A R T I C L E

Online Design Thinking and Community-Based Learning: Co-Designing an Indigenous Curriculum to Help Redress Language Marginalization

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Abstract. This case study discusses the implementation of an online design thinking project that uses a community-based learning approach to co-design a curriculum with members of an Indigenous organization in the community of Hueyapan, Morelos, Mexico to teach Nahua to children and adolescents. The study seeks to help redress the marginalization and decline of the Nahua language in this community. It also intends to expand TPC pedagogies by culturally localizing design thinking in an Indigenous context and using it as a framework for course design, which can help teach cultural awareness and user advocacy while broadening the relevance and connection between students from underrepresented backgrounds and TPC programs and pedagogies. The methods employed include testimonios, empathy maps, and a community-based learning approach to prototyping an Indigenous curriculum. The curriculum designed reflects an Indigenous axiology that places value on pedagogies that are experiential, community-based, intergenerational, and based on ethical praxes. Designing a curriculum to revitalize an Indigenous language entails much more than memorizing words. Revitalizing Indigenous languages involves reinvigorating customs and traditions that exist in these languages and that colonization and globalization have endangered. Ultimately, this project proposes a TPC pedagogy committed

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to radical collaboration through design thinking and community-engaged learning.

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As a Latina scholar engaged in technical and professional communication (TPC) pedagogies, I often witness the impact of curricula confined to one perspective, despite our diverse societies. It is not uncommon for students from underrepresented groups in TPC programs to face additional challenges as they not only learn content but also navigate Anglo-centric contexts, and some also have to adapt to linguistic differences. It should not come as a surprise that little relevance is partly why students from racial and ethnic minority groups are overwhelmingly underrepresented in TPC programs (Dayley & Walton, 2018). Teaching from a monocultural perspective in our multicultural societies also fails to adequately prepare all students, including White students, for increasingly diverse workplaces and perpetuates a lack of readiness for such environments.

Lack of awareness about diverse cultures is one of the leading causes of racial and linguistic discrimination (Rivera, 2022; Rivera, 2024), and it affects us all. Take for instance the incident that occurred in October 2022 involving the Los Angeles City Council. A leaked conversation infused with racially offensive remarks between Los Angeles Councilmembers Nury Martinez, Gil Cedillo, Kevin de León, and Los Angeles County Federation of Labor President Ron Herrera sparked widespread public outrage. What began as a council meeting on redistricting maps shifted into a racist conversation about Blacks and Indigenous groups in LA with roots in the Mexican state of Oaxaca. Through jokes and laughs, Martinez and Cedillo uttered racial slurs that went unchallenged by the other individuals present in the meeting (Munoz, 2022). The incident exposed the often-hidden racism within Latinx groups, forcing local institutions to grapple with issues that are part of the daily life of Indigenous individuals throughout the Americas. It was evident that the council members involved in the incident, despite their own Mestize Latinx backgrounds,[1] and even though they led a

[1] In Colonial Mexico, Spaniards used the terms Mestiza (for female) and Mestizo (for male) to describe a person of mixed blood, Indigenous and Spaniard. Today, the term

city that is home to approximately 200,000 Zapotecs of Oaxacan heritage (Gomez, 2022), regarded Indigenous Mexican cultures as remote and unrelatable. Situations like this expose the harmful effects of having a limited understanding of diverse cultures.

This study illustrates how TPC instructors can combine community-based learning approaches with design thinking projects to incorporate curricular practices that create opportunities to teach and promote cultural awareness and user advocacy in TPC courses while amplifying the agency of marginalized communities. To this end, this IRB-approved case study discusses the implementation of an online design thinking project that uses a community-based learning approach with members of Aatzin Tlatlaltzin [Land and Water/Tierra y Agua], a nonprofit Indigenous organization that sponsors an afterschool program at the community library of Hueyapan, Morelos, Mexico. This project seeks to help redress the marginalization and decline of the Nahua[2] language in this community by collaborating through online design thinking workshops to co-design a curriculum to teach Nahua to children and adolescents in Hueyapan. I examine how design thinking as an online maker space can be used in curriculum design to reclaim Indigenous languages, epistemologies, and axiologies that have been marginalized by practices that promote linguistic superiority and racist attitudes toward Indigenous groups. This study also intends to expand TPC pedagogies by culturally localizing design thinking in an Indigenous context and using it as a framework for course design, which can help teach cultural awareness and user advocacy while broadening the relevance and connection between students from underrepresented backgrounds and TPC programs and pedagogies. To be specific, this work intends to answer the following questions:

1. How can design thinking as an online maker space and community-engaged learning be used in curriculum design to reclaim Indigenous languages, epistemologies, and axiologies?
2. How can localizing design thinking in an Indigenous context help design cultural awareness and user advocacy in TPC

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is used to describe mixed blood in general and/or to describe individuals raised in Western traditions. I use Mestize as a gender-inclusive neologism.

[2] Mexico has 11 linguistic families, 68 linguistic groups, and 364 linguistic variants. The Yuto-Nahua family is one of the 11 linguistic families. The Náhuatl group is of the 68 linguistic groups. This group has 30 variants that Indigenous Nahua groups self-denominate in different ways, such as Nauta, Tla'tol, Masehuatl Tajtol, Náhuatl, Mexcatl, Nahuat, and Mexicano, to name a few. I use Nahua, from the Yuto-Nahua linguistic family (INALI, 2008).

pedagogies?

Literature Review

This study examines how design thinking, a user experience (UX) research methodology, can help address the needs of an Indigenous community whose communication practices have been dramatically sidelined by Western systems. Therefore, drawing on the work of UX and TPC practitioners and educators who have worked on building a more inclusive field is essential. Although UX is still largely linked to examining digital spaces, UX intersections with TPC have featured studies that "move into new spaces, incorporating new methods and forging new connections" (Rose & Schreiber, 2021, p. 345). In the last decades, TPC has seen an increase in participatory research that is action-driven, community-based, and user-centered (Durá, 2015; Jones, 2016; Rose et al., 2017; Sun & Getto, 2017; Walton et al., 2019). Participatory methods have helped scholars directly engage in issues of inequality and have provided key concepts and structures to analyze data.

