home with you." Dancing was daunting to me, and this almost sent me into an anxiety attack just thinking about it. After talking with Áxvaay's son, Yupsítanachaxvaay, and practicing the next afternoon, I danced that night without an ounce of fear. Then I danced the next day, and the next day, the day after that, and then the two hardest days at the end. Sure, I messed up a couple of times and my voice was shot, but I easily figured out that what

Xanchíifich said was, and was explicitly articulated by Yupsítanachaxvaay, that “anxiety is the ego talking for you.”

There’s a certain point in the dance where we all join hands and dance together. It was at this point during my first or second dance that I realized where I was, how far I’d come, how proud I was to be there, and how proud my family and ancestors were to see me make it this far. A mental block freed, and I felt a large sense of relief. I finally felt like I earned that tattoo, and I gained an immeasurable amount of confidence about who I am and where I’m from.

I also had a number of spiritual experiences while I was there, and I had them because I was open to them. I keep an open mind and stay flexible when navigating the spiritual and determining what those experiences can do for me. They came to me in a way that represented the “seeing is believing,” approach that my STEM-oriented mind favored. This was a gap bridged for me, as I was able to understand another piece of the world I had been missing up to this point. It changed my answer to “What is real?” and allowed my mind to open up to searching more about this new reality and how it informs the way I navigate the world from a holistic point of view.

Like all good things, it eventually came to a close. But a couple of days before it ended, Yupsítanachaxvaay pulled me aside and said, “I wanted to let you know that we’re all super happy and thankful you’re here and that you have a community here.” That was the first time anyone had ever said that to me, and it felt good to hear it. (‘Good’ is a tremendous understatement, but I won’t get too into the emotions here). I told him I would never have claimed I had a community here unless someone told me first. I’d earned the privilege to say that I have that community. I’ve summed it up this way for people: Dance was probably the most

transformative ten days of my life so far, and definitely the best ten days of my year. The first text I sent to my family when I got back into cell service read: “I feel more like a man now than ever, and I did the Barneys, both those here and those who’ve passed on, proud.”

I did not come out of it empty-handed either. During all of the dances, Medicine will typically give us a teaching. It is with those teachings I became informed about how we should live and how we should think of the world around us. I’m happy to say I was doing some of them before but learned more about what I can do to improve my ways of knowing and being than I thought I would. These teachings act as our armor and help us to handle the outside world, and by having them at the front of our minds every day we can lead successful lives.

Everything you’ve read is what it means to be a Native American. No one thing makes someone Native, not just blood, family, community ties, material culture, ceremony culture, language, lateral violence, or struggle, but rather all of it. The combination of these leads to Native experiences, which together, makes us Native. This is my Karuk experience, my personal Indigenous research, and it’s shaped me in ways where only words would be an injustice. All of this allows me to sit comfortably where I am, approach my research holistically, and make my biases aware. It allows me to be fully human in this work.

This story and my interactions with the language programs to this point are why I’ve chosen the route I have. People say that when a language dies, the culture dies with it. In the interest of safeguarding Araráhih and Karuk knowledge, as one may also feel obligated as a young person, further reading of this thesis will explain not only what I’ve learned when it comes to language regeneration, how it can be implemented practically, and why a language app provides more of a positive outcome than a negative. In the next chapter, we’ll discuss some of

the recent literature surrounding Indigenous methodologies, protecting Indigenous data, and learning language through technology to further inform this work.

BRIDGING THE GAP BETWEEN INDIGENOUS METHODS AND WESTERN TOOLS: A LITERATURE REVIEW

In the last chapter I positioned myself as a military brat on the path to reconnection, and finding that reconnection through language. I gave insight into my worldviews by discussing my relationship with my community and land while also developing the three main points of mind, body, and spirit, to encompass the human approach I take to my work and research. In this section, we're going to listen to other voices in my field of research to gain a better understanding of what language regeneration looks like, how it's approached, and the role a language app can play.

The popular quote by Audre Lorde, "The master's tools will never dismantle the master's house," (Lorde, 2003) was frequently thrown around during one of my methods classes. It's also a common critique from some of my peers about my work on Indigenous language apps because one is taking the concepts of curriculum and Western technology and trying to implement them in Indigenous language regeneration work. I typically respond with "I might not be able to dismantle the Master's house, but I'll happily steal their tools and build something for my or my community's benefit." Now, in full context, the quote by Audre Lorde is surrounded by Black, lesbian, and feminist discourse seeking larger changes in the patriarchy and society as a whole. One could say that someone using the quote against my idea of Karuk language regeneration so feverishly is an admittance of misunderstanding of the scope of my work and a misunderstanding of the quote's origins. What I'm trying to do in this chapter speaks to Indigenization theory - taking tools to transform and adapt them to cast Indigenous worldviews.

While I'm not looking to dismantle any houses, I think it would greatly benefit my community if we could find a way to reach the youth with language and begin to undo or resolve a portion of the damage caused during the US Boarding School Era. After this comprehensive synthesis of Indigenous methodologies, Indigenous methods, and drawing conclusions of practical applications of data security and sovereignty, you'll find that the reasons I've chosen to combat our language deterioration with a language application are an apt step forward in more than one direction. Some of the themes I discuss will flow into one another.

Contemplating Indigenous Methodologies

From the way I understand it, Indigenous methodologies are the background to one's research which informs their methods (the way one conducts research). I'd frame it as a set of questions that one should ask themselves before doing Indigenous research, such as, "Who should be involved in this work? Who am I accountable to? Why am I doing this project? Who or what will benefit from this project?" where the list isn't definitive and can expand and contract based on one's project (Smith, 2022; Walter & Anderson, 2013; Wilson,2008).

A question that I've spent probably far too much time contemplating is "Am I being Indigenous enough in my work?"[1] This sort of dialogue dominated my first methods class, and while I don't think my work is entirely Indigenous or entirely Western, I like to think that I bridge/fill in the gap between the two. To start, I want to address Sean Wilson's contribution to my work, since I mentioned him in the previous chapter. It wasn't until my second reading that I realized that my attitude toward research is written and discussed in *Research is Ceremony*. Wilson writes in two separate texts, one which speaks to the academic audience using fancy academic terms, and another to his kids in an informal and easy-to-read explanation of what's

being discussed in the current chapter. From this, I lean toward informal writing because it's organic and personable, and I find it to be far more effective at knowledge dissemination than any professional paper or article I've read. What's the point of doing what one may think is important research if they can't effectively communicate the implications of said research? This reminds me of many discussions I had in Earth Science about why certain areas of the government disregard scientific study, especially when it comes to the climate crisis. Essentially, if Smith (2022) gave me insight into my experiences research, then Wilson (2008) showed me how they are valued in Indigenous research and how to articulate them in such a way that the academy will accept.

Figure 1: My artistic interpretation of the ideological, philosophical, and pedagogical gap that needs to be bridged between Indigenous and Western worldview.

The prospect of a digital app on a computer that's more powerful than the machine that put Americans on our Moon, which lies in the palms of our hands, just about covers the Western side of my work. (Western science and the desires of constant production and innovation). The Indigenous side is a little more nuanced. As I said previously, I'm using the app as a tool, which I can fill and imbue with Indigenous methods. By discussing some of Linda Smith's project suggestions (Smith, 2022), I can illustrate the Indigenous methodologies that have gone into this work. Some of these are present within my written portion, but others were present behind the scenes and not documented here, where they occurred naturally by just being a part of life and the Native experience I mentioned in the last chapter, not explicitly employed for "research purposes."

This acts as a version of autoethnography where I can share my work in a story format and place my personal experience at the forefront, which is a core Karuk value. Karuk traditional instruction methods are minimal. Not in the sense that they don't exist, but in the sense that no one, traditionally, directly instructed a person, but a person discovered information on their own. It's a system where "over-explaining is stealing a 'person's opportunity to learn, and stealing is against the law,'" [and] over-explanation constitutes practically any explanation at all," (Lenk, 2012, p. 8). In this way, "you have to work through it yourself, [or] it's just somebody else's words, of which you have no understanding," (Lenk, 2012, p. 9). Similarly, Paul Whitinui (2013) summarizes Indigenous autoethnographic writing as "a process of "self"-discovery and that writers have to 1) write as a way of learning more about yourself and your topic with an emphasis on "showing" more than "telling" and 2) as a method of discovery and analysis, in that, by writing in different ways we discover new aspects of our topic and more importantly our

relationship to it[...]" (Whitinui, 2014, p. 463). This further describes my writing style. Rather than telling you what I know, I display my discovery of this information and how I understand it and/or find it useful and take you (the reader) with me.

Examining the eighth chapter of the third edition of Linda Smith's (2022) *Decolonizing Methodologies: Research and Indigenous People,* seven Indigenous projects play into my work. First, Storytelling, as described by Russell Bishop and Margaret Kovach in Smith's book is an apt way of representing the "diversities of truth," and that storytelling is both "method and meaning" and connected to knowing (p. 166). Combine this with the projects of Reconnecting/Connecting, Networking, and Sharing. Connecting is described as "what it means to be whole," (p. 170) and it essentially asks the researcher, "Who are you accountable to?" and pushes them to understand identity, place, spiritual and physical relationships, and community welfare. I characterize it as reconnecting, and it's exemplified in my first chapter. Networking, while similar, is discussed as building healthy relationships by understanding another's spirit and intentions to build knowledge. Smith describes Sharing in Indigenous communities perfectly as the "responsibility of research," (p. 183) and how it picks up the slack left behind by education systems that have done a poor job at educating Indigenous communities and can be done informally. Sharing what you know in an oral setting is a cornerstone of Indigenous communities.

All of the above describes the entire first chapter of this thesis: a story about plunging myself into my community, both in language and in ceremony connecting and networking with the community and the land. All while maintaining connection with my community by discussing my work and sending it out to get thoughts and good conversation flowing. This is

research where I evaluate myself as a human subject and think deeply about my experiences, which is where these themes came from. This project is not just an app, it's been the development of new worldviews and paradigms.

The final three projects encompass Revitalizing and Regenerating, Protecting, and Negotiating. Revitalizing and Regenerating are hot words because they're specific to language work. Smith entertains a discussion here about the state of many Indigenous languages, and how some scholars prefer the word "regeneration" because language doesn't die, the people do. I prefer to use regeneration, but in a way that's less illusionary. I define it as recovering after significant loss. The Karuk have 25 speakers and counting, so we don't have to bring the language back to life because it's already living, we just need to grow our group of speakers. Protection is a broader project that's discussed as Indigenous peoples' efforts to protect themselves, their culture, and their land. Language regeneration falls into this category by its nature. Negotiating is about moving and planning methodically, both as individuals and whole communities, to protect and preserve the future of our communities. It's about strong leadership and making deals that enforce self-determination.

Treating our language as data and working toward Karuk data sovereignty, as we will further discuss in this chapter, are efforts to protect our language in the modern age. Being in the modern age, however, has its drawbacks. I always tell the students I'm a Teaching Assistant (TA) for that this continent is forever changed, and that no matter what we do we cannot go back to the "good ol' days." Progress today requires tactical legal and tribal government advancements and deep planning for the future. By respecting and negotiating data dissemination

and protection with Universities and the US Government, we can make our way into more autonomous government practices.

