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Honoring Culture in Indigenous and Latinx Communities

Belin Tsinnajinnie with Sam Kennedy¹

The gym in Santa Fe

Not too long ago, I returned to the gymnasium at Santa Fe Indian School where I played basketball as a boy. This gym was filled with memories from when parents from Indigenous communities all over northern New Mexico came to see their children play basketball. Back then, we had generations coming to support our teams, the concession stand had that familiar smell, and there was joy in the laughter and the teasing (depending on how the game progressed). The players felt empowered to do what the community wanted them to do in order to succeed.

This time, however, I was not in the gym to play basketball, but to attend the Julia Robinson Math Festival. The Math Festival had trained high school students to lead activities at individual tables filled with interesting mathematical puzzles and games. The idea was for them to host the Math Festival for middle school students at Santa Fe Indian School. Now the gym was filled with the same kind of energy that I had experienced as a boy, but this time focused on thought-provoking mathematics. We saw what it looked like when Native youth were given the authority to facilitate an event for their own communities in a social and cooperative atmosphere. Everyone could be their best selves, their whole selves, with their families right beside them. I saw a spark of what community-led mathematics could be, and where it could go.

I grew up in a rural locality in the desert. In our Diné (Navajo) language we call it Na' Neelzhiin, also known as Torreon, New Mexico. It is on the eastern edge of the Navajo reservation in the northwest portion of what we now call New Mexico. It is a sparse area with about a thousand or so residents, but you wouldn't know it driving through the region because the residences are really, really spread out. Learning mathematics in a rural setting involves challenges, including limited access to resources such as the internet. Even more, however, the structure for learning mathematics must be rooted in a community's heritage and culture.

¹ This chapter reflects Belin Tsinnajinne's experiences, written with help from Sam Kennedy.



Belin in Na' Neelzhiin.

I went to high school at Santa Fe Indian School (SFIS), a three-hour drive from Na' Neelzhiin. SFIS served students primarily from the nineteen Pueblo Nations across the state along with other Native nations. It provided a different kind of Indigenized center and learning experience.

Drawing from this rich heritage, I now teach a diverse group of students at Santa Fe Community College. Many come from Indigenous backgrounds. Many come from Latinx backgrounds. And many, like me, come from multiple backgrounds and have multifaceted identities. For me and many others, creating mathematical communities in, by, and for Indigenous and Latinx people requires a focus on the identities of these students and on the enrichment of the communities that have shaped their lives.

The diversity of our communities

I often think about the diversity within Indigenous and Latinx groups. My father is Diné and was raised in Na' Neelzhiin, and my mother is Filipina. Her parents immigrated from the Philippines to Hawaii. So I can see myself relating to the peoples in the Southwest as Indigenous people, but also to people whose parents are immigrants. And I'm hardly alone in having multiple identities.

David Austin, an Indigenous mathematician, serves as living proof of the strength of these cultures for a career in mathematics. As he describes it, “[a]s a member of the Choctaw nation who grew up in Oklahoma … I do know the challenge of working to become a professional mathematician while feeling like ‘home’ is far away. This is something that I’m able to share with the students, and I hope they hear in my story a message that it is possible to learn to live in two worlds at the same time, that there is great meaning to be found in accepting that challenge, and that there are resources to help [1].”

Learning and teaching mathematics in Indigenous and Latinx communities often takes a different form than it does elsewhere in the country. When we are teachers of record for students of a math course at Santa Fe Community College, we are also teachers of record

for their mothers, fathers, brothers, sisters, cousins, uncles, aunties, and nephews. At the same time, we are students of the mothers, fathers, elders, and other members within our community. We need to have an understanding that the experiences students have learning mathematics in our classrooms will have an impact on others they engage with nearby. In other words, there is a chance that students will carry a traumatic experience in a mathematics class with them as they engage with the youth. Thus, it is important to provide students with a mathematical learning experience that honors their identities and empowers them to provide a context for learning mathematics that they can then pass on. Teachers here are accountable for providing a mathematics education that's equitable, and we are responsible for seeing that people can have an experience that feels empowering, because empowering students empowers our whole community.

The mathematical assets inherent in our communities

As mathematicians who have undergone years of mathematical training, when we take on initiatives to develop mathematics in Indigenous and Latinx areas, there is a tendency to have the mindset that we are bringing the mathematics into communities, rather than seeing and appreciating the mathematics that is already here. When we have the idea that we are bringing mathematical insights to a group that does not have this knowledge, it can feel like we are “saviors.”