As a user-center and participatory methodology, UX has the potential to address structural inequalities as it becomes highly localized when working in community-based contexts (Rose et al., 2017). UX's ability to adapt and intimately engage with local contexts enables it to address existing systemic imbalances. The global and the local can no longer be understood as binaries—as we see in this study, "the fluid structure of global/national/local must happen on the local level, such as through user advocacy work that ensures the inclusion of underrepresented users" (Sun & Getto, 2017, p. 90). Moreover, highlighting the experiences of technical communicators as community advocates decenters hegemonic practices that do not always align with underrepresented groups (Rivera, 2022), guiding us toward innovative human-centered designs to solve social problems (Tham, 2021). Lilian Xiao (2018) points out that the first step to designing more inclusive experiences is to understand "how and why people are excluded" by purposefully identifying "moments of exclusion" through pain points (n. p.). Combining UX with community-based participatory approaches has proven to be an effective tool to help solve the social problems of underrepresented groups.

Some of the most useful UX approaches have emerged from design thinking, a UX methodology often used to solve issues with products or services by generating innovative ways to prototype and test solutions from the perspective of users. Its comprehensive process–empathizing, defining issues, ideating, prototyping, and testing—also makes it a powerful tool for social advocacy (Lane, 2021; Rivera, 2024;

Tham, 2021). Social problems are complicated; they are also "political, culturally situated, and incomplete," and design thinking helps untangle wicked problems for which there are no complete solutions (Tham, 2021, p. 59). In this project, design thinking is used as a framework for course design to solve a wicked problem, an innovative approach rarely used in TPC practices and pedagogies. Nonetheless, UX and design thinking are situated in Western praxes that may not align with Indigenous groups. Pedagogical praxes are no different, and promoting practices stemming from Indigenous epistemologies in contemporary curricula should be anchored on Indigenous perspectives (Aguilar Gil, 2020; Itchuaqiyaq, 2021; Smith, 2012; Tuck, 2011). Thus, the scholarship of Indigenous pedagogies is also central to this study.

Pedagogical practices in Indigenous contexts may look quite different than what we see in Western academia. Claudia Zapata Silva and Anita Rojas (2017) argue that for an Indigenous person, the intellect is not linked to writing as is the case of Western cultures—nor to digital technology abilities, I might add. They assert that an Indigenous intellectual is a person who acts as a cultural ambassador and as a political leader and not necessarily one who is formed in Western educational systems. Because the "culture of discrimination is deeply rooted in society, and thus also reproduced by Indigenous educators and students," curricula must contextualize knowledge through more reflective and critical processes (Jiménez & Mendoza, 2016, p. 65). Indigenous pedagogies call for programs "from the bottom" that are locally and regionally constructed (Jiménez & Mendoza, 2016, p. 67), and for a curricular rematriation based on Indigenous epistemologies, such as making generational knowledge and using home languages (Tuck, 2011). Indigenous anthropologist Jaime Martínez Luna asserts that an Indigenous pedagogy must foster a plurilingual education that respects the unique differences of Indigenous communities, teaches a multicultural lens that promotes Indigenous histories and cultures, encompasses a universal communal pedagogy and knowledge where everyone can curate knowledge and wisdom, and is based on ethical praxes (Matías, 2020). Indigenous pedagogies, as Antoine et al. assert (2018), require a close look at designing learning experiences that are personal and holistic, experiential, place-based driven, and intergenerational.

Overall, examining Indigenous pedagogical interactions through a design thinking lens can help deconstruct the characteristics of Indigenous pedagogical practices in an Indigenous context. It can also help identify areas of dissonance between mainstream UX research focusing on digital interfaces or heavy users of digital technology and design thinking conducted with Indigenous communities whose pri-

mary mode of communication is neither written nor digital.

Contextual Background

Indigenous languages continue to have a marginal role in relation to the European languages imposed throughout the continent, causing devastating effects on Indigenous epistemologies and the overall way of living of Indigenous people. For example, in many Mexican regions where Indigenous communities concentrate, government-funded multilingual education has struggled to sustain long-term programmatic goals as it relies upon weak accountability processes and scarce resources (Jiménez & Mendoza, 2016). Therefore, Indigenous organizations allocate a considerable amount of their efforts to revitalizing Indigenous languages.

Site of Research

This study examines a UX community engagement project conducted with members of Aatzin Tlatlaltzin, a nonprofit Indigenous organization that sponsors an afterschool mentoring program at the community library of Hueyapan, Morelos, Mexico. Hueyapan is located in central Mexico, a region where Indigenous Nahua communities have a strong presence. In 2017, Hueyapan became an Indigenous municipality part of the Tetela del Volcán community (Consejo Municipal, 2021). Later that year, in December 2017, Hueyapan became its own municipality, independent from Tetela del Volcán, in order to receive government funds allocated for Indigenous municipalities directly from the Mexican government and not from Tetela. These radical political changes return to Hueyapan its sovereignty to be ruled by its own Indigenous customs and traditions, hence the importance of advocating for the revitalization of the Nahua language.

Although Hueyapan's population increased from 6,478 in 2010 to 7,855 in 2020, its Nahua-speaking population (3+ years) decreased from 43.53% in 2010 to 35.08% in 2020 (INEGI, 2010; INEGI, 2020). According to Aatzin Tlatlaltzin, the bigger problem for this community is that there is only a handful of Nahua speakers among children who can fluently carry on a conversation in Nahua, a critical fact that the statistics given by INEGI—a government-funded institution—does not reflect because their charts do not show the levels of language fluency among Nahua speakers. For this reason, Aatzin Tlatlaltzin wanted to create a language revitalization curriculum that can be embedded into their afterschool mentoring program.

Methodology

This study was conducted late in the summer of 2021 when the COVID pandemic was still a major concern in rural Mexico, and Hueyapan was closed to outsiders to protect its population. For this reason, the participants in this IRB-approved online case study (IRB# 2236) agreed to conduct the study via Zoom. My methodology consisted of four online design thinking sessions with the Indigenous educators who run the afterschool program in the Hueyapan community library.

Rather than recruiting participants for this project, the participants recruited me. I met one of the participants in 2019 at a different, larger, research project with Indigenous groups where I also used a design thinking process (Rivera, 2024). In 2020, I was contacted and asked to help the Hueyapan community library group. We began our study in the summer of 2021 after the IRB was approved and the Informed Consent forms were signed. In a way, my radical collaborations with Indigenous groups prompted my involvement in this project. Jason C. K. Tham (2021) describes radical collaborations as those that 1) expose participants to complex problems regardless of experience; 2) resist hierarchical structures; 3) welcome perspectives that span theoretical, personal, and professional boundaries; 4) suspend beliefs and judgments of people and ideas; 5) explore empathy together as a collaborative learning tool; and 6) invite and activate radical change (pp. 102-103). I may add that radical collaborations with Indigenous organizations also require a sustained commitment to Indigenous rights advocacy.