Though Smith says that some of these projects may be connected to others, to refer to them as "projects" almost makes them seem singular, as if one cannot work on any other project than the one they've decided (Smith, 2022). These may all be projects for one to work on, on a singular project level, at any given time, but my first chapter is example enough that you can have experiences that lead to many projects. Then I contemplate Shawn Wilson's quote, "If research doesn't change you as a person, then you haven't done it right," (Wilson, 2008, p. 135) and in this way, I'm tempted to call these "projects" Indigenous experiences in modern research. With this approach, I imagine there should be two lists among Smith's two chapters of projects. One for the actual projects, like Regeneration and Protecting, and another for experiences like Networking and Sharing. This way, researchers can frame the work they're doing by placing themselves within a project or two, and then mapping out their experiences with that project. This could create a deeper sense of community for Indigenous researchers within the academy and allow for more personal connections, and subsequently further employ the Sharing and Networking areas discussed prior as they are high values in Indigenous communities.

To metaphorize and build on sharing, I think of Indigenous research, as a whole, like a golf swing. You have to have good aim (You know what question you want to ask and what methods and methodologies you're going to use), you then have to make contact (Your study was a success and you gathered and interpreted the data in a way that answers your question), and then you follow through (the information is shared effectively, and the researcher actively seeks to make change based on that study). Deficit research is research that aims to point out

problems in or treat minority communities as sub-human (mostly in older texts) in need of some sort of help without regard to what fuels the problems found in those communities and what their actual needs/wants really are. For this, I'll provide an old example and a recent example. In Alfred Kroeber's *The Handbook of the Indians of California* (1925), you'll find that in the captions of all images of tribal people, instead of male and female, they are described as types (Kroeber, 1925). This book is primarily ethnographic in nature, during a time when "the real Indians were dying off," and eugenics was a very profitable route of research. Anthropologists wanted work that preserved these people and their ways but refused to place them at the same level of the White man. (There are few exceptions to this rule). In Joseph & Golden's *Diabetes in Native Populations and Underserved Communities in the USA*, they do a great job at outlining the health disparities found in a number of minority groups but don't examine the social and societal settings and ask themselves why these issues are occurring (Joseph & Golden, 2017). They acknowledge that in poorer communities some adults have to work two jobs in order to make ends meet, and therefore don't have time to exercise and by the end you're left with the notion: "Well, if these people would just get better jobs to free up time to exercise, eat healthier and quit smoking, they could get rid of this diabetes problem." There was no research into how these communities are systematically handicapped, why Native communities in particular have better access to poor diet choices than healthy options, and how generational trauma leads to finding poor coping mechanisms.

For a lot of deficit research conducted by, historically, Non-Native individuals, they have decent aim and good contact, but their follow-through causes them to slice it out of bounds. The follow-through tells you the story of the swing. The golfer (researcher) thinks they have good

aim and good contact, but the caddy (affected individual, Tribal Government, etc.) notices the issues in their form (that the golfer's interests (aim) are misplaced), which causes the faulty swing. They notice that their methodologies are in the wrong place, their data acts as confirmation bias for their research question, and without focusing on community needs and relationships with the affected individuals the work is poorly received by Indigenous communities. Deficit work loves to identify problems and it might provide solutions to the problems, but the execution of those solutions, or lack thereof, is problematic due to the disconnect in the researchers' methodologies - specifically lacking in reciprocity and relationality. Now, this doesn't apply to all researchers or Indigenous research, it's just a framing of a pattern I've seen historically. This research is an example of what I don't want this work to be. We, the Karuk people, know we have few language speakers left and we don't need any more research to prove that position, but we need to do work to try and captivate new speakers and grow our speaking community. To my knowledge, a majority of language research and development done in my community has been largely positive and doesn't fall under this category. The works of JP Harrington (1932) in his faithful documentation of Karuk language in *Tobacco Among the Karuk Indians of California*, the countless hours of documentation and restoration of the Karuk language amounting to a Karuk Dictionary by Bill Bright and Susan Gehr, come to my mind as formative work in early and contemporary Karuk language regeneration (Bright & Gehr, 2005; Harrington, 1932; Karuk Tribe & The University of California Berkeley).

Exploring Indigenous Methodologies in Language Learning Technology

While there's quite a bit of research on Indigenous Methodologies (Archibald, 2008; Smith, 2022; Walter & Anderson, 2013; Wilson,2008), there seems to be a gap in the literature when it comes to the use of those methodologies in language technology. However, there are a handful of sources that attempt to address and explore that avenue, specifically the Indigenous navigation of digital spaces and the decolonizing of technology used for language revitalization (Meighan, 2021: Shilling, 2020).

Shilling's (2020) paper, *Exploring the use of mobile language learning technology as a means for urban Indigenous youth to connect to identity and culture*, seems to be a spearhead in current research when it comes to the use of technology allowing individuals apart from their home communities to connect with those communities. She writes from the standpoint of someone who grew up in urbanized areas, her journey of reconnection, and how that reconnection has informed her and given her the necessary cultural sensitivity to navigate her research. In this respect, Shilling (2020) and I seem to have much in common, and there's one quote from her dissertation that sums up my attitude when it comes to language work and its intermingling with technology:

> Insisting upon Indigenous identity constructs that require land access denies the urban Indigenous population living away from their territories the right to consider themselves Indigenous. (p. 42).

It pushes against the unwavering traditional stance some take when it comes to language learning and creates space for Indigenous ideology in a technological setting.

Shilling (2020) addresses the presently known, positive consequences of technology and social media, and their assistance in keeping up with relationships and maintaining connections to home communities, while also providing spaces for Indigenous groups to assemble and discuss to suit their purposes. However, the dissertation seems to have been written before the onset of COVID-19, thus before the widespread use of online meeting programs. For a clear demonstration, my language community became my first connection to my community, which operates exclusively through Facebook by using several group chats and group pages. This is then supplemented with online meeting platforms like Zoom and Webex to attend class as a group and harnesses the most important part of learning a language: speaking with others. While social media platforms provide a safe space, open to those who choose to interact with it, where information that individuals or the community thinks is important can be displayed and discussed, Shilling (2020) also asks us to keep intellectual property laws and corporate interference in mind, as they'll most likely be against Indigenous ways of knowing (Francis & Liew, 2009). This is important when discussing language apps because when you're using recorded audio or video clips you run into those laws, where the individuals being recorded and those doing the recording both have rights. I begin to ask, "How can you obtain the rights to use that content, in the interest of creating a language app? Do you have to go to each living family member and get their consent? Does this apply to a Karuk dictionary app?" This is directly applicable to our language because our online dictionary is supplemented by many recordings.

Found within Shilling's (2020) dissertation, a 2016 survey's results were discussed, displaying that modern technology in general has made room for Indigenous language resources and platforms, broadening the scope of community engagement (Galla, 2016). This is

exemplified in my community with our dictionary website, which acts as a machine translator and storage area for stories, and other online tools that we use like Kahoot© and Memrise™. This is also in direct support of a Karuk dictionary/language app, which intends to bring more people to our language community while also bolstering language use at home.

Other articles in this area suggest that Indigenous communities around the globe have been implementing their traditional knowledge systems to ensure different platforms of technology reflect their ways, and the same goes for the rapidly evolving area of tech-science, artificial intelligence (AI) (Carpenter et al., 2016; Lewis et al., 2020). Combine this with work outlining what the future of decolonized, technology-based language revitalization work can/should look like (explored in Chapter Three), and you've got a hefty start toward the development and implementation of Indigenous worldviews and ways of knowing into language applications (Meighan, 2021).

Shilling (2020) and Meighan (2021) both address the use and publication of Indigenous knowledge online and the differences between open-access information and sacred information. Most of the guidelines are contextual and vary from community to community, and possible guidelines for Karuk knowledge and its uses will be in the next section and Chapter Three. It's important to note that in all of my research, I haven't found any piece that indicates or documents a set of real "guidelines." However, certain standards and themes arise in each piece of literature, so these "guidelines" are implicit. Chapter Three will discuss what these are explicitly and why I'm following them but will do so in such a way that it's not the only way to implement Indigenous methodologies in language technology.

Indigenous Data Sovereignty: Claiming and Protecting the Intangible

To clarify, data sovereignty is the ability of a nation or governing body to collect and govern information by its laws and philosophies, and Indigenous data has a more complex definition than the Occam's razor alternative: "Data that is Indigenous." Indigenous Data is collected with Indigenous methodologies behind the research and is typically for work/projects that aim to better the Indigenous community in some way. However, it's also the information that isn't present in the foreground, like community-held knowledge and teachings only accessible through community involvement, because Indigenous communities reserve the right to determine how their ways are used in various settings (Kukutai & Taylor. 2016).

Concerning the intangible, such as language, stories, music, and spirituals (or Ikxaréeyav as used in Karuk), the predominant Western academic mindset either claims them as property, copyright, or non-existent/unimportant. They might have you believe that unless it's tied to research in some way, it's not considered data or even research at all. Trevor Reed asked one of his Hopi community members about what traditional songs were for and was given the response, "Well, no one just sings out here," (Reed, 2020, p.205). This implies that a certain amount of care and respect is necessary when it comes to traditional song, as opposed to just popping it on your phone and singing along to it. In some tribal communities, songs are considered property, but not in the way that the English word characterizes it. You can't/don't buy them, they're typically passed down to you. Karuk stories and songs of Ikxaréeyav are living entities themselves with their own agency and, to me, this speaks to the power that words have, in general, and that by extension, words can be considered living as well. They hold immense

power in preservation, teaching, expression of feelings, affecting others, and so much more that it would be wrong to decline them that agency (Momaday, 1970).

In Māori, Taonga is “anything highly prized”, and consists of material content like regalia and other items, but also the immaterial, in this case language. However, it’s not just the articles or language themselves, but specifically the knowledge they carry (Ruckstuhl, 2023). This furthers the point that data doesn’t exclusively apply to information found during research. Based on the Māori interpretation of *Te Tiriti o Waitangi* (*Treaty of Waitangi*), a treaty made between English Royal Representatives and some Māori tribal leaders, the Māori retain sovereignty over their “lands and treasures.” Taonga is also, living and relational to the whole community, and, like many other Indigenous ideologies, the current generations are obligated to safeguard Taonga in the interest of future generations. With this in mind, the Māori have been able to protect community-held knowledge - protecting Taonga, or living data - and create a Māori Data Governance Model, and Māori Data Sovereignty for Cloud use (Ruckstuhl, 2023).

Similarly, in Karuk culture, koovura Ikxaréeyav (all of the spirituals) teach us lessons, provide knowledge, and guide us through our lives, and would be considered “living data”. To further a point in language, I stated earlier that “when a language dies, the culture dies with it,” and I’ve had many discussions with peers and colleagues about how learning a language allows you to think in the way of that culture by unlocking that cultural context. In this way, we wouldn’t just protect the language itself, but that’d be used as a gateway to protect the knowledge held within it.

