Indigenous Language Revitalization through AI and Community - From Grandma to Ippo'si'

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There are currently less than thirty first-language Chickasaw speakers. Over a thousand are actively engaged in the learning process and have some knowledge of the language[1]. All first-language speakers are over sixty-five years old. Language revitalization is urgent, but simultaneously, it cannot be rushed or pursued carelessly. As with many efforts centered around Indigenous peoples and cultures, these efforts must be done intentionally and with Indigenous-led principles.

At the cutting edge of revitalization efforts, advanced computing and machine learning hold tremendous potential, so long as the right design methodologies guide them. In this essay, we envision this weaving of Indigenous principles, and AI speech recognition and language generation through storytelling.

This narrative shares the story of a young Chickasaw man who struggles to reconnect with his culture following the death of his grandmother, one of the few remaining fluent speakers of Chikashshanompa', the Chickasaw language, something she did not pass on to her children or grandchildren for fear of discrimination and economic hardship. Our narrator must overcome barriers of isolation, distance, shame, and even paywalls, until they find a (fictional) AI-driven app, Anompa' Okcha̱a, created by a Chickasaw start-up. The app provides free, interactive learning, leveraging automatic speech recognition, natural language generation, machine translation, and augmented reality technology to provide real-time feedback on pronunciation and sentence formation. The technology is not presented as a commercial product, but rather as a shared resource. Nor is it a replacement for community engagement, but rather, a catalyst, as our narrator uses what they've learned to teach their younger sibling and attend in-person language classes. Our narrator uses the opportunity provided by this emerging technology to shift their degree towards a meaningful career in STEM through language revitalization, and a timeskip provided shows that ultimately, they achieve acceptance and peace through service and community, not dictionary perfection. Finally, they experience a thought itself in Chickasaw, demonstrating the deeply powerful effects of Chikashshanompa' have truly taken root.

We, the authors, speak from our hearts and our lived experiences as Native youth and engineers, knowing that our generation will make huge strides toward anticolonial healing and cultural revitalization efforts such as language reclamation. We believe that this narrative demonstrates the true essence of what artificial intelligence technology can help heal, as long as it remains guided by Indigenous-rooted ethics, consultation, and relational-centric development practices. The United Nations recognizes the preservation of Indigenous languages as a human right and many Indigenous communities center their language as the root of their culture and lifeways. At the precipice of revolutionizing the way language can be preserved and learned, we should understand the nuances, pitfalls, and potential of using machine learning with Indigenous communities and their languages, and further recognize that Indigenous computational design principles of relationality, community-centricity, and data sovereignty are pathways to holistic and better use of computational tools.

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[1] Davis, Jenny C. "Talking Indian: Identity and language revitalization in the Chickasaw Renaissance by Jenny L. Davis." *Language*, vol. 95, no. 2, 2019, pp. 374–376, https://doi.org/10.1353/lan.2019.0034.

A rumble of guests flattened into a wall behind me. I leaned forward and ran my hands across my face, pressing under my glasses and pulling down with a measured breath.

The past two weeks had been a blur. Mom had been concerned, yes, but occupied and exasperated by her work. We had just taken for granted, stupidly, that whatever spell Grandma had would pass. A small set of shoes appeared out of the corner of my vision, and I hurried to stand, eyes meeting hesitantly those of an Koletyo, one of my grandmother's many friends.

"Ipok chóyyokma chiya."

Something in me panicked. It must've shown on my face.

"Oh." There was pity in the gentle creases around her small eyes. "I'm surprised she didn't teach you. She was one of the few that knew our language well." The comment lacerated an already tender mind, bleeding a swell of hot tears into the corners of my eyes.

"It's alright, young man. She was so proud of you."

I choked on the strain in my throat and accepted a hug. For the rest of the afternoon, I listened to songs and stories about my grandmother. Her leadership. Her kindness. And each time Chikashshanompa' — our Chickasaw language — was spoken, or a new memory was shared, I finally began to realize how little I knew, and how much we had lost.

Why did she never tell me this? I thought. No, I knew that wasn't right.

Why did I never ask?

Even as I accepted love from distant relatives, I wanted to confess. I didn't feel the grief they thought I did. I just felt numb. I didn't deserve the sympathy because, clearly, there was so much I never even learned about my grandmother or my people because I didn't have even the fucking foresight to realize that she wasn't always going to be there, even quietly, in my life.