The methods employed included testimonios, empathy maps, and a community-based learning approach to prototyping the Indigenous curriculum. I coded the testimonios through testimonio maps, a data mapping tool I designed in a previous research project (Rivera, 2022). I also coded the students' information provided by the participants through empathy maps (Wible, 2020). I discuss each method in more detail in the following sections describing each phase of the design thinking process. All interactions during the project were conducted online through Zoom. Interactions were conducted in Spanish, and the data was later transcribed and translated into English. The participants and students' names were changed to maintain confidentiality. The three participants identified as females and varied in age, a significant factor that illustrates different generational experiences. Carmen was in her 60s, Olivia in her 50s, and Aurora in her mid-20s.

We met once a week for one month. During our first workshop, the participants shared their experiences through testimonios. This method yielded data that helped me not only to empathize with the

participants but also to define the issues involved in the research. During our second workshop, the participants completed empathy maps of three of their students. Understanding students' take on the topic helped our group see the issues through the students' lens. In our third workshop, we ideated and prototyped three lesson plans anchored on experiential and communal practices, which the participants tested independently. After the participants tested one of the lessons, we met one last time to discuss and reflect on the outcomes. The design thinking process we followed during our online sessions is as follows:

- Online Workshop #1: Empathizing with Indigenous educators and defining the issues
- Online Workshop #2: Empathizing with Indigenous students
- Online Workshop #3: Ideating and prototyping
- Online Workshop #4: Reflecting on testing

I delineate the details of the design thinking process in the following sections. I examine and discuss the outcomes at each stage rather than at the end to deconstruct the design thinking process and identify areas of dissonance that might emerge at each phase when localizing design thinking for and with this Indigenous group.

Empathizing with Indigenous Educators and Defining the Issues

In our first online session, I used testimonios to understand the lens of Indigenous educators and identify the issues they wanted to focus on. Testimonios are personal narratives rooted in Indigenous traditions that reconstruct a lived collective experience of injustice, urging civic engagement to produce social change (Rivera, 2022). Most researchers draw upon a few broad, open-ended questions to build dialogue, or *plática* (Rivera & Gonzales, 2021), which transitions from "I" to "we" to reconstruct the experience of a group. When combined with design thinking, testimonios can build empathy and define the issues with which users grapple. Additionally, for many individuals who belong to Indigenous and Latinx groups, testimonios may also involve the cathartic act of *desahogarse* or releasing stressful sentiments (Rivera, 2022), which can function as an emotional foundation for a more fluid and organic way of conducting research. Foregrounding emotions triggered by a person's experience, as Scott Wible (2020) points out, adds an important level of depth to the design thinking process, hence the value of testimonios as UX methods.

As each Indigenous educator took turns answering six open-ended questions (see Appendix A), the rest of the participants listened attentively. Sometimes participants asked follow-up questions to one another, and sometimes they prompted me to share my own experi-

ences as a bilingual educator, generating empathy through dialogue and pinpointing issues by sharing experiences. I coded the interview information as testimonios through testimonio maps (see Appendix B). Using testimonios as a UX method when working with Indigenous communities allows me to trace their individual and collective experiences (Rivera, 2022), which helps identify pain points that expose the issues (Stanford d.School, 2020). I also identified how the participants asserted their agency by mapping their civic engagement and the implications of these engagements. Based on the testimonio maps, I identified three pain points: discrimination, lack of resources, and apathy or lack of interest.

Pain Point #1: Linguistic Discrimination. Discrimination is the central factor influencing the marginalization of Indigenous languages. In Mexico, for example, new generations prefer to speak the dominant language, Spanish, to avoid discrimination in a society that stereotypes Indigenous individuals and their cultures (Diario Oficial, 2020). While all three participants stated that they learned to speak Nahua from their parents or grandparents, the two more senior participants had different educational experiences than the youngest. Whereas Aurora adapted to Mestize education without major problems, Carmen explained that when she was in grade school, she was punished for not speaking Spanish. “At school, the teacher pulled my ears for speaking Nahua with other kids. Because she [the teacher] was Mestiza, she didn’t understand, so she hit us and punished us by forcing us to carry bricks. It was a difficult experience as a young girl,” Carmen stated. Olivia did not talk about her own experiences with the Mestize education but explained that her dad experienced corporal punishment as Carmen did:

> Teachers wanted their students to respond to the instructions given, but the children didn’t speak Spanish. These were hard times for the children of that generation. My dad said that teachers hit him when he didn’t understand what they said to him. He had a hard time understanding the difference between an “o” and a “u” and between “b” and “v.” Children of that generation could not handle the pressure of not speaking Spanish. [. . .] My dad always said to us, “I don’t want you to speak Nahua because I don’t want you to suffer the way I did.” However, we learned it through my grandparents. They always talked to us in Nahua. This is the main reason why younger generations don’t speak Nahua.

I was aware that Mexican American children in the US were physically punished for not speaking English, a common practice that faded with the Chicano Movement (G. Rivera, 2016). However, I was surprised to learn that Indigenous children also received corporal punishments from Mestize teachers for not speaking Spanish. As a Mestiza educator, it was difficult to hear the extent of discrimination against Indigenous groups and its effects on Indigenous students. The participants were also taken aback when they learned that Mestize children in the US also received physical punishments for not speaking English, pointing out that they were under the impression that life in the US was exemplary.

Pain Point #2: Lack of Resources. Lack of resources and support is another major issue in Hueyapan. Native Peoples in Mexico have not been given the proper opportunity to exercise their agency. Government policies that intend to "benefit" or "support" Indigenous communities lack the Indigenous vision to do so accurately without the participation of Native Peoples (Diario Oficial, 2020). Carmen feels that Hueyapan experiences a "total abandonment on behalf of the government institutions." "We don't have the infrastructure; we lack support not only in infrastructure but also financially," Carmen stated. Olivia explained that in the specific case of the community library, it lacks the space to service students:

> One of our greatest challenges is the space because the library is six meters by four meters. Two years ago, the General Director of Libraries visited us and said that this is the second smallest library in the country. It is located on the second floor, and the children don't have a place to play. It is very small.