A Note on The Legal Standing of the Karuk Tribe

Now that we've defined the intangible and the lengths that communities will go legally and conceptually to protect these aspects of culture, where do the Karuk stand legally? How can follow in the Māori's footsteps? In the 1850's the Karuk Tribe negotiated and sent off a treaty, but it was never ratified by Congress. We wouldn't become federally recognized for the next 120 years, gaining recognition in 1979 and creating a Tribal Constitution in 1985. In the grand scheme of US Westward invasion, we're pretty young. Regardless of age, our status as a federally recognized tribe endows us with the right to negotiate with Federal, State, Tribal, and Local Governments (Wheeler-Howard Act of 1934). Uniquely, the Māori together have only one treaty, Te Tiriti o Waitangi, and before that the He Whakaputanga o te Rangatiratanga o Niu Tirene: Declaration of Independence of the United Tribes of New Zealand which outlined the sovereign powers held by the chiefs, primarily made up of northern tribes. This document helped create Te Tiriti o Waitangi where it's stated that the Māori retain "[sovereignty] over their lands and treasures (i.e. Taonga)," and has helped inform decisions made today, which include the protection of taonga (Ruckstuhl, 2023, p. 400).

While a lot of literature exists about and around data sovereignty, I couldn't find any examples of tribes working on and actively pursuing it. By our constitution, organized for our overall welfare, the Karuk Tribal Government is obligated to provide for the preservation of Karuk families to maintain cultural identity, and "take all actions that are necessary for the exercise of powers delegated to the Tribal Council," (Constitution of the Karuk Tribe, 1985). I believe that there's an argument here that would allow us to claim our language material, both written and recorded, for continued cultural protection for generations. Through the

consideration of language as data, we can develop and maintain a means to store these sources and determine who has access to them. This would solve the potential misrepresentation of our language and our values as well - if you want to know, you must come to the source. By building a dictionary/language app at the same time, we can standardize the language into a form that all can learn and understand. This standardization could be just that, a standard, but not a determination of how it's used. This way you're able to preserve those dialectical differences across families.

"But doesn't an app contradict the idea of preventing open sources of information by creating an open source?" On the surface, this is correct, however, in creating and making an accessible app, one determines what can be programmed into it. By methodically restricting access to certain stories and/or songs, you push the learner to become involved in the community. Doing this tightens up security by adding another obstacle in the way of someone looking to extract the information and benefit in other ways (i.e. financially or socially), and community-held knowledge is earned. Most of the Karuk information is open access, so we may already struggle here, but implementing this Tribe-wide could resolve this.

To clarify, I'm not vouching for a complete lockdown of Araráhih or a golden standard of how it should be spoken. I'm simply looking for a way for the Karuk Tribe to hold rights and interests wherever the language, and the culture within it, is involved. One of these steps is tacking down an established (standardized) orthography (spelling system) and pronunciation.

However, investigating further into how tribes in the U.S. can regulate data governance, I came across a law review journal that seemingly shatters the above aspirations. It details the relationship between federally recognized tribes and the US Government, specifically the

Supremacy Clause, where the interests of the United States Government overpower those of tribes (Tsosie, 2019). Therefore, if a tribe were to implement laws exercising data sovereignty, it could spark State and Federal interest causing the enaction of the Supremacy Clause. Additionally, the US Congress regulates information technology and enforces these laws through the Federal Communications Commission (FCC). Consequently, if tribes try to implement regulations of information, they'll clash with federal law and federal law will always trump tribal law (Tsosie, 2019). This is called preemption. A possible upside to this is that Tribal Governments are protected under the federal trust responsibility which vouches for tribal self-governance. This opens up the possibility of a slight workaround that would allow tribes to "protect data in possession by federal agencies that [concern] tribal governments and their members," (Tsosie, 2019, p. 238-239).

The Agency and Power of Language

I want to take this section to theoretically frame my thesis, and some of the information above, to gain familiarity with some of the major academic thought processes behind some of the statements made. Since I made a seemingly large leap to consider words as Spirituals, I need to take a section to unpack what I'm drawing from and why I find it applicable. The focus here will be on language alone, but I recognize that other areas, like art and music, can transcend the realm of words.

I had an interesting discussion with a committee member about performatives, or phrases that, once spoken, change a person's life. Like "I hereby sentence you to life in prison without the eligibility of parole." It's not the words themselves, but the authority behind them (in this case, a judge who has been elected to be the legal voice of a community), and it's the two

combined that actively alter the path of the individual it was spoken to. This speaks to the agency of language (G. Gamble, personal communication, December 11th, 2023).

As I stated previously, koovura Ikxaréeyav, specifically those within stories, teach us, and by extension words hold just as much spiritual agency. If you take a step back in your existence, words make up our entire world. Language is how we act, how we imagine, how we convey feelings and information, how we understand concepts, and how we describe the world. There is not a second of the day that goes by where language is not directly involved with you (Momaday, 1970). To display this, I encourage you to sit with each of the following thought experiments for a couple of minutes and flesh out your answers.

- What was your first thought when you woke up this morning, and then what did you do after that?
- Recall, in your mind, a time when someone deeply offended you or an aspect by which you live your life. How did you react?
- Think of a time when you conducted a thought experiment, or even think of one now. It can be as complicated as theoretical physics, or as simple as thinking about how a sentence might go over with a particular individual.

These are basic questions but are good for the general understanding that words give our motivations weight and substance and allow us to act with those subconscious motivations and feelings. This grip that language has on your reality can/will change with every language.

Now, recall a more specific scenario and, again, sit with all of these for a minute and let your gears turn. It’s okay if you can’t remember everything, but say the things you can remember out loud, to yourself, or write them down.

- Think of an event in your life where you were extremely happy. This could be anything from a wedding to a childhood memory with your grandparents.
- What were you wearing, specifically?
- What did it smell like?
- Who was with you, and what was their presence like?
- What makes this memory such a positive one? What feelings does this memory illicit?
- What did that moment teach you? Whether it's about people, the world, nature; anything.
- Now take a minute to live in what you built in your mind.

By recalling all of these pieces of memory, you've managed to bring your imagination to life - so life-like that you can live that moment over and over again. Now, one doesn't think of the words that specifically make up that memory. For instance, you can picture a red shirt without saying to yourself "red shirt," but being able to conjure it in your mind means that you know how to describe it verbally in the first place.

Now, you may be saying "Well we all have an imagination, this isn't as profound as you're making it out to be." While you might be right, I've demonstrated, through you, the mechanism by which we imagine, and the intense power that mechanism holds and uses. By thinking in language, you build a dynamic world, and you know the language so well that you don't need to put any effort into thinking about the underlying worldview (or cultural context) that is built in. You just know.

On top of this, in many Indigenous communities, the act of discussing information in a story format is not just for show, but for conveying and passing down information - factual information (Vizenor, 2000) Truly, what is the existence of any country, body of law, or individual, than a set of stories? Do you discount your great-grandfather's World War II memories and history simply because it's told in a story format rather than a textbook? Or, to speak further to Vizenor's piece, if law books are filled with storied information on what dead White men have said about governing this country, then how is that different than the information found in the stories told by Elders about how they govern themselves from their relatives who have passed on (Vizenor, 2000)? There is no difference.

Regarding Language Learning and Learning Through Technology

It's common knowledge that learning new things becomes harder as you get older, and learning a second language isn't separate from this issue. However, for apps specifically, there becomes an issue with motivation to learn, which affects users of all ages. This next section will be a breakdown of popular language resources and a general academic consensus when it comes to methods of learning a new language.

When referring to manual and machine translation, I'm referring to sources like the Karuk Dictionary and the first part of Ararahih'urípih (the Karuk Dictionary website; directly translates to Karuk language net), where you can search for a specific word and directly translate it. A more common use of this type of translation is Google Translate.

Machine translators are beneficial in the sense that they are widely available, they're immediate, some can span hundreds of languages, can translate short words and vocabulary well, and in some cases simply structured texts, too. (e.g. Google translate) However, you can lose

cultural context in favor of a literal translation. This means you may lose significance that is present in one language but is lost when translated to another, also causing unintentional ambiguity between parties (Latief et al., 2020; Niño, 2009). Machine translators also typically require internet access (Latief et al., 2020; Niño, 2009).

From the perspective of regenerating a language, the cultural context is the key to understanding how a language and its community work. Therefore, immediacy, although convenient, opposes the goal of establishing new speakers of Araráhih. One can easily search for a word or phrase to get the point across in the moment, but unless one repetitively uses the word and integrates it into their life, it falls back out of the mind. Machine translators also fail to tell one how/when to use words, which is integral to communicating respectfully, based on a nation's culture. Furthermore, manual and machine translators like the Karuk Dictionary and the initial half of Ararahih'urípih work well for translating a select few words or phrases, but when left alone the lack of understanding of the proper use and origins of words causes these resources to have little impact on language regeneration. It's not that these aren't worth one's time, because I think they're great resources that should be converted into an app format, but the work doesn't stop with these resources. However, the effectiveness of all of the Karuk sources could lie in the user's strength of desire to learn Araráhih.

A common criticism when discussing language apps is that "for the applications to *work,* people would have to actually 'use them*',*" (Liu et al., 2022, p. 6). An application is available all the time, and having a journal of written language removes a sense of urgency to learn it; a "It's been written down, so I'll come back to it later," attitude. Today, most of my community speaks English, and hardly any away from the twenty-five speakers speak Karuk outside of a few words

or phrases. I took two years of Spanish in high school, and I can barely remember a handful of expressions to get me by. I'd be a deer in the headlights if someone tried to converse with me in Spanish. Why is this? My family speaks only English, my friends speak only English, and the rest of my school career involved only English. One hour per day for two years didn't teach me Spanish, but twenty-three other hours per day taught me English. I'd argue that same expression for those who lean more toward class curriculum and language classes. For *language* to work (regenerate, in this case), people actually have to *use it* and be immersed in it. School programs and classes will only get you so far but, until it's implemented into people's homes, achieving success will be a consistently steeper uphill battle. Having the language in the palm of one's hand, all day every day, acting as a supplement to classes and curriculum, could be an optimal step forward. We might not have immersion schools, but we could create *immersion homes*.

Persistence leads to more success, and users who use apps long-term experience a significant increase in language abilities. In contrast, short-term users have little to no increase in language ability and comprehension. A majority of tracked Duolingo© users leave the language learning app due to feelings of lack of engagement, or no motivation, and in order to make up for this deficit, some programs have "gamified" their apps, giving them attributes like those in video games to keep users engaged and encourage competition among their peers (Loewen et al., 2020).

Gamification could easily keep users engaged and learning, depending on the extent an app is gamified. User experiences, when discussing learning activities within language apps, need to include noticing and correcting their errors, asking for rephrasing and clarification to determine correct meaning, learning by actively speaking and practicing while focusing on the

form of the language (e.g. conjugations), and learning collaboratively (Rosell-Aguilar, 2017). Users also should feel that what they're pursuing and practicing through the methods above is "interesting, rewarding, and challenging," (Rosell-Aguilar, 2017, p. 252). Studies, regarding language acquisition with help from Massive Multiplayer Online Roleplaying Games (MMORPGs) that have a diverse world full of activities and have a global reach, have found that the quantity and quality of second language interactions exceed those in the classroom. It is acknowledged, however, that vocabulary and sentence usage are performed better by those in a classroom setting with specific goals and milestones in mind (Li, 2022). While gamification is extremely useful, it's a little out of the scope for what I think the initial dictionary app should look like. However, it is and should be a goal we can strive to implement in the future.