But our real goal is to uplift people, to help them recognize their strengths and their mathematical knowledge—to come with the understanding that their culture is already mathematical and already rooted in rich mathematical traditions. This approach might look different, and it takes learning on our part to really unveil that perspective and understanding. The challenge is to bring that to light for the parents and help them realize that they possess mathematical knowledge and can serve as resources for their own children. For example, Indigenous communities in New Mexico have utilized patterns observed over the course of millennia in the night skies that informed agricultural practices sustaining the health, traditions, and well-being of their people. Pueblo, Diné, and Apache Nations in New Mexico have the knowledge and understanding that is essential to protect the land, waters, and living beings from encroaching efforts for resource extraction. When the region and those living and working there start viewing themselves as resources, we can move past the old “savior” model of math education and help people embrace their relationship with mathematical knowledge. We need to come to communities in a way that meaningfully engages their cultures and traditions, where people are not passive recipients of mathematics, but active authorities on their own firm cultural footing. Other mathematicians involved in the Alliance of Indigenous Math Circles (AIMC) agree.

The AIMC has encouraged and fostered the growth of mathematics in Indigenous communities through extracurricular activities where students investigate ideas collaboratively and experience the joy of mathematical discovery. The stories of the people involved in the organization create a narrative of Indigenous mathematics as it is and should be: run by, and run for, the Indigenous communities.

LaVerne Lomakema, a high school math teacher in Kearns Canyon, Arizona, and regional coordinator at AIMC, explains that “[m]ost Native communities are already economically disadvantaged; this creates stress on many communities. If students could



Photo Credit: Bob Klein, Alliance of Indigenous Math Circles.

AIMC Summer Math Campers huddle to debate a solution.

understand the role of mathematics in their communities and within mainstream society, their opportunities would be endless [1].” Craig Young, a middle school math teacher in Tuba City, Arizona, and regional coordinator of AIMC, observes that “[o]ur Navajo youth needed a program that empowered them in a traditional holistic approach that complemented their way of life and way of thinking. All indigenous communities have a history of complex mathematics and sciences through their cultures, and the Math Circles help our indigenous youth [1].” And Bob Klein and Tatiana Shubin add that “[i]n our experience, the flexibility of mind required to approach new grammars and vocabularies constitutes a true asset in terms of learning mathematics. Moreover, many indigenous languages reflect embedded philosophies that are radically different from the Western philosophies embedded in English. Being fluent in English and an indigenous language therefore magnifies that flexibility of mind, fostering the kind of creativity that leads to great mathematical discoveries [1].”

Making Indigenous and Latinx math flourish

Many organizations, groups, and associations of mathematicians and mathematics students from underrepresented backgrounds are building vibrant mathematical communities. But to me, two organizations which exemplify asset-based and community-centered learning philosophies, CEMELA and AIMC, have been transformative in my own mathematical career and in the creation of my mathematical communities.

The Center for the Mathematics Education of Latinos/as (CEMELA)² is a consortium

² CEMELA is a Center for Learning and Teaching sponsored by the National Science Foundation, grant number ESI-0424983. Any opinions, findings, and conclusions or recommendations expressed in this manuscript are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

of universities committed to improving mathematics education for Latinx students. At CEMELA, critical scholars in mathematics, language, culture, and teacher education work together to form asset-based approaches for mathematics education for Latinx students. This interdisciplinary approach aims to understand the interplay of mathematics education and the linguistic, cultural, and sociopolitical issues impacting Latinx communities. Embracing parents as resources in the education process, some CEMELA projects support after-school math clubs and family math nights which provide opportunities for Latinx students and their families to experience engaging mathematics that assumes their brilliance without the constraints of rigid school standards.

The Alliance of Indigenous Math Circles uses a “math circle” model of mathematics education, where mathematical knowledge is not viewed as something delivered from on high, but, rather, created and used and “wrangled with” by students themselves. AIMC provides math circle workshops for both students and teachers serving Native communities. AIMC workshops for students not only bring mathematics professors from academic institutions to facilitate math circle sessions for students but also elders and experts from within Indigenous communities to facilitate activities to support Native cultural learnings and identities. AIMC teacher workshops provide opportunities for educators to engage in math activities that are offered in math circles and at math festivals. These math circles and the family math nights run by CEMELA both work to bring the entire community together to do mathematics. They engage the whole student, their upbringing, their identities, and their cultural histories.

Conclusion: family as community

Many people in mathematics communities are interested in equitable educational opportunities. These include math educators, in-service teachers, mathematicians, teacher educators, and policymakers. But we now have effective models that involve families and communities in initiatives that advance mathematics. Perhaps the next step considers how we can include these families and communities in policy and curricular decisions. These incremental steps will give Indigenous and Latinx communities an increasing opportunity to have agency in decisions that affect their children and neighborhoods. In turn, this inclusive combination of ideas and voices will lead to stronger and more equitable mathematics educational opportunities.

Reference

- [1] Klein, B., Shubin, T. (2019). Building the Alliance of Indigenous Math Circles. *Notices of the American Mathematical Society*. 66(4): 540–546.



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