The community lacks the resources to provide basic needs such as breakfast at school and more formal library services. The participants wish they could offer proper cafeteria services to help the children and adolescents in their community. The library's lack of resources reflects the needs of their community, as Olivia explained:

> There is much marginalization. We pitch in to buy bread because some children don't have a dad, only a mom, and the mom works. The mother can't be with the kids to make them food, so they come without eating. These kids know that there is always someone here to care for them.

Aurora believes that the government's lack of support extends to educational spaces, which in her view should require students to learn Nahua in k-12 education. "The government doesn't consider Native Peoples and doesn't require Nahua at school," Aurora stated, "There is a need to create awareness among our constituents about Indigenous linguistic rights. That is a right we have as Native Peoples, and the part related to teaching Nahua at schools needs to be enacted upon."

Additionally, digital technologies pose a conundrum for rural Indigenous communities such as Hueyapan. On the one hand, there is a lack of infrastructure that support digital technologies beyond access to social media via cell phones (e.g., access to computers, reliable internet, and digital educational platforms), which causes an educational gap between rural and urban communities (Consejo Nacional, 2022). On the other hand, easy access to cell phones and social media has caused a dependency on constantly consuming information that distracts students and their parents from engaging in extracurricular activities. Oftentimes, parents in Hueyapan "prefer to spend more time with a cell phone than with their children," Carmen stated. Olivia explained that students relied on WhatsApp during the pandemic to turn in homework, but digital initiatives did not expand beyond the bare minimum. Another issue for this Indigenous group is that the platforms they use and the content they read are either in English or Spanish, as Olivia explained:

In cell phones and computers, applications have everything in English or Spanish but not in Nahua. For instance, there's the "F" of Facebook, but many don't know what it means. They don't know what Facebook or WhatsApp, or Messenger mean. For me, even podcast is new.

Unsurprisingly, and like US educators, the participants in this study shared conflicting attitudes toward technology. Carmen saw technology as a distraction, whereas Aurora saw it as an opportunity to innovate pedagogical strategies to engage students.

Pain Point #3: Apathy or Lack of Interest. Another major issue in Hueyapan, a consequence of the other two previously discussed, is the apathy or lack of interest in learning Nahua among the younger generations. Carmen explained that "the little ones don't speak Nahua anymore. The youth doesn't speak it, and no one is doing anything. Parents are getting lazy about communicating in Nahua, or the children prefer to communicate in Spanish." "I see how our society and even our people, dads and moms, are not interested," Olivia expressed. Carmen believes that this issue has become a social challenge that

stems from the lack of opportunities in the community:

> Sometimes they [parents] come to me and say, "No, I don't want my kid to speak Nahua. I want my kid to speak English. Why would I want my kid to speak Nahua? I want my kid to work in the US and speak English." This is a cultural and social challenge.

The participants explained that Hueyapan offers Indigenous education in preschool. However, once students enter elementary school, they quickly forget about Nahua because from that point on, all education is in Spanish. The domino effect of this issue causes a shortage of Nahua teachers to support Nahua instruction in elementary and secondary schools in their town. It should be noted that this is not the case in all of Mexico. There are places throughout Mexico where bilingual and intercultural education, albeit imperfect and under-resourced, has been sustained through various programs from preschool to post-secondary schooling.

Empathizing with Indigenous Students

During the second online session, I asked the participants to create *personas*, fictional depictions of typical students, but it quickly became apparent that it was difficult for them to imagine a fictional student. As stated by Shawn Wilson (2008) and Asma-na-hi Antoine et al. (2018), Indigenous knowledge-making practices are relational, and thus the participants needed to connect this exercise to actual students. Therefore, I gave them the option to compose empathy maps of their students instead. After each participant completed the empathy maps independently, the group compared notes.

Aatzin Tlatlaltzin's afterschool mentoring program services 20 children and adolescents between the ages of 8 and 17. Creating empathy maps of three students of different ages (8, 10, and 17) gave us a good understanding of their aggregated needs. First, there is a clear lack of educational infrastructure to accommodate the needs of Indigenous students. In the case of their Nahua language, for example, it is only taught in preschool today. The empathy maps revealed that the oldest student speaks more Nahua than the younger students. Even from one very close generation to another, the level of Nahua language spoken has drastically diminished. Based on the assessments and perceptions of the participants, the 17-year-old student speaks 50% Nahua, the 10-year-old speaks 20%, and the 8-year-old speaks 10%. The younger the students, the less Nahua they speak.

Although the results of three students are not enough to generalize the characteristics of the entire community, the report from Comisión Nacional para el Desarrollo de los Pueblos Indígenas [National Commission for the Development of Indigenous Peoples] (2018) confirms this fact. In 2000, 51.2% of Nahua children (all genders) between the ages of five and nine, spoke their Indigenous language. By 2010 only 45.9% of Nahua girls and 45.1% of Nahua boys between the ages of five and nine spoke their mother tongue. In comparison, the 2000 census reported that 92.1% of Nahua men and 91.5% of Nahua women >65 years spoke Nahua, and by 2010 the number of Nahua speakers among this Indigenous population increased to 93.2% of men and 92.5% of women. These numbers, however, also show a national decline in Nahua children who speak their mother tongue of more than 5% between 2000 and 2010. This decline has been evident in Hueyapan in the last 10 years. According to INEGI (2010; 2020), Nahua speakers >3 years in Hueyapan decreased from 43.53% to 35.08%. Again, as stated by the participants in this study, these statistics do not reflect the state of the disaggregated linguistic abilities of children and adolescents in their community nor their specific level of fluency, which according to Aatzin Tlatlaltzin, it is at an even more dire stage.

Another important revelation in this exercise, which needs to be expanded through more research, is how the Indigenous boys mentioned by the participants in this research feel responsible for the future of their families. When they become disenchanted with education and the lack of job opportunities, usually in adolescence, they begin a new goal, to learn English and leave town for a potentially better life in the US. The participants described their 8-year-old student as someone who dreams of attending school. He wants to be an agricultural engineer to continue working with the land like his dad, a farmer. By contrast, their 17-year-old student is already thinking about leaving town to look for better opportunities in the US to help his parents. For these students, learning Nahua to preserve their language eventually becomes less important than learning English for survival.

Ideating and Prototyping

Localizing an Indigenous curriculum entails more than shifting away from Eurocentric understandings of education. It also requires recognizing the distinctive characteristics of each Indigenous community. In Canada, for example, Antoine et al. (2018) describe Indigenous pedagogical approaches as personal and holistic, experiential, place-based, and intergenerational. In Mexico, Jorge Enrique Horbath (2018) describes Indigenous pedagogies as those that promote 1) family and

communal life; 2) oral tradition, Indigenous literature, and historical testimonios; 3) intercultural life; and 4) the study and transmission of Indigenous knowledge (p. 73). While we can trace similarities among these two Indigenous approaches, the historical and current contexts of Indigenous communities in Mexico (364 Indigenous variants and Indigenous communities with large numbers of monolingual speakers of Indigenous languages) shape Indigenous pedagogical approaches that place Indigenous languages and multiculturalism at the center.