Conclusion

By exploring Indigenous methodologies both on its own and in conjunction with language revitalization and technology, I've set up the next two chapters. In chapter three, we're going to combine Indigenous worldviews with the themes unpacked in the section exploring Indigenous methodologies in language regeneration to further construct an Indigenous methodology for language apps. In chapter four we'll explore the prospect of creating a Karuk language app. Not only will we employ the content observed here, but we'll also look into the formatting of language apps that are popular today, addressing the topic of using a western tool for Indigenous language regeneration from both a philosophical and practical point of view.

AN INDIGENOUS METHODOLOGY FOR LANGUAGE APPS

As briefly discussed in the last chapter, there's no clear ideology when it comes to Indigenous Methodologies in language apps or language learning technology. In this chapter, I will attempt to fill in this academic gap with a mixture of personal experience and critical thinking. I'll also respond to several questions and statements brought up to me to fully understand the goals of a Karuk dictionary/language app.

The most obvious questions that I first had to ask myself were, "Why an app? What are the positives and negatives of an app for Indigenous languages?" My original draw to an app was simple. Before I attended language classes over zoom, I spent time (and still do) perusing our dictionary website, learning different words and phrases to use during the day. Even having been so disconnected generationally and spatially from my community, it gave me a way to eventually make that first connection. Therefore, I figure an app could streamline our dictionary to be used in the same way, and act as an overall supplemental resource. I pictured a young person in Florida, as far across the country as one can get from the Karuk homelands, who knows their ancestry and knows that their family has been away from home for a very long time. I thought, "How might they start their connection process, even if they're far away and may be afraid of jumping straight into the community?" Language can do that, and an app can open those boundaries between outside and within the language community. It would provide a way for an individual to learn pieces of the language, enough to get a basic grasp, without the social fear of messing up, do it at their own pace and time, and join in the community when they see fit. Having an app, of either the dictionary or language learning kind, also pushes new and old speakers to implement the language into their homes, beginning a cycle of learning in and out of

class, and since just about everyone today has a smartphone, you can reach everyone from all age groups. This allows for the whole family to get involved and create a healthy learning environment, and learning together can help build learners confidence (Begay, 2013; Miangah & Nazarat, 2012).

Next, I began to ask, “What happens when they’ve built the confidence and they’re ready to jump into the community?” In the app, other resources should be made available, like Zoom links to our weekly classes, links to our Facebook groups, and maybe even some of our group chats. The goal of the app is to simultaneously appeal to the individual and build up the community. My first interactions with language were with the language community, and I want to hold that sense of togetherness in high priority; therefore, having the app act as a funnel into our community rather than focusing on learning alone is a priority. Not only will this grow our group of speakers, but it will also provide a place of belonging and a place to make connections with others that could lead to further involvement in Tribal practices as a whole, bolstering language and Tribal involvement at the same time.

By restricting the amount of language an individual can learn from the app, such as ceremonial language, community-held knowledge, and longer phrases and sentences, you push them to get involved with the larger language community to learn more. This allows the speakers who know more of the language to teach newcomers just by interacting with them. This places a sense of responsibility on the learner to get involved and carry on the knowledge they’ve gained to pass it to new speakers, beginning a cycle that resembles Māori language nests. Our current format of “teacher-pupils,” where conversant level and Master Speakers teach classes to students of varying degrees of proficiency, works as an intro, where my classmates and I are examples.

This allows the individuals to learn from each other, while also respecting and keeping our Master Speakers involved. They hold the most knowledge about the language and about learning the language, therefore, they should hold more authority when it comes to teaching the language. Through this process, the new learner works their way from an individual to a group with similar skills, learning from more skilled individuals, to learning with a master speaker. This is not an exclusive timeline, as many of these can be done all at the same time. For instance, if you're taking a class that's being instructed by a Master speaker, you're doing the whole process in one session.

"How can someone connect to land if they're not here?" is another popular question that gets raised. While many Native languages are land-based, I don't think this restricts learning to ONLY that home area. By land based, I mean that most Native languages reflect the land in which they live. In English, for example, if we're trying to tell someone to locate an object in relation to them, we would use phrases like "To your right/left," or "Behind you." In Karuk, our directionals are exactly related to the landscape itself, using phrases like "Uphill, downhill, upriver, downriver," and "across," (Garrett et. al, 2020). The simple answer would be to include images and pictures that provide insight into land-based knowledge. While this works, I don't think it's a solid solution as it can create a material sense of land, rather than a relationship with land. Ultimately, this relationship to land rests on the shoulders of the learner if they're not learning the information in the immediate area. The learner must put effort into imagining/framing themselves in that area to try to grasp an understanding of that land-based knowledge they're trying to understand. This could be as simple as understanding that there may not be words for North, South, East, or West and asking oneself, "How do I *literally* orient

myself in the language, and what does that say about how I should read my surroundings in this language/worldview?" This is part of placing oneself in the cultural context. In this way, it also puts a sense of responsibility on the learner to think deeply about the language and continue learning, rather than just having all of the information given to them outright, which could be seen as putting the cart before the horse. The growth in language has to occur in stages because it gives learners time to grasp areas of concepts before moving on.

"An app is only as useful as people choose to use it." This is true, and probably the toughest argument to rebut. However, I don't look at this argument from a strict app point of view, as I think this can apply to all subjects. If someone wants to learn a language or subject, then they'll put in the time and effort to do so. If they don't, then they simply won't. However, I've found that those in my language group seem to be more committed to learning the language than any other group of people I've seen attempting to learn a new language. I also want to acknowledge that everyone has other priorities in life. If you're working paycheck to paycheck and just trying to survive, the last thing you're interested in is learning a language. An app, however, makes the prospect of learning a language more accessible than attending a class. In this regard, when making an app, you have to consider your audience. If I were making a language app geared toward drawing in the world's population and making a profit, maybe I'd be more concerned about people using the app. However, because I'm arranging it toward my community, where a large number of us seem to hold enough motivation to learn just because our language is in such crisis, along with an amalgamation of identity and personal motives, I don't think gamification and looking for consistent engagement is an issue worth tackling from the start. (We will discuss how other language apps are performing in the next chapter). I

mentioned before that learner's growth should occur in stages, and I think the same should apply to the app. Let the committed speakers use it to build their skills, and then after they've been established as formidable speakers, collaborate with them to branch the program out to reach other audiences and maintain that audience. This seems most realistic and would make a dictionary app a good start.

This leads me to my next point: App construction and its future directions should be discussed and troubleshot with the community, both at the drawing board and during its implementation in the public. Tribal jobs where, in the US, tribes are made up of corporations, it can be difficult to build a program with individuals from the community. From all of my interactions, I've found that there is a disconnect between the language community and the Tribal Government. Not necessarily because they don't get along, but because there's no communication whatsoever. Speaking to the bigger picture, if any substantial progress is to be made, the lapse in communication must be resolved. Here is where I enlist a two-pronged philosophy: The basics of the app itself could be discussed and built in collaboration with what the Karuk Language Committee wants to see and, once the app is released, we take public feedback and build from there. This way you're blending what the Tribal Government is looking for and catering to the needs/wants of the community in its entirety. It would be in the Tribal Government's best interest to have access to and implement curriculum and other language resources developed by community members. Implementing learning processes doesn't have to start from scratch, and access to those materials can help shape the app and classroom activities alike.

To further discuss implementations on the Tribal Government side of things, an account system within the app would be useful for restricting access to community-held knowledge. By restricting within the app where a user must be identified as Karuk affiliated to access certain stories, we can prevent the misuse of Karuk Tribal knowledge and exercise our rights to data sovereignty, as described in the last chapter. I see this working out similarly to our people's center archives, or the Sípnuuk (Storage Basket Website) where certain images and other documents are withheld until an account is made and verified. Another option could be USB card readers, like what the military uses for servicemen and women to gain access to government restricted portals and areas of the internet. This would then require an overhaul of Karuk identification cards. This is just a thought, and we could, alternatively, simply not include certain pieces of information in the complete language app altogether.

"How many people will this project take and who should absolutely or can be involved?" My thesis work has been mostly solo, realizing that Master's work is meant to open pathways for more tangible work. Estimating with organizations like UC Berkeley, the Karuk Tribe and Karuk Language Committee, Master speakers, programmers, and lawyers, this project could require twenty to twenty-five people just for the app alone. In the grand scheme, it may fly across hundreds of peoples' desks. Master speakers should be directly involved, along with the Karuk Language Committee, putting their voices at the forefront. I've discussed our language material with Dr. Andrew Garrett from UC Berkeley, and the Tribe is allowed to use any and all language material as we see fit (Andrew Garrett, *Personal Communication,* October 2023). Networking with other individuals who've taken on the language app project in their Native communities is also a must. We don't necessarily need to build this whole thing from the ground up when others

who have been through the process can help in some pretty big ways. I've reached out to some tribal communities that have apps, to get their experience, and have yet to receive responses. However, I was able to get in contact with a couple of tribal language app companies to get some insight into what their process looks like. It would seem that these companies already have the app built and structured, and the tribe they're working with just needs to provide the materials (The Language Conservancy, 2023; Ogoki Learning, 2022).

"How will I fund this?" The world runs on currency, so it'd be a mistake not to address the financial side of things and the ethics of some financial decisions. Doing a rudimentary search on Google of "How much will an app cost to make?" garners answers between $40,000 and $75,000 and even as high as the $100,000 range.[1] The numbers don't account for living expenses, commonly found in grants, of which the current national average is roughly $65,000 a year. While living adds more money, it would also give me more time dedicated to working on the project. Add how much money one might have to pay those affiliated through the grant like lawyers, as the Karuk Tribe currently lacks legal counsel ($85,000/yr.), and app programmers ($80,000/yr.) and that price could jump easily. I've never seen amounts of money like this, so these numbers, in total, seem astronomically large to me, and I'm sure a lot of this is subject to change based on the situations at hand, and if we choose to work with one of the above companies, that would remove the programmer position entirely. I know the state of California offers resources for language projects, and recently I've been looking at grant funding options

[1] During this research process, I did receive information from a representative from Ogoki Learning, however, upon asking if I could discuss our correspondence for more accurate pricing I was told to wait until an agreement had been made.

including federal grants, like the National Endowment for the Humanities, and more niche grants like the American Philosophical Society.

Depending on who a grant is coming from, it may have strings attached that could ask for partial or complete ownership. A similar problem arises when licensing the code. Some pieces of code have strings attached that as well would require some sort of claim or information from me in order to license those pieces of code. To try and minimize this issue, I'd have the programmer keep a list of all outside codes used and their corresponding licenses (Quinton King, *Personal Communication,* September 5th, 2023). However, this could all be resolved when going through a company, where instead of keeping a logistical mess of programmers and the code they use, we pay a straight licensing fee to the company to use their previously produced software. However, it's worth noting that the Language Conservancy, in recent years, has run into some complications over unshared revenues and control over other Native languages, so reading the fine print and negotiating properly needs to be a top priority in the effort of introducing data sovereignty (Brewer, 2022).

"What's a realistic timeline, to hold myself accountable to my community?" I've brainstormed plans that would result in a fully functioning language-learning app in ten years, and other timelines suggest establishing a language app in six years (The Language Conservancy, 2023). This would harbor early versions of the app released within the first couple of years and the rest of that time being dedicated to troubleshooting and adding features when necessary. However, taking the project in chunks, I'd like to see a dictionary app in peoples' hands within the first two or three years, then add other features moving toward an interactive curriculum, and creating new deadlines or check-ins as time goes on.