If I had even just one more day- what would I have discovered?

Would I ever have the chance to learn again?

I flopped onto the floor and began anxiously scrolling through Instagram. *Meme. Meme. Beadwork post. Political post. Meme.* Thoughts were ricocheting in my head. It had been a week since the funeral. The shame in my throat as Koletyo, Nashoba, and the rest of the elders gestured around me, Chikashshanompa' springing from their lips. For what felt like the hundredth time that week, I opened Google and shot in queries.

resources to learn Chickasaw

Muskogean Southeastern language learning materials

Chickasaw dictionary

My eyes flitted over column after column of purple links, each one hardening a layer of hopelessness in my mind. Then, a stroke of blue. The result read:

Chickasaw Language Consortium - Revitalizing the Chickasaw…

This is it, I thought. I could teach myself everything. The next time I saw the elders, their eyes would shine. They would finally be proud. I ran to find my mom. As I told her, her eyes lit up and she smiled back at me, but the joy she shared slowly faded into consternation.

"Show me this website." I handed her the phone. She took a look and sighed. "I was worried it would be them."

"Who? Is there a problem with this course?" I asked.

"We can't get it. First, look at this price tag." She clicked on the link. *Courses offered at $2,000 per level. Package all four levels for $1,000 off.*

Shit. I hadn't seen that.

"But…What if I earn the money, Mom? I *need* this. You and Grandma *never* taught me. How else will I ever learn? What's gonna happen if I just grow up not knowing, and one day I have my own kids and I can't teach them either?"

My mom tensed up. "No. We will not pay these people. Did you even look to see who's behind this, saoshi?

"These are missionaries. Outsiders. Selling *our* language back to us at prices so high that you, a *child*, would have to pay for your right to learn." She took a deep breath. "You wanna know what they did to Koletyo's family to make this? Damn near a thousand hours of the audio they used to train their little artificial intelligence were from conversations she had with Nashoba. Without her, that *product*-," she practically spat the word "wouldn't be what it is."

"When her family asked if they could get the course for free for some of Koletyo's kids — or even for a discount — those fuckers said no. Said they had to make their money back, that they had already done *so much* for the community by making these courses by extracting our knowledge and our voices."

"Sweetheart, not knowing our language isn't your fault. And I am sorry that I cannot teach you myself. But this isn't the way to do things."

Mahli' Hashi', the Month of Wind. The Native student group was carpooling to a powwow. I had it marked on my calendar, and I even told some people that I would be there. But when the time came to head out, I was simply feeling too anxious. Now, I walked through the hall dejected on my way back from the store.

I had sacrificed so much to get into college. Time with family. Time with the land and the community. I had hoped that somehow, in the distant land of Colorado, I could make up for that

lost time reconnecting with other Chickasaws. But that didn't happen. Even though they were nice, they were from widely different places, cultures, and languages.

I could almost feel a black hole taking shape inside me, a gnawing sense of isolation and inadequacy. My eyes darted over posters on the wall, just long enough to register meaning but not so long that any thoughts formed. But the word "Indigenous" caught my eye.

Community-Led AI-Language Initiatives
Data Sovereignty and Indigenous Language Reclamation
talk by Cyrus Colbert

Tomorrow, March 2nd, 1-3 PM

The caption explained that Chickasaw citizen Cyrus Colbert would be discussing their new artificial intelligence language app — Anompa' Okchą́a, or *The Living Language* — that the Chickasaw Nation tasked him and his team of engineers and linguists to develop.

A wave of hope washed over me, immediately followed by a defensive flash of fear. The last time I got this excited over a language tool, I wound up devastated. But my hope was a dangerously inextinguishable ember, bouncing sparks through my mind late into the star-strewn night.

I arrived at the auditorium early and seated myself for Cyrus's talk. Eventually, a tall figure came on stage and began to speak:

"When it comes to Indigenous language revitalization, braiding community with technology is imperative. Historically, our languages have been oral. They are strongly tied to physical place, to being present, and in community with one another. Nowadays, our language is in desperate need of revitalization, but our citizens live more spread out than ever before. But we have writing systems and scientists among our people. We adapt.