Fittingly, much of the curriculum created by the members of Aatzin Tlatlaltzin during our third online session aligns with Indigenous approaches to education that support the following pedagogical attributes: a) experiential – allowing students to learn by doing through engaging lessons that foster relational interactions between the students and the subject of study; b) community-based learning – incorporating community knowledge that builds a relationship between students and the local ecosystem; c) intergenerational – integrating the expertise of Elders and leaders into the curriculum in order to transmit Indigenous traditions, knowledges, and languages to the younger generations; and d) based on ethical praxes – embracing pluricultural practices and promoting sustainable ecologies (see Figure 1).

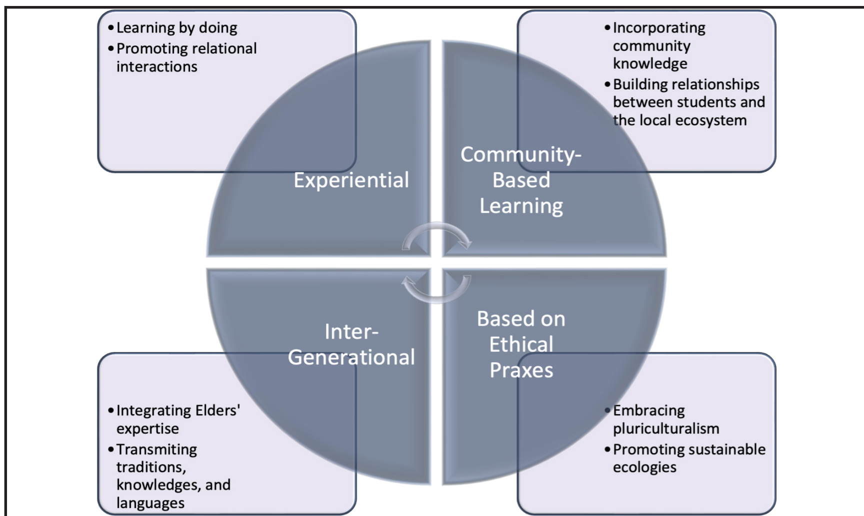

Figure 1. An Indigenous Approach to Education

Rather than mapping a curriculum that draws on outcomes, the participants prototyped a holistic curriculum largely driven by their local cultural traditions, albeit their focus on language. Thus, instead of mapping the curriculum designed by the participants as a set of matter-of-

fact linear lesson plans, I mapped it as a holistic model that traces the Indigenous pedagogical attributes mentioned above (see Table 1):

- In Lesson 1, students walk through the forest with their parents. Students learn the names of plants, birds, and insects in both Spanish and Nahua. They study the consistency of plants and make comparisons once they return to the library. This lesson allows students to classify collected plants and reflect on the importance of taking care of the environment.
- In lesson 2, students do something similar to the first lesson, but this time, they learn the practice of reforestation as taught by an Elder farmer in Nahua. Indigenous educators clarify concepts in Spanish. This lesson also prompts students to reflect on the environment in local and global contexts.
- In lesson 3, students visit a local Elder who shows them the local tradition of backstrap weaving in Nahua. Indigenous educators clarify concepts in Spanish. Students interact with sheep and participate in shaving the sheep's wool with the help of adults, all while learning new concepts in Nahua related to this ancient practice.

	Walking through the Forest	**Learning Reforestation**	**Learning Backstrap Weaving**
Experiential	Through a scheduled walk through the forest, students learn names of plants, birds, and insects in both Nahua and Spanish. They study the consistency of plants, collect fallen leaves, and make comparisons once they go back at the library.	Through a scheduled trip to the forest, students learn concepts related to reforestation while also learning the practice of reforestation in both Nahua and Spanish.	Through a trip to a local farm during the month of November, students learn concepts related to the local tradition of backstrap weaving in both Nahua and Spanish. Students learn the full process, from tending sheep to shaving the wool to backstrap weaving.
Community-Based	Students learn about medicinal plants that are used in the community.	Students learn about the reforestation process and its importance to the local community and to the global wellbeing.	Students learn about how backstrap weaving is an ancient tradition in the community of Hueyapan.

	Walking through the Forest	Learning Reforestation	Learning Backstrap Weaving
Intergenerational	Teachers, parents, and Elders who accompany students take part in the teaching process.	Teachers make previous arrangements with the community's agricultural leaders to teach the lesson.	Teachers make previous arrangements with a community Elder to visit their farm and pass on to students the knowledge of backstrap weaving.
Based on Ethical Praxes	• All lessons include learning terms and concepts in both Spanish and Nahua. Because most Elders only speak Nahua, students are fully immersed in the experience, and teachers check for accuracy in Spanish. • Most students are learning English as a third language at school, and some contribute to their afterschool mentoring sessions by translating basic concepts into English to teach other students and to teach their own Nahua teachers who do not speak English. The participants also expect students to translate some concepts to English. • Rather than assessing knowledge, all lessons include a reflecting activity in Nahua that includes promoting environmental awareness.		

Table 1. Holistic curriculum to teach Nahua to children and adolescents in the community of Hueyapan, Morelos, Mexico.

Understanding and teaching language not only as a cultural element but also as an epistemic referential is crucial. The Nahua language is the critical conduit to teach the local traditions to children and adolescents. Language "is what identifies our Indigenous communities. It is our essence," Olivia noted. By adding experiential experiences that involve learning from Elders and reflecting on their significance to the local community as an important part of a global ecosystem, students learn to value local traditions not as trades or hobbies but as treasured practices passed down through generations which need to be sustained in the same way as their Nahua language.

This Indigenous curriculum stimulates learning as the act of receiving knowledge and as a practice that infixes agency. The participants hope that learning Nahua through an Indigenous axiology that values ancestral practices and traditions will give students tools to shield them against a Western axiology that places Indigenous languages as less than European languages, provoking discrimination against the Nahua language and a lack of interest to learn it. Globalization threatens Indigenous knowledges and traditions because it sees them as social and technological deficits (Hueyapan Consejo Municipal, 2022).