This final section is broken into four parts that make up the main legal concerns for this process. “Where can I find a lawyer/lawyers who is/are knowledgeable in tribal law, state law, and tech law?” To be honest, I don’t really know yet, but looking into law review journals (as seen in Chapter Two) raises the following concerns: If I decide to work with individuals from tech companies or universities, how can I make sure that they won’t take my framework and propose it to other tribes and monetize it; what sort of property rights laws do I need to be aware of, and do they change by state; and what does/will data sovereignty look like for the Karuk Tribe now and years down the line? Working on this project, whether alone or with a company, I hope to establish a start to Karuk data sovereignty, where the Tribe will have the ultimate decision on where our language resources are implemented and who has access to certain materials. I don’t know of any ways that the Karuk Tribe is taking advantage of its sovereign rights to govern its data, or if it has even been considered. One option would be to reclaim ownership over the Ararahih’urípih website and store it and its language data in our Sípnuuk online library that is run through the Karuk People’s Center. Some would say this would “gatekeep” language, but data sovereignty goes beyond just language material as it allows tribal communities to govern their data and have more decision-making authority on projects within the community.

Working with tech companies and universities will require contracts that outline the wants of the Tribe, the deliverables from the company and/or university, and who claims rights to what. However, working with a university would remove the legal worries as the project would have the universities’ legal team at its disposal. Furthermore, I know that, at the bare minimum, we need to be aware of the intellectual property laws that surround the

Ararahih'urípih website, which determines the use of all of the recordings on the website, and those laws apply to both the speaker and recorder. Outside of this, I don't know if these are specific to California, and I'm not sure if there are any other laws at the state and federal levels that I need to know about. (I envy the patience and diligence of tribal lawyers).

These questions are just the tip of the iceberg, and really exemplify what lies under the surface of the claim, "I'm making a tribal language app." However, they are necessary when attempting such a feat, thus building a methodology. You have to ask these questions, and more like these, to determine the futurity and viability of the project.

In total, this is a mixture of what communities need to be thinking about and how an app should function as a resource within the community as a whole. As discussed, language learning technology creates space for users to identify and relate with their home communities while also learning from and building off other students and Master Speakers. It could also allow for a rudimentary starting perspective on land relations, which could further encourage those seeking to (re)connect. Additionally, an app puts language in homes, a leap for increasing the frequency of language use, and based on the outlined philosophy, this can fuel the language community. When it comes to relationships, an app can take on the feedback of the entire Karuk community by serving the wants of the Council while focusing hard on the needs of the language community. This relationship can then produce viable and agreeable decisions regarding the access and restriction of certain areas of language and community-held information.

The above should serve as a suitable and open outline - not a definitive checklist. However, while this can be added and subtracted from in many ways to fit other tribes' or individuals' needs, the core methodology underneath it all is community and relationship

building to secure the futurity of Araráhih and Karuk data. In the next chapter, we'll discuss an app outline and compare language apps and resources, both Native and non-Native in origin, to get an idea of the direct next step and where the future could/should take us.

THE APP BUILDING PROCESS

My experience with physical technology is pretty vast. I've built and upgraded my own computer since high school, and I've built computers for other friends of mine as well. As for digital technology like programming and software development, I'm a lost cause. Naturally, when I discussed a desire to create an app, I said, in my ignorance, "How hard can it be?" This chapter will outline just how hard it can be.

In the grand scheme of things, a fully functioning app is a big ask for my initial six-month timeline. My goal with this chapter isn't to have a pristine product, but rather a framework to easily build upon with the previous chapter's insights, post-Master's work. This way, I'll have an easier time working directly with individuals in my language community, I'll (hopefully) have moved a little bit closer to the Karuk homelands and be able to dedicate more of my time on the app itself. I have some interesting ideas for the app, however, implementing them straightaway without a thorough understanding of what the community wants/needs concerning an app could be a mistake further down the line (Liu, et al, 2022). This chapter amounts to a "Future Work" section illustrating what the next steps are and what needs to be done. It's a plan that reads well on paper but reveals its nuances when applied in practice. Based on my recent interactions with programming companies and research into possible partnerships with universities, I firmly believe that with dedication within the first few years, a beneficial product can be produced and further improved.

Basic app construction involves coming up with a general game plan for the project, and then deciding what some basic screens/flows look like. This section really favors creativity, as you're creating something brand new and can make it look and function however you please. To

get an idea of my thoughts, below is an outline provided to me by Chat GPT when I asked it to provide a list of software requirements (the left-most bullet points), and then I took those topics and filled in the details to the best of my ability, based on my specific project (OpenAI, 2023; Bree Wilson, *Personal Communication*, August & September 2023). I chose to use ChatGPT to display the use of AI as a supplemental, but not critical, resource for project development and brainstorming, and to dispel some of the myths that surround Artificial Intelligence. As stated previously, I have very little experience in app programming, and rather than surf the guru websites that plague google, ChatGPT was able to give me a solid framework without the extra fluff. Keep in mind that this is only a rough draft and nowhere near a final product.

Introduction:

- This project will be a language learning app for Araráhih (The Karuk Language) in order to supplement and grow the Karuk Language community by recruiting and regenerating speakers. This app will be primarily geared towards the Karuk people, but also those who have traveled far and have been disconnected and are looking to reconnect, acting as a funnel into the community.

- Functional Requirements:
  - User Authentication:
    - Users must be able to create accounts with a valid E-mail address and password and should be allowed to reset their password if it's forgotten.
  - User Profile Management:

        - Users should have profiles displaying their username and profile picture.
        - It should also include the amount of experience they have earned, and titles based upon that experience.
    - There will be a built-in curriculum with lessons, with Lesson plans sourced from online resource documents:
        - All instructions should be listed in American English.
        - The introduction lessons should include information such as sentence structure and pronunciation.
        - The first lessons should start with one word at a time with a total of 20 steps to complete the lesson. A maximum of 5 new words or phrases per lesson to teach through repetition.
        - Each subsequent lesson should build upon what was learned in the previous lesson.
        - Each lesson, upon completion, should reward the user with experience points, a maximum of 20 points (1 point per task), losing 1 point per user error. The points lost can be earned back through a lesson review, and 5 points can be earned through the repetition of the lesson reviews. (The purpose of the points is meant to incentivize the program with progression rewards.)
    - Workings of Lessons:
        - Users should have a mix of tasks when encountering a lesson:

- tapping the correct translation of the words from English to Karuk and vice versa
- tapping parts of sentences for word and phrase ordering
- audio clips to tapping the correct word and translation.
- audio to speaking the word correctly.
    - The ability to speak into the microphone and have systems to check for pronunciation.
- matching the English word or phrase to the Karuk word or phrase
- Correct responses should be noted in green and given a positive sound.
- Incorrect responses should be noted in red and given a negative sound.

    - Images should be included when necessary.
        - For certain words pertaining to animals, physical objects, emotions, etc. Images should replace words.
    - Audio at all steps of the way from master speakers and current learning speakers.
        - All Karuk words should be tapped on and have the word spoken back to you and their translation provided.

- Non-Functional Requirements
    - Performance:

        - The app should respond to user interactions within 2 seconds under normal load conditions.
        - Audio input from users should take a little more time to compare pronunciations, but no more than 7 seconds.
    - Security:
        - Users E-mails and passwords should be stored securely using encryption.
    - Leaderboard:
        - Experience data from all users should be compiled into a list showing the users' usernames and the amount of experience earned. The top of the list should show the user with the highest amount and the bottom should show the user with the lowest amount. This would be based on the experience earned during the month and would be reset every month, with rewards given to the top three positions. To reduce discouragement from competition, it'd be a good idea to allow users to opt out, or remove this section entirely, based on community feedback (or immediate Karuk Language Committee feedback).
- User Interface (UI) and Screens
    - These tabs should be shown at the bottom of the screen at all times, except when in a lesson: Home, Pronunciation, Stories, Leaderboard, Profile, Settings, and Other Resources.

        - Home: shows current lesson, future lessons, and current progress within a unit.
        - Pronunciation: Chart of Karuk characters for extra pronunciation practice - with sound.
        - Stories: list of Karuk stories that are publicly available and lessons to learn after a certain point of lesson progression. (This should be locked for the first few units, then unlocked upon a unit's completion).
        - Leaderboard: A list of every user ranked by experience earned during the month, which resets every month.
        - Profile: Customizable with pre-rendered images and color palettes, and displays personal achievements, like unit completions and titles (Apprentice, Master, etc.).
        - Settings: Volume, notifications, light and dark modes, report bugs, etc.
        - Other Resources: Links to Facebook groups, dictionary website, and other sources.
- Maintenance and Support
    - Users should have the ability to report bugs.
        - The handling of these reports is to be determined (TBD).

The purpose of the outline above is to break down all the basic requirements of a language learning app, from security and storage to some general functions. This next section is

specifically breaking down the screens and flows of the app itself. Wherever you want the user to tap, there must be a screen or function associated with it that follows. I've framed this from the viewpoint of one opening the app for the first time.

Screen 1: New users should be able to create an account with a valid E-mail address, or other routes such as Google or Apple ID. If they're using E-mail, they should then receive an E-mail to confirm their email is correct before moving on.

Screen 2: Users should then be allowed to create a password, with two sections, the first to write the password, and the second to confirm their password.

Screen 3: The new users should be prompted with a screen with an option to select a profile picture from their camera roll/photos and type their screen name.

Screen 4: As an authenticated user, upon log-in, I should be presented with the main lesson screen with buttons dedicated to the Current Lesson, Lesson List, Next Lesson, Current Unit, and Unit List. There should also be a Bar at the bottom that stays visible throughout all screens, except during lessons, and a black star on the tab logo should indicate where the user is located within the app. A tutorial box should pop up and walk the user through each of the main screens and their general functions. For screen one, the tutorial should state: "Ayukîi! This is the main lesson screen, where you can track your progress through the current unit and the lessons list. Tapping 'Current Lesson' will start the language lesson or resume where you left off. Please tap on the Pronunciation Guide."

At this point the screen should fade a bit and leave only the “P” at the bottom highlighted - This should be the only selectable option on this screen.

Screen 5: The Pronunciation Guide should be set up in a grid, with 24 squares, each holding a letter or set of letters and short words on how the utterance is pronounced. Upon tapping a square, the user should hear an audio recording of the pronunciation of the utterance - for all squares. The tutorial box should say this: “This is the pronunciation guide, where you can tap on an utterance and have an audio recording speak the utterance to you. Try tapping on ‘aa’ now.” The screen fades and the “aa” box is the only available option to tap and tapping it will play the audio recording for the user. After the user has listened to the audio, the tutorial box should say: “Now, let's move on to the Stories tab.” The screen fades except for the icon that looks like a book, and that should be the only selectable option.

Screen 6: The Stories tab should be set up in a list, where the title of the stories is listed to the far left, a brief description in the middle, and a button to the right to learn the story. The tutorial box should say this: “This is the Stories tab, where Karuk stories can be found and learned. This feature will be unlocked after a certain point in lesson progression. For now, let’s move on to the Leaderboard tab.” The screen fades and only the Leaderboard option is available to tap on. If we start building an app based on our current dictionary website, we should be able to use the recordings we already have to assist in learning these stories.