"It is for that reason that we made Anompa' Okchą́a. This app is meant to help bring community together, whether that be through group classes that use the app as a learning tool, or by empowering individuals to learn Chikashshanompa' on their own. We developed a highly accurate Chikashshanompa' speech recognition model — 4.8% Word Error Rate on a benchmark developed by an independent team of Chickasaw AI experts — and this is used within the app to provide users with immediate feedback on their pronunciation and an opportunity to practice speaking. The app also features a chatbot that enables users to practice reading and writing, as well as pedagogical, culturally relevant AR experiences. Our keystone, in my opinion, is that all of this is completely free to Chickasaw citizens. And our people's data sovereignty is fully protected; individuals retain the rights to recordings of their voices, and they can ask us to remove their voice from our model and retrain it if they ever so desire."

A roar of applause came from the crowd.

Cyrus spoke a little while longer, explaining the model architecture, the data collection methodology, and the process of working with community and elders to design Anompa' Okchą̀a respectfully and effectively.

During the Q&A, I stood up nervously. I had planned on being concise, but I let all my thoughts spill out.

"Okay, so, one time when I was really little, I was talking to Elder Koletyo, and, you know, she got really mad at me after I said yakkookay instead of chokma'shki to say 'thank you', because she said that yakkookay is Choctaw and Chickasaws don't say that. I had a couple of times like that where elders got upset with me for saying stuff one way even though I learned it that way somewhere else. So if I learn with this app is that gonna happen to me again?"

"Yeah, I have to say I'm not surprised by your story one bit. That's not an uncommon experience at all. The thing with Chikashshanompa' there are many different ways of saying the same thing. Our speakers are human, and like anyone else they have their preferences for how we say things. That's in Chikashshanompa' *and* in English, mind. Sometimes they just give people a hard time about it, especially our young people." I gave a slow, understanding nod.

"So, to answer your question, no matter how Anompa' Okchą̀a teaches you, you're bound to get someone a little upset with how you talk. But that's just part of the process at the end of the day. And regardless of what the Anompa' Okchą̀a *teaches* you, our speech recognition model has support for all the dialectical variations in Chikashshanompa', so you can speak how you know best and you won't run into the app trying to change you or force you to meet some standard in that way."

I downloaded the app as soon as I got home, reflecting with a glowing smile on how patiently Cyrus had answered the rest of my questions, and how he encouraged me to stay in touch. Words appeared on the screen, prompting me to pronounce, of all things, the translation of "thank you."

I feel my chest tighten, childhood fears rushing back. First, I say it the way I remember Koletyo told me to. "Chokma'shki," I stuttered into the mic. I could immediately tell that I pronounced the vowels too English-like, and felt embarrassed. A gentle 'X' showed on the screen above the words "Try Again."

I did, and this time I spoke correctly. A green check mark flashed on-screen. I smiled, feeling the shame recede a bit. But not entirely — some still lingered in my throat. I clicked "Redo," and this time I leaned in and said the same word I had been scolded for all those years ago. "Yakkookay."

A green check mark. I grinned like a dumb kid, somehow affirmed by this intangible piece of software. At that moment, I felt a cocktail of positive emotions I hadn't felt in years. Inspiration, hope for the future — for the next generation of Chickasaw speakers. A sense that this app had given me a new way to connect with my community; I could use these AI tools to build up my knowledge of the language until I was comfortable enough to try speaking with

elders. I wouldn't need to become perfect, or fluent, just *decent*. I clicked on the next flashcard. It read–

Say "asayokpa"

"I am happy"

"Abookoshi'akǫ ayalitokhmat bissa' losa ayoowalitok. I went to the river to pick blackberries."

"Abookoshiako ayalitok bissa' losa ayoowalitok."

"Pretty good, but make sure that the ending is abookoshi*'akǫ,* with a glottal stop and the "o" nasalized.

Some three months had passed since I first started using the app. It was a bit of a routine at this point and comforting even though I was states away from home.

"Abookkoli'akǫ iliyyatokhmat atǫfalla' imilhlha' ilayoowatok. We went to the field to gather atǫfalla' imilhlha'."

"Abookkoliako ayalitok atǫfalla' imilhlha' ayoowalitok."

Even before the translation was spoken out by the app, atǫfalla' imilhlha' struck a chord in my mind. Atǫfalla'. My grandmother mostly spoke to me and my brother in English, but there were some words she would use even with us, especially local foods.