For example, the Indigenous practice of backstrap weaving is considered unnecessary, time-consuming, and outdated through Western axiology that places a higher value on new technologies (e.g., digital technology and machinery). As discussed earlier, technology is both a friend and a foe for rural Indigenous communities like Hueyapan that struggle to preserve their language and traditions.

Reflecting on Testing Outcomes

Because our interactions were online and the participants needed to test the lessons in person, I could not directly observe this step. Therefore, the participants tested the lesson "Walking through the Forest" with their students before our last online session. The last online workshop consisted of a step-by-step narration of the lesson the participants conducted with their students in person and a reflection on the project.

The group met at the library and took Hueyapan's Municipal Council vehicle. They were dropped off where the road ended, and from there, the group walked toward the hill. "As we walked, we explained," Olivia commented:

> This is a plant called *tlatlanili*. This is an *ocotl*, an *ocote* [ocote pine].[3] This is an *āhuēhuētl*, an ahuehuete [Montezuma cypress]. The *ahuatl* [oak/encino]. We gave them the names of each specie we saw. For example, there were birds, "Did you hear the *tototzintzintle*? Did you find insects too?" Everything that exists in the forest has its name in Nahua. We explained as we walked, and when we got to the top of the hill, we explored the trees and acorns again because the flora is different there.

Students also explored the textures of the various leaves they found. The participants showed their students the different leaves. "We showed them a leaf of *āhuēhuētl*, a leaf of *ahuatl*, so that students could touch the texture," Olivia explained, "They are different. The *ocotl* leaf is different from the *ahuatl*, and also different from the *āhuēhuētl* and from the *tomazquitl* [arbutus/madroño]."

At the end of the trip, the group walked back to the library, where students worked on reviewing the concepts learned. Students were asked to paste the leaves collected into their notebooks and label them with their Nahua names. Olivia explained that embedding environmental awareness into the lessons was also important:

[3] The Nahua linguistic group has 30 variants. The terms in Nahua used by the participants in this study reflect the Nahua variant of Hueyapan.

> We also contribute by caring for the environment because the Indigenous communities are linked to what provides sustenance and feeds us, like the soil and nature. Nature is hurting and polluted, so we participate in reforestation by planting trees yearly. This is how we contribute to the environment.

To create environmental awareness, the participants added a closing activity to the lesson, which consisted of writing and performing a reflective piece in Nahua. The texts produced by the students are calls to action that are directed to their parents as members of the community, as Olivia described:

> In their reflection, a student mentioned the names of many animals in Nahua: "We the children of the community of Hueyapan invite you to take care of all the animals that live in the forest, the tecolotl [owl/búho], tototzintzintle [little birds/pajaritos], *mazatl* [deer/venado], *ayotochtli* [armadillo/armadillo], *coyotl* [coyote/coyote]." The reflection also talked about the insects in the forest. This student added a long list of animals, and at the end of the reflection the student said: "Help us so that the animals can live wherever they want to, under an *ocotl*, under an *ahuatl*, or next to a *tlatlanili*." This student already knows these names by memory.

The participants explained that they could not test the other two lessons because the traditions each demonstrates depend on the year's seasons. The yearly reforestation process in Hueyapan occurred a few months before this study, so the participants had to wait until the following year to conduct this lesson with their students. In the case of the backstrap weaving lesson, the participants wanted to include the full process, which includes shaving the sheep. However, during the study, Hueyapan was in monsoon season, and the participants explained that it was not the ideal time to shave sheep. Sheep grow fungus on their skin when they do not have their wool to protect them during the rainy season.

Showing students how they clean the sheep's wool is also important for the participants. In Hueyapan, they "hit the wool with a stick to clean it," explained Olivia, "We don't use a washer machine to clean it. We want our students to see the process. […] We want them to touch the texture of the dirty wool and to touch it again after it is clean and when it is dry. The wool has different textures." Part of the process includes using a local specie of thorn called *calones*, which is used for

carding wool. The idea is also to show students the different species of thorns in Nahua and their various textures, similar to how they taught the names and textures of the plants and how they want to teach the textures of the sheep's wool.

The participants emphasized the importance of teaching the Nahua language while immersing students in a learning experience that included thorough processes of community traditions. By teaching their students the significance of the natural environment in sustaining Indigenous communities, the participants also demonstrated a strong commitment to environmental awareness in the curriculum. Whereas language, tradition, technology, and natural environment are typically regarded as separate concepts that rarely intersect in Western contexts, they constantly interact and intertwine in this community.

Implications

Working with a design thinking process in combination with community-based learning in an online environment to design a curriculum by and for Indigenous audiences yielded important implications for the Indigenous organization behind the project and TPC practitioners and educators.

This project demonstrates how design thinking combined with community-engaged approaches localized on underrepresented groups has a strong potential for raising awareness about social issues and challenging oppressive structures (Lane, 2021; Rivera, 2024; Tham, 2021). Applying the user-centered and action-based principles of design thinking empowered the participants in this study to actively participate in pedagogy design to reclaim their language, demonstrating that carefully designing *for* and *with* underrepresented audiences fosters advocacy (Pope-Ruark et al., 2019). This case study delineates a deliberate process informed by the rhetorical practices of an Indigenous community not only to find effective ways to teach Nahua to young students but also to advocate for the sustainability of their community praxes.

Combining design thinking with community-engaged learning also encouraged the participants' students to recognize their agency in shaping their communities by creating a sense of ownership and responsibility toward addressing social issues, as seen in the students' reflective essays. Helping students acquire proficiency in their mother tongue benefits the entire community as they can fully engage with and pass on traditions and skills that hold a high collective value in their world. Notably, the participants' aim was never to deter students from continuing their education in Spanish. They understood the im-

portance of speaking Spanish fluently to navigate systems in Mexico. They even expressed pride in knowing that some of their students are also learning English. For the participants, however, learning Spanish or English should not occur at the expense of neglecting their native tongue.