Screen 7: The Leaderboard Tab should display a list of 25 users learning the language through the app, where the person on top is in the first-place spot, below them is the second-place spot, and so on. Users' profile pictures should be visible to the left, to the right of that is their username, and to the right of that, their current experience. This screen should refresh every month, putting all users at zero experience for the new month, and adjusting as the users pass lessons and gain experience. Users should be able to tap on the other users' pictures and view their profile screens, as noted in the next screen description. Perhaps this system will scare people off, rather than encourage friendly competition? Maybe it should be totally anonymous? Another point to look at in the future. The Tutorial Box should say this: "This is the Leaderboard, where the top 25 users with the most experience for the week are displayed. The Leaderboard refreshes every week, giving everyone an even chance to place on the board. You can unlock different titles depending on where you place. For now, let's move on to the Profile screen." The whole screen fades except for the profile icon at the bottom, and this is the only option they can select.

Screen 8: The profile screen should have a main portion dedicated to the user, with their profile picture easily visible, title, username, and total experience, and then two buttons below this main one, one for the list of Titles, and another for Unit History. The profile picture should be easily changed by tapping on the profile picture icon. The Tutorial box should say this: "This is your profile, where you can customize your picture and title to your liking. Let's move on to the Settings tab."

Screen 9: The Settings screen should display on and off switches for notifications and dark/light mode. It should also have a button for reporting bugs. The tutorial box should say this: “This is the settings tab, where you can adjust your app preferences and report bugs, should they come up. The final tab is the Resources tab.” The whole screen fades except for the Resources icon at the bottom, and this is the only option they can select.

Screen 10: The Resources tab will display a list of links to other resources including Facebook pages, PDFs, websites, and more. These links should take them out of the app and transfer them to the respective resource. The tutorial box should say this: “This is the Resources tab, where you can find extra resources for further learning and community outreach. This concludes the tour, so feel free to tap around, get your bearings, and then start your first lesson! Yôotva!” The user should then be free to navigate all screens of the app freely.

Screen 11: After tapping on the Lesson portion of the home screen, the lesson learning page should be opened up going straight into the content.

Screen 12: Tapping Lesson List on the Home screen should open up to a screen with a list of lessons. The current lesson should be in the middle of the screen, with previous lessons below and accessible, and future lessons locked until progress is made with the current lesson. If a user wants to change lessons, a text box should pop up asking “Would you like to change to lesson [insert number or title]?” with Yes or No options.

Screen 13: Unit list - same as the Lesson List above.

Screen 14: Tapping on Learn in the stories tab should bring the user to another screen where they are able to see the lessons available and go through them as normal, like from the home screen.

Screen 15: Tapping the Report Bugs option in settings should open up a half-screen box where they are to describe, in detail, the bug they encountered and a submit button. When they hit submit, their report is sent to the maintenance team to handle those issues.

Screen 16: Tapping on Titles in the profile tab should open the list of possible titles for the user to equip. Those that are locked should be faded out, and those unlocked should be clear. Titles should have short subtext describing what is needed to unlock them, and tapping on an unlocked title should automatically make that their current title, along with displaying what it took to unlock it.

Screen 17: During Lessons: Words in Karuk should be displayed and spoken aloud to the user; then a selection of four English words should be underneath. Selecting the correct translation should be denoted in green and a positive sound. Selecting the wrong translation should be denoted in red with a negative sound. Each successful task completed should reward the user with an experience point, and each failed task shouldn't reward an experience point. (There will be more of these screens that will teach the language, but that will be determined at a later date).

This is fine and all, but how can I do this in such a way where I retain ownership, to gift it to the Tribe? Or is there a way to work directly with the Tribe to ensure they retain ownership,

while I assemble a team and work on it? How can I trust the individuals I'm working with? How can I incorporate the audio recordings of individuals of whom it's their, or their heirs', intellectual property (King, *Personal Communication*, 2023)? These questions may seem redundant, but you have to keep all of this in mind because one false move could create a slippery slope that could have detrimental long-term effects in a number of areas, like losing rights, or people taking our model and trying to sell it to other tribes.

Two options for app creation here are Fiverr, a website designed for freelance services, outsourcing a coder to do all the work or possibly working with UC Berkeley. In practice, you'd post all that information discussed in those previous lists to Fiverr, then people can place bids, and you can choose which programmer you'd like to work with. With the programmer, you can discuss these outlines in greater detail, determine a color scheme, and source areas. Source areas will depend on whether or not you want to commercialize your program. As I'm planning on this app to be free, I would ask that the programmer pull from open sources, where licensing won't be an issue. Working out a deal with UC Berkeley could be super beneficial because they currently run our dictionary website and have a bunch of stories and audio recordings to pull from. This could avoid intellectual property laws because UC Berkeley already holds the rights to these pieces of audio data, in mostly good conscience, and wouldn't require anyone to get ahold of the rights individually. It also feels more legally comfortable, because working with a university gives you their legal team and abilities as opposed to taking on the possible legal burdens oneself. The final alternative is that I hand-pick individuals or programs with grant funding.

An Examination of Other Language Apps

It wouldn't be a plan proper if one didn't look at other language apps, both from tribes and companies. At the start of this semester, I downloaded three acclaimed programs in an attempt to teach myself Japanese and Turkish, those including Babbel, Rosetta Stone, and Duolingo in order to get a grasp on the formats of the most successful language apps on the market. (Babbel wouldn't allow me to choose Japanese, so I went with Turkish instead, as I already had some experience with the language when I lived there). From the start of the apps, both Babbel and Rosetta Stone advertise subscriptions. Babbel will only allow you to go so far in a single language before making you purchase a subscription in order to get advanced lessons in that language and access to other languages. Rosetta Stone also has roughly the same requirements except you can choose to pay for just the language you're learning, and the next level subscription gives you access to all languages they offer for a price jump. Duolingo, on the other hand, has a subscription, but it's not required to learn a language, it only allows you to get rid of ads, make unlimited mistakes, review your mistakes in a specified lesson, and unlimited attempts at legendary challenges.

Obviously, Duolingo seems like the good route to go financially, but I want to take a minute to examine the curriculum each program offers, and perhaps this will shed some insight into what I devised above. This will be from the perspective of starting a new language and what users will see in their first lesson and will provide insight into what might keep users coming back.

Duolingo's lessons include the following:

- Having the word spoken and written out for you in the new language, and then you select the translation in your familiar language with an associated image.
- Having only the word spoken to you in the new language, and then you must select the correct word also in the new language.
- Having a sentence spoken and written out for you in the new language, then you construct the translation one word at a time in your familiar language.
- Having the sentence read aloud to you, then you construct the translation one word at a time in the new language.
- Having a sentence read aloud to you and written out, then you tap a button and speak into your microphone the sentence in the new language. It grades your pronunciation.

Duolingo appears super user friendly, rewarding you with green and a positive tone when you get your answer correct, and letting you know you messed up with red and a subtle negative tone when you get it incorrect. It consistently gives you notifications of support in the middle of the lessons, where some are cheesy, and others let you know how on track you are. For instance, some could say, "Users who practiced German for 15 minutes a day were 4.7 times more likely to finish the course," or something else to that effect. You earn "experience points" as you complete lessons, and your results are submitted to a public leaderboard to show you how you stack up against other users in experience gained through the week. The only downside is the extra review is locked behind that paywall I mentioned earlier.

Babbel's lessons include the following:

- A word in the new language is read aloud to you with the translation in the familiar language, and you have to select the correct word in the new language.
- A word in the new language is read aloud and written in the new language, and you must pick the correct translation out of a set of four words in the familiar language. This continues with each correct guess, except the correct word is no longer able to be selected, narrowing your choices for the newly presented word to three.
- A word in the new language is read aloud and you have to construct it syllable by syllable. Not quite phonetically.
- It teaches you different grammar you'll need to know going forward. This is more phonetic. For instance, it will tell you that "ş" in Turkish is the equivalent of "sh" in English.

Babbel is similar to Duolingo in the sense of notifications of getting it right or wrong, but its white interface comes across as bland and simple. It feels more like a classroom where Duolingo makes you feel more casual, like a house party for learning languages maybe, with all its bright colors. It does have a section dedicated to games when you learn enough words and phrases, and a section for reviewing what you've learned. A place to compare yourself to others in how much you've been learning, like what Duolingo offers, is absent here.

Rosetta Stone's lessons include the following:

- The phrase is read aloud and written for you in the new language, and you have to pick the associated image. The familiar language is missing here, only the language you're trying to learn is present.

Rosetta Stone seems bland with just that one lesson type, but it makes you associate certain words in the new language with images. It also throws longer phrases and sentences at you pretty fast, which can be intimidating if you don't feel you have the first few words down. It also shares its bland palette with Babbel, and it's positive and negative chimes with the other two programs, as well. However, not giving you access to one's familiar language seems like a step toward immersion, perhaps allowing learners to get a better grasp on the words and phrases. It did, however, make me feel like I didn't know what I was saying at times and that I was just picking images based on the few words/phrases I could make out.

In total, Babbel seems to fall short of the strengths held by Duolingo and Rosetta Stone, and I think even when separated they all have their weaknesses. While Duolingo does occasionally restrict your access to your familiar language, I think a section that's closer to Rosetta Stone's method of simulated immersion would be extremely beneficial. Perhaps, in the future, the Karuk Language app could combine these two with its established curriculum.

Other programs out there exist, like Memrise and Kahoot, where anyone can create lessons and anyone can take them, pending they have the link. From the way I see it, they do the job of allowing one to create lessons, but they're not consistent. If the teacher stops creating lessons, then there's no way to progress further. With a built and set curriculum, there's at least a foreseeable end to the course where your only other option is to get real-world experience. They work for classroom activities and quick review, but because of the lack of creation of further lessons, they don't carry as much water in terms of learning a language. On top of this, they are created by individuals in the community and considered open access. From a data sovereignty standpoint, this is a weakness in this method. If anyone can access these materials, then there are

no restrictions on what can be done with them. By creating our own app, we can secure access to our language materials, and it would allow us to impose certain restrictions on companies or programs that want to use our language resources. It would also allow us to build our own curriculum framework based on the way we want the language to be taught. All the above programs, along with some of the below, use a predominantly Western approach to teaching language. Perhaps we can create a curriculum that is mostly audio-based and enforce language learning by structuring the whole app within the language as well, rather than in English. There are many options here.

For tribal language apps, I've explored a few that are available to me on my Android, and some others with the help of my girlfriend's iPhone that are available on Apple's operating system. Tribes I've pulled from include the Lakota, Salish, and Blackfeet. All of these are free programs. I'll discuss what they all include, and I'll also include some of the other language materials available from some of these communities that could make for a good Karuk starting point.