When I was young, she would send us to the south side of our allotment to gather the atǫfalla'. My cousins and I would compete to see who could get the ones with the biggest bulbs, and by the end, we'd be covered in dirt. She would scramble eggs with the chopped-up onions, filling the kitchen with the fresh scent of spring.

"Go on, go get atǫfalla'. Keep your cousins safe. Yahmi hashanha'shki"

I remember kicking my feet at the island, waiting for my plate. Looking at the art she had up on all the walls and shelves. It was a magical place. I remembered how she would celebrate our arrival for the summers with pashofa. I used to hate how long she'd make me stand on the stool, stirring, stirring, stirring that huge pot, knowing it wasn't ready until an eternity had passed.

"Abookkoli'akǫ iliyyatokhmat atǫfalla' imilhlha' ilayoowatok."

Part of me still wondered why she had never taught us the language. But I had grown, and I realized in those memories of her smile and the food she would encourage us to eat, that above all else, she had wanted us to be safe, to be accepted, to be happy. Something that she

wasn’t afforded while growing up during a time when it was safer to hide your Native identity, especially your language.

I took a break from studying to google how to cook pashofa.

My leg bounced as I looked around the simple classroom. The group of students was greyer and more wrinkled than I expected. It made my heart ache with memories of appo’si’, my grandmother. She would have been having a good time, telling jokes, and embarrassing me with introductions. Instead, my younger brother pouted in the plastic chair next to me. We haven’t been the closest since I left for college. I guess mom wanted some “sibling bonding.”

I tried a deep breath. This class was the natural next step and it was easy to accept the invitation I received on the app. Despite my growing confidence in speaking Chikashshanompa’, a lump formed in my throat at the thought of communicating with a real-life person.

I closed my eyes and thought about how much progress I had made. Anompa’ Okchą́a made it easy to celebrate and track how many words I had learned and it was a daily practice to introduce myself in the traditional way.

“Alright! Chokma'shki, my relatives.” A middle-aged man with short dark hair clapped his hands together at the front of the classroom with a warm smile. The murmuring of the class quieted and even my brother shifted upright in his seat. “My name is Joseph Yazzie, and like all of you, I am learning Chikashshanompa.”

“It warms my heart to see so many of you here today, following and healing the many steps of our ancestors.” Joseph paused and motioned to an elderly woman standing to his right.” And I’d like to have us start in a *good-way*. Our class Elder, Lorry, will begin with a blessing.”

A good-way.

Like following a familiar song, I nodded my head to the words Elder Lorry offered. I relaxed and closed my eyes. My leg stopped bouncing.

I would continue to attend class with my brother over the summer. He piqued up when Joseph asked us to use the AR functions on the app to go outside and identify plants. It was like a game for us, competing who could identify the most plants and call them by their appropriate name. He was still a little stinker and would ask questions about how the app worked - often stumping me. Eventually, the thoughts of how it worked became more about how can I help make it work. I wondered if Cyrus’ company took interns.

I would declare my major for computer science the next semester.

It was the last day of the Annual Chickasaw Festival, and hundreds of vendors lined up, selling art, clothing, and food. The first whole week of my internship with Anompa' Okchą́a was at its end, and despite being hired to do software engineering and AI research, I had so far written exactly zero lines of code. Instead, each day, Cyrus had driven me and a few other interns to different community centers in south Oklahoma, to cook large meals and to hear their language learning journeys. Listening to so many other experiences gave me more perspective than I could have ever thought up brainstorming in a windowless room.

I noticed a familiar face in the crowd - Koletyo. She was sitting behind a table, and her granddaughter — no older than six— rested adorably in her lap. From Koletyo's ears hung a dazzling pair of red, black, and white beaded earrings in the shape of a woodpecker. *I should compliment her*.

Upon thinking this, that familiar shame from being scolded by her welled up in my throat. But this time, it was muted, and I approached her with hesitant confidence.

"Chįhaksibish takaachi ayokpą́shli."

She gave a pleasantly surprised smile and seemed to stifle some laughter. "Chokma'shki. Thank you." A pause. "You know, earrings are called haksibish takaali', not haksibish takaachi. You just told me you like the way my ears hang." The laughter finally explodes out of her, her granddaughter joining in.

At first, my face flushed red, and I felt like a kid again. But by now I had practiced failing. I laughed with Koletyo, and responded, "How do you know I don't like the way they hang? I just looove the way they droop!"

We continued our conversation, and I thought to myself, *alali*— I've come home.