Although many UX strategies can be used successfully when working with underrepresented groups, it is crucial to remember that UX and design thinking are anchored on Western practices with power imbalances that will not always align with the practices of non-Western cultures. Thus, fostering equity by localizing approaches is key. Localization can help place equity at the heart of UX, but it needs to go beyond adapting superficial linguistic and cultural differences (Rivera, 2024). We must also localize methods that engage the local context of users when needed. As Tham (2022) argues,

> To aspire to a future (or futures) of design thinking that moves beyond functional purposes, technical communicators need to advocate for values and directions that support an equitable playing field for designers and users that are not predominantly occupied by Eurocentric (White) narratives that postulate certain assumptions about social needs and a disparate trajectory that advance social justice through equitable methods. (pp. 271-272)

In this study, it was critical to use testimonios as a design thinking method to empathize with and define the issues of Indigenous educators in Hueyapan. The participants' experiences emanating from the narrative and dialogue of testimonios help examine issues at a deeper level (Rivera, 2022). In the words of Liz Lane (2021), "[i]f we are truly designing communication, we must teach others to design from experience and stories, to encompass and accommodate the marginalized (p. 227). Accepting the messiness of design thinking (Lane, 2021), sitting comfortably with ambiguity (Rivera, 2024), and embracing flexibility when identifying areas of dissonance between traditional methods and participants from underrepresented groups are critical components of fostering equity in design thinking projects.

An area of dissonance when localizing this design thinking project in an Indigenous context was the creation of personas, which I intended to use to empathize with the participants' students. As explained previously, Indigenous epistemologies are relational, and thus the Indigenous educators who participated in this study preferred to work with the information of actual students as opposed to imaginary ones.

Therefore, I proposed to use empathy maps instead. Pivoting to empathy maps was relatively easy and worked well with the group.

Another area of dissonance that can arise from working with Indigenous groups, which can also affect other underrepresented groups, is the testing phase. Testing is the design thinking phase that is most concerned with efficiency. It is the part where designers evaluate the results of prototypes created during the process, and for many designers, it is what makes design thinking a successful project. However, testing ideas to solve complex social issues is not an easy task that can be completed in one, two, or even four sessions. For various reasons (e.g., the complexity of the issue, quick access to the testing site, etc.), it is difficult to test a prototype designed to help address social issues rooted in *institutional verticality*—the vertical social, cultural, racial, and linguistic hierarchies of Western institutions (Rivera, 2024). In this project, for instance, the participants could only test one lesson because the other two draw on community traditions that depend on seasonal patterns.

Additionally, what we consider a good evaluation tool from a Western perspective might not always align with Indigenous assessment views. For example, the participants in this study assessed the efficiency of the curriculum with observations and reflective essays that addressed not only language skills but also how students built a relationship with their local ecosystem and advocated for its sustainability. These findings and observations on testing put forward questions for future design thinking projects involving social justice advocacy and underrepresented groups: Is testing an inherent part of design thinking? Can testing be negotiated? What other concrete, realistic options, if any, can design thinking offer to test and evaluate projects to address complex social issues rooted in systemic inequities?

Just as the Indigenous curriculum designed in this study promotes experiential learning by doing, design thinking as a teaching methodology can also give TPC students opportunities to work with real-world social issues for which they can propose real solutions (Bay et al., 2018). TPC instructors—including myself—have used design thinking as a pedagogy approach in TPC courses as it provides a framework to teach coveted skills in technical professional spaces (Balzotti, 2022; Lane, 2021; Tham, 2021). Design thinking "is inherently user-centered and has become a central methodology in many engineering programs and technical workplaces" (Bay et al., 2018, p. 172). Moreover, localizing a design thinking project in the context of underrepresented groups can help TPC educators develop and teach critical cultural awareness, preparing future TPC practitioners for diverse working environments.

When TPC students are exposed to the social contexts of underrepresented groups, they learn to acknowledge the need to critique social problems and, most importantly, recognize the need to "participate in the process of advocating for change" (Tham, 2021, p. 90). A critical cultural awareness that reflects on positionality is needed in today's professional environments. Workplaces are increasingly diverse and—despite the politicized gazes that restrict diversity, equity, and inclusion initiatives in some public institutions—professional spaces are becoming less tolerant of employees with low or no sense of cultural awareness, as seen in the anecdote I presented in the introduction, which caused the forced resignation of several of the political leaders involved in the racist conversation.

The case of the LA City Council is an extreme example of individuals with no sensitivity to diverse cultures. Nevertheless, it provides a clear illustration of the importance of embedding the points of view of diverse cultures in what we teach, even when all students in our classrooms are White. As Lane (2021) argues, "Investigations into oppression can help us better understand design for what and for whom" (p. 219). Using design thinking approaches focused on underrepresented groups can also help increase the engagement of students from these groups in TPC courses. Embedding non-White voices in curricula helped me and my BIPOC peers navigate academic spaces that sometimes felt foreign during our time as doctoral students.

Furthermore, although design thinking has been used as a methodology to teach TPC courses, this innovative approach has rarely been used for course design. This study provides a concrete example of how to use design thinking as a framework for course design and can guide programmatic approaches in TPC programs and other organizations to help solve complex programmatic problems. It can also help prepare graduate students to teach undergraduate courses (e.g., designing syllabi, sequencing a course, etc.).

Lastly, using design thinking as an online maker space is challenging. Working, teaching, and learning through online spaces present challenges and opportunities that were highlighted during the COVID pandemic. Collaborating with Aatzin Tlatlaltzin on an online design thinking project yielded important takeaways for working online that mirror what the rest of the world experienced, which need to be considered when conducting research with underrepresented groups.

Online spaces are as asymmetric as the real world. As seen through the participants' comments, Aatzin Tlatlaltzin lacks the infrastructure to provide an adequate learning environment to students, such as reliable internet access. This scarcity manifested during our online sessions.

The participants had to walk to the only internet café in town once a week for one month to participate in this project. Carmen, Olivia, and Aurora connected to the online sessions from a cold internet café wearing masks whereas I connected from my living room. Despite this, they were committed to the project and were as excited as I was to learn from one another. We were all cognizant that this project would not have materialized if not for the opportunity that online as a maker space presented during the COVID pandemic.

It should be noted that the experience detailed in this project is unique to Aatzin Tlatlaltzin. I have worked with other Indigenous organizations in Mexico with robust online infrastructures that support their communities through a strong online presence. Yet, other Indigenous communities in Mexico are in more precarious conditions than Hueyapan. Researchers should always survey the online infrastructure of participants before committing to an online project.

Working in online spaces requires technological adaptability. Technical issues are inevitable because, as they say, technology is not perfect, and neither are we. Researchers are likely to run into unfamiliar situations as much as participants and thus need to be ready to troubleshoot and, if needed, pivot to different strategies during the sessions, much like when teaching online.