Starting with the Salish app, titled *Salish Qlispe 1*, upon opening, you're greeted with a screen with four buttons: Language, Cultural Notes, Search, and Credits. Navigating to the language section provides you with 45 lists of phrases for anything from objects around the home to hunting. Tapping one of those gives you the option to learn, play games, and quiz yourself. Learning takes you word by word, giving you an audio pronunciation, images, and both the word in English (with an option to hide English) and Salish. This is a simple system of tapping the words and learning by repetition. Games have easy, medium, and hard options where no English is involved, but the Salish word is spoken, and you have to select the appropriate

image. If you select the correct option, you get a congratulatory message and are rewarded with a varying amount of points, and if you select the wrong option, you get a negative message and lose points - you cannot go below zero points. Under quizzes, there are listening, reading, and speaking options. Listening and reading are your standard matching or selecting the word/image to the word/image shown. The speaking section is all self-evaluation where you can record your voice and then listen to the recording provided and select whether you pronounced it correctly or incorrectly.

The Cultural Notes section includes recordings of songs to assist learning, a link to the Salish Video Website, and images of various people and objects and their descriptions and cultural importance. The search section is an area where you can search for words found within the 45 lesson lists. Finally, the credits page acknowledges all of those involved in creating the language app.

The Salish app is a good example of curriculum and how the language can be implemented into daily activities to ensure repetition and frequent use. Its navigation makes sense, but feels rudimentary, and I'd imagine that this could be because of its plain color scheme and lack of instructions. Although the app is simple to learn on your own, an introductory section that explains entirely how the program functions would help put it all together. It's also missing a pronunciation guide. Salish is one of the harder, more nuanced, tribal languages to learn and, without an audio or video pronunciation guide, it's increasingly difficult to tell if you're pronouncing certain phrases or sets of letters correctly.

The Blackfoot/Blackfeet have a couple of language apps, one of which is formatted exactly like the Salish app previously described. The Blackfoot/Blackfeet app I chose to look

into, titled *Blackfoot Conversation,* is different in the sense that it may seem like a general downgrade, but it has a couple of upsides I haven't seen just yet. When you open the app for the first time, there's no introduction or tutorial, but a list of different settings, like comforts and discomforts and social events. When you tap on a category it pulls up a list of ten to forty words and phrases that you can then tap on to see translations and hear audio. Aside from a search bar to search through the language the app provides, this is about it. Compared to the previously discussed apps, it's pretty bare bones, and it has an issue where you can't pause or stop audio so some pieces of audio can bleed together. The app's layout is simple, and transitions are quick making the program very easy to navigate, but it lacks character. It can teach you phrases, but it feels rigid and overly systematic. One thing that's unique to this app is that it gives you Blackfeet/Blackfoot translations in all three bands of dialects (Kainai, Piikani, Siksiká), English, and French. Having multiple dialects increases the versatility of the individual learning the language and it involves the wider audience of the Blackfeet/Blackfoot Nation both here in the US and in Canada.

What a lot of tribal communities have in common, when it comes to language apps, is that many have dictionary apps. Due to the recent downsizing and rethinking of my project, this is an optimal start. It would allow us to rework the current dictionary website we have to be more user-friendly and would be a good start to insert the language into homes. For instance, taking a look at the *New Lakota Dictionary* app, I found feels similar to the outline I created before, but is a handier version of the regular dictionary. Upon opening the app for the first time, you're greeted with a tutorial on how to use the dictionary and each of the app's functions, and then you just start searching for words and go from there. The app's primary feature is the search bar,

where you can type words in both English and Lakota (the app has its own built-in keyboard where you can type in Lakota-specific characters), and it adaptively searches for words as you type in you're looking for. Upon finding your word you can navigate to its specific entry where it'll give you the definition, uses in sentences, other variations of the word, and both male and female audio pronunciation. It also has an interesting feature where any word on the screen can be selected, then copied, or searched for, keeping the flow between words pretty smooth. There are options to create lists of favorite words to come back to later, a history screen to go back to the words you most recently visited, how to read lexical abbreviations, and other settings for dark mode, font size, and audio abilities. Submitting feedback is readily available on almost every screen where you can provide your name, Email, reason for comment, and then your comment, to help improve the app with each new version. The only feature I think it's lacking is a pronunciation guide for Lakota's unique characters and specific letter combinations. While you can assume pronunciation by listening to various words, I think it's a necessary resource to ensure proper pronunciation.

This app is a spitting image of where I think we should take our next step. From here, we could progress to adding a curriculum and making an app where one can learn the language. Karuk curriculum exists in several areas, but because they've been made by various community members/language activists, the Karuk Tribal Government cannot use them as they don't have the rights to them, or so I've been told. If we can find a way to negotiate the handling of these materials, that would be a step in the right direction for implementing at-home curriculum. I also think we should take a feature that exists in some tribal language apps of formatting the entire program in Karuk, rather than English, or at least make English less prioritized. This would

philosophically frame the program as its intended purpose is to raise up Karuk language and knowledge, above its English counterparts, and reinforce the idea of language learning by exposure.

As a final note, I ran into accessibility issues among tribal apps, which is a huge pitfall. I found that many tribal apps are exclusively on Apple's operating system, so I was only able to test the Lakota Dictionary app on my Android phone and then borrow an iPhone to go through the other two. Reducing the app to only being available on one operating system cuts your user base, plain and simple. I also found a message in the google play store for another language app, *Beginner Lakota Sioux*, and it stated: "This app isn't available for your device because it was made for an older version of Android." This speaks to problems with upkeep. Not only does it take time and resources to build an app, but it also takes time and resources to continue to support it as time goes on and operating systems change. Based on this, it would be exceedingly beneficial to have it available on both operating systems and ensure that the program has continued support to keep it relevant as time goes on. Since this project would take years, it's difficult to say what sustainability would look like, as many factors play a role, mainly funding. Many tribal positions are grant-funded, meaning there's no job security – if the money runs out, you're out of the job. One's gut instinct might be to just continue grant funding for an app maintenance position, but that just prolongs the problem. The resolution I would like to see should come from within the Karuk Tribe itself. Perhaps after the debts of our Rain Rock Casino are paid and the Tribe starts generating money, we could open up a number of permanent positions in the area of language work and expertise. While great in thought, as this example is in

a perfect world, this is a task that we'll have to accomplish and think more about when that necessity draws nearer.

A Karuk language app that includes small aspects of language immersion, like forcing you to use only Araráhih on occasion and speak it, that's entertaining for at least a few minutes per day can be created through the inspiration provided by popular and tribal language apps. However, working on a dictionary app and securing the rights to our language resources as a Tribal Government is a viable first step. It's a sizeable step, and while it may be far from what I'd initially envisioned it is nonetheless a necessary step, as it sets a foundation for the future of technology-assisted Karuk language regeneration and future protections where research involves the Karuk Tribe and its people.

CONCLUSION

While the conclusion normally marks the end of a project, over the last two months (December 2023 - January 2024), I've been more convinced that I'm finished with my writing and have been trying to make the transition into reality. That said, it's made the idea of writing a conclusion exceedingly difficult. So, rather than it being the end cap, I'll treat this more like a connector between pipes, as I'm going from the academy to the work force, and hopefully starting this project up.

One thing I've come to realize is, for an app format we don't need to start from scratch. There are several groups and programs that we can start with or pull from to develop a dictionary app and beyond. For example, The Language Conservancy offers a three-year plan to create vocab builder apps, textbooks, picture books, dictionary apps, and more (The Language Conservancy, 2023). There's also Ogoki Learning, the only Native-owned app development company, that's created over 280 apps for tribes across North America, spanning from universal language apps to full immersion apps (Ogoki Learning, 2023). With these in mind, along with a recent controversy with the Language Conservancy, it's imperative that, regardless of the route we take, we need to ensure that our language data rights remain with the Karuk Tribe. Another step for placing language into homes is through programs like the free and open-source Keyman, which allows anyone to create keyboards with specialized characters and keystrokes to install onto people's computers and phones. It's so easy that I created a rudimentary Karuk keyboard that allows me to type characters such as â, ê, î, ó, and ú seamlessly on Windows-supported programs - all within the one hour and six-minute duration of the KISS Alive III album. There are also programs like Biskaabiiyaang: The Indigenous Metaverse, an Anishinaabe virtual reality

game that takes place in the distant future and allows players to learn language, listen to stories, and learn from plants and animals, further exemplifying that tribal nations are at the forefront of the use of new technology for cultural and linguistic immersion.

During this last two-month duration have been meetings, mostly informal but informative on the Karuk Tribe's (as a government) reality of language, tribal politics, and discussing the ins and outs of taking on a grant-funded project. It's been a mental shift of responsibility as if to say, I've accomplished what I came to do in graduate school, and now it's on to making a legitimate change. Informing myself on the reality of tribal politics allows me to get just a little bit higher to see what's coming next, and to be prepared to handle it when the time comes. I've spent much of these last few weeks stressing about making this project a reality, as it has support in a majority of areas of the community, but a lack of support in others. It's also allowed me to get my priorities straight. At times, it seems I have a swarm of goals following me around that are all related to the same conclusion, but don't necessarily need to be there. Every person will work on what they're passionate about and they aren't, nor should they be, responsible for every outside idea that slides across their desk. My top priority for the last two years has been to get the master's degree, and now that priority is shifting to building a Karuk dictionary app.

All of the above speaks to the perfect scenario of completing my degree and moving straight into project development, and while it sounds good, it's not the most practical. The research never stops, further contributing to the seemingly required feeling of never being sure of oneself in their work. As my work has transitioned from language regeneration to grant-writing, I've been opened up to some sources that have shown me how my work contributes to the current academic conversation and luckily doesn't render my work obsolete. Surprisingly, I've

come across quite a few works from members of my community that I had no idea existed before, from a wide range of time. In the interest of assisting others in future work, I'll provide as exhaustive a list as possible of the works I found later in the game that, had I known about them before, I would have included somewhere in this work. All names listed are those that the articles were published under.

- "Karuk Language and the Albers Basket" by Phil Albers and Elaina Supahan Albers is a chapter from Leanne Hinton's *Bringing our Languages Home: Language Revitalization for Families* (2013). This excerpt speaks specifically to the impact that learning the Karuk language has on Karuk families and children. I found it to be a touching read and it opened me up to what it means to speak language in the parent role - a topic I hadn't thought about previously. I would have included it within my methodologies section to further the discussion on working with one's community, but more specifically working within one's own family.
- "Teaching Well, Learning Quickly: Communication-Based Language Instruction" is a chapter found in Leanne Hinton and Kenneth Hale's *The Green Book of Language Revitalization in Practice* by Terry and Sarah E. Supahan (2001). Essentially, it's a documentation of their efforts to teach children Araráhih almost exclusively through the spoken language. There are important questions in there that would contribute to my chapter on Indigenous methodologies for language apps in terms of teaching methods and content.
- *Community-Based Efforts to Preserve Native Languages: A Descriptive Study of the Karuk Tribe of Northern California* by Christine P. Sims (1998) is a spectacular,

thorough, and comprehensive history of the Karuk Language that includes discussion from Terry Supahan, Sarah Supahan, Leanne Hinton, Bill Bright, Julian Lang, Violet Super, and a handful of anthropological sources. It's a well-written history and it taught me a few historical details that I didn't previously know, and it would have been a wise addition to my introduction in going over the history of Karuk language work.