Conclusion

Clearly, the curriculum designed in this project is about something more than memorizing Nahua words. Doing, seeing, listening, writing, performing, and even touching to feel the textures of their environment are all part of participating in the traditions of an Indigenous community. Revitalizing Indigenous languages involves revitalizing customs and traditions that exist in these languages and that colonization and globalization have endangered. The decline in the use of the Nahua language in Hueyapan drastically affects the transmission of local ancestral knowledges that have a high impact on the community, such as the conservation of the environment and the nurturing of medicinal plants (Hueyapan Consejo Municipal, 2022). Embedding environmental reflections into the curriculum was crucial to create environmental awareness among their students and to build the collective activist consciousness of the younger generations.

Although my contributions throughout the design thinking workshops were made with the utmost respect, and even though I hoped the participants saw me as a collaborator rather than a detached researcher, my positionality as a US-based university professor who is also a Mestiza was clearly in their minds. This was evident through

their comments on their role as Indigenous educators without formal education. "Perhaps we don't have a formal preparation, but we have rich Indigenous traditions, even if some say that we don't know anything because we are Indigenous. People discriminate against us, but I think we have rich cultures and traditions," Olivia stated. "We don't have a degree. We are not qualified because we don't have a document from the State. Maybe we don't even have the methodological training to teach because we only do it in a natural manner. We contribute by sharing knowledge in the way we want to share it," Carmen explained. The participants' comments on the "natural manner" in which they teach their "rich cultures and traditions" reflect an Indigenous axiology that places value on pedagogies that are experiential, community-based, intergenerational, and based on ethical praxes. The creation of this Indigenous curriculum demonstrates how this Indigenous group applied their agency as educators teaching in the way they think is best for their community.

The results of this study highlight the importance of community-based learning, which is important for Indigenous groups and can impact other underrepresented groups. Understanding teaching as sharing knowledge and learning as gaining agency benefits an entire learning community. Some of my most well-regarded lessons, according to student surveys, include creating skillshare instructional videos to teach us skills valued by students and local communities, like how to write basic Chinese calligraphy, how to change the oil of a car, how to dance Folklorico, and how to use basic ASL; working on an online design thinking project at the highest point of the pandemic that asked students to help find solutions for professors struggling with technology; collaborating with local nonprofits to create awareness about COVID-related issues during the pandemic; and working with community-based organizations to learn about the underrepresented groups they serve and help them create awareness about the issues they care about. Ultimately, this work advocates for more inclusive UX research designed to help solve complex social problems of underrepresented groups and for TPC pedagogies less concerned with genres, as Tham (2021) proposes, and more engaged in radical collaboration through design thinking and community-engaged learning.

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Appendix A

Open-Ended Questions

[English]

1. How did you learn to speak Nahua?
2. What can you tell us about your experiences as a Nahua speaker?
3. What can you tell us about your work as a Nahua teacher?
4. What motivates you to teach Nahua to children and adolescents in your community?
5. What are the most significant obstacles in your role as a Nahua educator?
6. What would you like people to know about your Nahua language or about Indigenous languages in general?

[Spanish]

1. ¿Cómo aprendió usted a hablar Nahua?
2. ¿Qué nos podría decir acerca de sus experiencias como hablante de Nahua?
3. ¿Qué nos podría decir acerca de su trabajo como maestra de Nahua?
4. ¿Qué le motiva a enseñar Nahua a los adolescentes y niños de su comunidad?
5. ¿Cuáles son los más grandes retos que usted enfrenta en su papel de maestra de Nahua?
6. ¿Qué le gustaría que la gente supiera acerca de su lengua Nahua o de las lenguas indígenas en general?

Appendix B

Carmen's Testimonio Map

<table>
<tr><td colspan="2">Name: Carmen</td></tr>
<tr><td>Place of Origin: Hueyapan</td><td>Languages: Spanish & Nahua</td></tr>
<tr><td>Pain Points:
• "At school, the teacher pulled my ears for speaking Nahua with other kids. Because she was Mestiza, she didn't understand, so she hit us and punished us by forcing us to carry bricks. It was a difficult experience as a young girl."
• "We don't have a degree. We are not qualified because we don't have a document from the State. Maybe we don't even have the methodological training to teach because we only do it in a natural manner. We contribute by sharing knowledge in the way we want to share it."
• "The little ones don't speak Nahua anymore, the youth doesn't speak it, and no one is doing anything. Parents are getting lazy about communicating in Nahua, or the children prefer to communicate in Spanish."
• "We see our language diagnosis very fragile because, in our studies, we only found one girl of 16 years old who could speak fluent Nahua in our neighborhood."
• "We need many tools and mechanisms to continue strengthening the language…for example, I'd like to comment as an anecdote that I brought my kitchen chairs to the library for the kids."
• "We only have an Indigenous preschool with Nahua teachers, but when kids leave preschool and enter elementary school, Nahua erases from the memory of kids because they don't have classes in Nahua because Nahua teachers don't come back."
• "[Our main challenge is the] total abandonment on behalf of the government institutions. We don't have the infrastructure; we lack support not only in infrastructure but also financially."
• "Another challenge is also social, because of the apathy of parents, because they prefer to spend more time with a cell phone than with their children."
• "Sometimes they come to me and say, 'No, I don't want my kid to speak Nahua. I want my kid to speak English. Why would I want my kid to speak Nahua if what I want is for my kid to work in the US and speak English.' This is a cultural and social challenge.</td><td>Issues Identified:
• Discrimination
• Lack of adequate professionalization
• Apathy
• Lack of resources
• Lack of consistent public education policies for Indigenous education
• Lack of support for Nahua teachers
• Lack of support from educational public institutions</td></tr>
</table>

<table>
<tr>
<td>Civic Engagement:
• “Now that we have these afterschool classes with these children who are learning the language, we propose to continue to follow up with their language acquisition not only in elementary school but also in secondary school.”
• “A week ago, we organized a group, and now we have meetings among women. We’ve had two face-to-face and one virtual meeting to try to propel a new mandate that forces our state to implement Indigenous language classes as part of the curriculum. This is just a chat, but that’s how great things start.”
• “I like teaching Nahua because when that kid is my age, they will be able to replicate it.”</td>
<td>Ideas Tested:
• Teaching Nahua classes after school
• Organizing meetings to propose an initiative to require Nahua classes in k-12 schools</td>
</tr>
<tr>
<td>Outcomes:
• The afterschool program is a result of her civic engagement.
• Her civic engagement also helped her community become an Indigenous municipality ruled by Indigenous customs and traditions.</td>
<td>Implications:
• Propel more interest among new generations
• Propel government initiatives</td>
</tr>
</table>