- *The Karok Language* by William 'Bill' Bright (1957) is a text I couldn't manage to get my hands on, however, among all of the academic texts I've read regarding the Araráhih and Karuk language revitalization, it's a foundational text in the history of our process and descriptive linguistics. Again, this text would have been useful for establishing historical context and discussion around our most commonly used orthography (spelling system).
- *Nisotak: An Example of Flexible Design for Indigenous Language Learning Apps and Reconciliation* by Marguerite Kool, et al. (2023) was released recently and it was just one of those papers that slipped through the cracks until my committee chair sent it to me. Upon further review, it makes a great case for the technological side of things and fits right in with my chapter on app creation, as it goes over some of the Cree speaking community's thoughts on Nisotak's usability and social and learning aspects, while also prioritizing Tribal languages and cultures and minimizing Western languages and teaching styles. The paper also discusses the feature of allowing individuals to create and publish lessons to the app, which is interesting to think about as an addition to the format I've brainstormed. The researchers at the University of Saskatchewan have also been working with other tribes in the US, as far away as the Diné (Navajo), and, because it's

university led, it makes me think that working with them could be a good, more cost-effective avenue for the development of our own dictionary/language app.

- *Te Kāhui Rauraunga Māori Data Governance Model* by Tahu Kukutai, et al. (2023) is recent as well, but cited in the piece *Data is Taonga* by Ruckstuhl (2023) and it's a guide to system-wide governance of Māori data contributing to Māori self-determination. I mentioned it briefly concerning the Ruckstuhl (2023) piece but, in the swarm of papers, I never looked into it further. It quite literally is a comprehensive guide and sits at the top of my reading list; I'm eager to learn from it and see what avenues are available for data governance when discussed in the context of federally recognized tribes here in the United States.
- *The Role of Elder Speakers in Language Revitalisation* by Ruth Rouvier (2017) discusses the importance of elders being included in language revitalization efforts, not just resources, and the barriers that prevent or push some elders away from the process. She provides some good insight into the Karuk Master and Apprentice programs from the mid-2000s when she was the Karuk Language Program Coordinator. This paper also helped me get a good view of the reality of our language, as it helped me illustrate a 50% decline in speakers from then to now. This harrowing reality displays the urgence for Karuk language work, and further encourages me to pursue this project.

To make this project a reality, I have to wait for a grant opportunity to open up with a reasonable enough timeline to push the grant through one of the Tribal Council's once-a-month meetings, adjust to ensure it's written for the specific donor, and meet the needs of both the Tribal Council and the Karuk Language Committee. This would also involve a lot of meetings to

determine what the Karuk Language Committee and the Karuk language community would like to see in an app and further adjusting the grant proposal to fit those criteria, along with the donor's criteria. This is just the order of things, and these things take time, especially when tribal and social politics are involved. But that doesn't make it any less worth it. I'm positive that the scrutiny this program put me under has made me a better writer and academician, and thus better equipped to establish a solid career after my studies. Be it through funding this project and others in our language community, pursuing work in university settings, or maybe going for a doctoral program.

Being a teaching assistant during this time has also shown me what it means to be a good educator and how to communicate with individuals from all backgrounds. These learned skills and my interactions with roughly 800 students (200 in my classes alone) over my time have changed the way that I view the education of all ages and the positive change it can create. Conducting an introductory course, as I've done, is a battle against the severe chronic ignorance that plagues the larger population of the United States, and being at the forefront to discuss content that students have been previously denied in their shoddy grade-school education is gratifying. The master's program has also given me experience in a vast number of other fields, including food sovereignty, course management, student management, World Indigenous Nations Higher Education Consortium (WINHEC) accreditation and what it means to make organizational change, which further heightens my hopes for a career within this field.

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APPENDIX

GRANT PROGRESS FOR AN ARARÁHIH APP

The Karuk language is a canoe. It holds all of our baskets, our regalia, our materials, our food. The canoe holds all our practices, songs, and stories. It holds all our people and all the Karuk people yet to be born. The canoe carries us all; without it, we can't get anywhere.

— Charlie Thom, Sr., 2012 (Richardson, 2018)[2]

Introduction

The Karuk Tribe, or the Upriver People of Northern California, has its headquarters in Happy Camp, California, and has a presence along the middle Klamath River in Somes Bar and Orleans and further East in Yreka, California. We have resided along the Klamath and its creeks for thousands of years and had first contact with American settlers in 1850, a time when our people were killed for gold and profit, leaving us with roughly 800 people. We drafted a treaty with the United States (US) in 1851, but because the US was no longer making treaties with tribes, it was never ratified, and while we still reside in our traditional homelands, we have not been granted reservation status. This initial government-to-government relationship was

[2] This epigraph opens a chapter on the Karuk language in *The Languages and Linguistics of Indigenous North America: A Comprehensive Guide* (2023). It was taken down by Crystal Richardson (Karuk), one of the chapter's authors, during her recording of Karuk elder speakers now archived at the Survey of California and Other Indian Languages at the University of California, Berkeley. As explained in the chapter, Charlie Thom, Sr. was "[remembering] his first day in the boarding school (in a former military fort) to which he had been forcibly removed from his blind grandmother: his hair was cut; his clothes were taken; and he was repeatedly punished for speaking Karuk" (qtd. in p. 1).

terminated after World War II and we wouldn't become federally recognized until 1979, followed by the adoption of a constitution in 1985.

Statement of the Problem

The critical loss of Indigenous languages across the globe is well-documented, with the United Nations Permanent Forum on Indigenous Issues estimating "that one Indigenous language dies every two weeks," (United Nations, 2018). For the United States, much of this language loss occurred during the boarding school era (1869-1970), where tribal nations across the country saw their children taken, or in some cases voluntarily given to these government institutions in hopes of achieving a better life, and had their culture, namely language, forcibly stripped from them. In the aftermath, Native languages remain in severe decline. Ethnologue identifies 197 living indigenous languages in the United States, 193 of which are endangered, and only three are used as languages of instruction (Ethnologue). Forty-nine Native languages have recently become extinct, and The Language Conservancy estimates more than 200 Native languages have been lost since colonial times (*The Loss of Our Language*). The Diné (Navajo) have roughly 170,000 speakers, the largest number of speakers of all Native American tribes and, to express how large that number is, the second spot is held by the Yup'ik with just over 10,000 speakers. As of 2020, the Karuk Tribe with 3,751 enrolled members and around 5,000 registered descendants, making us the second-largest tribe in the state of California, have roughly twenty-five conversant speakers today, of whom five are masters. This is an almost fifty-percent decline since 2011 where there were ten First language speakers and almost thirty conversant second language speakers (Rouvier, 2017). As a result, Araráhih (the Karuk language) has been

labeled “severely endangered” by the United Nations Education, Scientific, and Cultural Organization (UNESCO) (*World Atlas of Languages*).

In 1986, William ‘Bill’ Bright, a retired UCLA Linguist who had previously done work with the Karuk people, was invited to return by language activists and helped develop the practical spelling system and taught local people documentation practices. He also worked with Susan Gehr, our previous language director, to develop the Karuk dictionary in 1997. (Julian Lang, *Personal Communication,* December 2022). Currently, most of the Karuk language programming is conducted by language activists in the Karuk language community with little to no involvement from the Karuk Tribal Government. The language used to be taught in schools across all ages, but within recent years, due to a lack of tribal administrative capacity (lack of grant writers focused on language), lack of speakers, and, recently, stricter school requirements, that has come to a halt, and the Tribal Council’s main push is to return it.

The historic assimilative processes and discontinued use of the Karuk language is detrimental to the Karuk community because it removes cultural context, cultural knowledge, and degrades community and individual identity. It’s said that when a language dies the culture dies with it. The diversity of language across the world allows a look into how different groups of people see and comprehend the world. Understanding cultural context and tapping into cultural intuitions teaches individuals how to see and act in a culture. This creates a sense of identity within the community that allows people to recognize other individuals among their cultural groups, and how they think based on their shared worldviews (Goodfellow, 2005).

Language loss is also highly known to be associated with poverty (Batibo, 2009; Nettle & Romaine, 2000; Robinson, 1996; Watson, 1994), where a majority of the world’s language

diversity is found in its poorest communities. The effects hit smaller communities the hardest because it becomes increasingly hard to establish trained teachers and develop language programs without the economic status that other better-off communities have. When a language dies, the culture dies with it. When smaller languages are absolved into one of the more dominant language groups, the last few members of that speaking group witness their stories, teachings, songs, and traditional processes and practices dissolve into the masses. According to UNESCO data, the death of a language, and the process mentioned prior, occurs every two weeks. (United Nations, 2018)

According to the California Department of Education, over 70% of schools in rural Humboldt County, and 69% of schools in Siskiyou County have rates of over 50% of their students being eligible for free and reduced-priced meals (California Department of Education, 2023). Both counties have high populations of tribal people, including Karuk, Yurok, and Hoopa. Hoopa Valley High School and Hoopa Elementary, where many people in the Karuk community attend, have eligibility rates of 78% and 65% respectively. Other schools with significant Karuk presence and free and reduced-priced meals include Happy Camp High and Happy Camp Union Elementary, where the local population is about half Native of whom are mostly Karuk, with rates of 63% and 57% respectively. The US Census Bureau revealed in 2022 that the population on Karuk Trust lands because we weren't granted reservation status, consists of 498 people, 307 of which are listed as American Indian and 131 identifying as two or more races. This indicates that the total tribal population is widespread over the entire region of Northern California and Southern Oregon and across the US, rather than concentrated on Government-designated lands (US Census Bureau, 2022). Within those lands, however, almost fifty percent of the households

are making less than $35,000 a year, with roughly one-quarter of the population living below the poverty level. Between 2008 and 2011 there were 10 first-language speakers and roughly 30 conversant second-language speakers, and today there are 5 master speakers (of both first and second-language speakers) and roughly 20 conversant speakers, showing a decline of almost 50% of speakers within the last decade. (Rouvier, 2017) Poverty rates such as these combined with the widespread tribal population and trends of language loss paint a dangerous image of the future of the Karuk language.

Despite high poverty, smartphone usage is widespread across all age and economic groups. Studies in 2021 have shown that 85% of the US population has a smartphone and that 96% of people ages 18-29 and 95% of people ages 30-49 have smartphones (Pew Research). The same study also found that homes with income of less than $30,000 a year were about 20% more dependent on smartphones (Pew Research Center, 2021). Knowing that eight to nine out of ten people possess smartphones within the age ranges of young adults to middle-aged, a Karuk Dictionary app would hit this prime demographic with ease. It would also assist in bridging the geographic gap, with the ability to include the 95% of Karuk people who don't live on or near our traditional homelands. Pair this with the Tribal Council's desire to implement language classes back into schools, and this would bolster the overall presence and potential use of the language just by having exposure at all ages. For *language* to work (regenerate, in this case), people actually have to *use it* and be immersed in it. School programs and classes will only get you so far but, until it's implemented into people's homes, achieving success will be a consistently steeper uphill battle. While the app won't actively teach the language initially, it could act as a supplement to classes and curriculum and encourage community members to join

our online language classes, while having constant access within their households. That said, studies have shown that when learning other languages, mobile dictionaries improved learners' language abilities above those who used printed dictionaries, and college students were able to fit language apps into their lives because of the app's constant presence and ease of access (Rahimi et al., 2014; Steel, 2012). We might not have immersion schools, but we could start to create *immersion homes*.