

GENIAL

Relevant STEAM Experiences

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EXECUTIVE SUMMARY

Informal science learning (ISL) organizations that are successful at providing meaningful science, technology, engineering, arts, and mathematics (STEAM)¹ experiences for Latino children, youth, and their families share some common traits. They have leaders and staff who believe in the importance of developing culturally relevant models and frameworks that meet the needs and acknowledge the legacy of STEAM in Latino communities. Such organizations are willing to take risks to create experiences that are culturally meaningful, garner funding and implement programs by working closely with their local communities, and sometimes go beyond by partnering with other organizations to build regional and national networks based on trust, common goals, and deep relationships. They also respond to changes in their communities, from language choice to acknowledgment and appreciation of diverse preferences, interests, lifestyles, and ways of knowing and learning.

¹ The GENIAL team, advisors, and panelists agreed that it was important to broaden the STEM content focus to STEAM, which includes the arts as an effective strategy to engage Latino audiences in informal science learning.



These organizations exercise great flexibility, are sufficiently agile to adapt to rapidly changing conditions, and value community partnerships as key to the development of relevant STEAM experiences. These traits make such organizations effective in providing relevant STEAM experiences for Latinos because they recognize that when it comes to such experiences, “one size does not fit all.” The idea that STEAM experiences need to be tailored to the nuances of a highly diverse Latino community was the focus of discussion for the Relevant STEAM Experiences panel during the GENIAL Summit.

This article offers recommendations for ISL organizations and their staff for cultivating qualities and behaviors to enable the development of relevant STEAM experiences that are attuned to the diverse needs of Latinos. They include developing the ability to take risks and be agile; valuing new perspectives, paying attention to the continually changing landscape of Latino audiences; seeking and responding to feedback from the community; becoming a good listener; empowering multiple generations and voices; and making space for the entirety of Latino cultural identities in the workplace. Each recommendation highlights examples provided by the authors, the GENIAL panelists, and participants as a result of small group discussions.

INTRODUCTION

The GENIAL Relevant STEAM Experiences strand was intentionally featured toward the end of the GENIAL Summit to build on the discussions of prior panels and participant breakouts informing and building up the content of this strand. A successful and engaging STEAM experience for Latinos that is culturally relevant responds to the nuances and diversity of Latino audiences, requires authentic collaboration with the community, and taps marketing and communications resources to make these experiences known and accessible to Latinos.

This strand was led by Cheryl Lani Juárez, CHISPA PI, Sr. Director of Professional Development, Phillip and Patricia Frost Science, and Verónica Núñez, Sr. Community Engagement and Partnerships Specialist, Oregon Museum of Science and Industry (OMSI). Panel participants included Juliana Ospina Cano, Senior STEM Manager, UnidosUS (formerly National Council for La Raza [NCLR]), Antonio Tijerino, President and CEO, Hispanic Heritage Foundation, and Verónica Núñez, Sr. Community Engagement and Partnerships Specialist, OMSI.

Panelists drew from their vast experience developing and implementing programs, activities, and exhibitions designed for varied audiences including toddlers and preschoolers, children and teens, and multigenerational members of extended families. They delved into specifics of how cultural and language considerations play a role. For example, program delivery, curriculum, and exhibition signage might be in Spanish, English, or both. Regional and cultural differences were recognized to have significant impact. To set the stage for the discussions, the panel provided rich context through a beautiful audio slide show (accompanied by Carlos Vives’ song “Amor Latino”), which provided images of Latino children and families in out-of-school-time settings, such as museums and afterschool programs. Strand leader Juárez then asked the audience to share adjectives describing what they had seen. Responses included joy, *familia*, *comunidad*, cultura, science, working together. It was clear that STEAM experiences for Latinos take place in the context of relationships.

“ONE SIZE DOES NOT FIT ALL”

Just as other strands during the Summit focused on characterizing the nuances of Latino audiences and discussed a variety of approaches and challenges for engaging them effectively in ISL, each panelist in this strand brought to the conversation their perspective on how the concept of “one size does not fit all,” in the context of STEAM experiences, impacts their work in real and concrete ways.

Ospina Cano’s work with UnidosUS involves figuring out how to expose primarily K–12 Latino youth to STEM when science is not being taught in school. Working with 33 community-based programs and schools in eight states, she understands that “the Latino community differs by region.” As a result, she and her team must be “intentional with our goals and the way we roll out a program.” She emphasized the capacity to adapt quickly, show cultural competence and humility, and commitment to gathering feedback and making timely modifications. She encouraged practitioners to remember that at the end of the day we are working with people, and, as humans, we value authenticity and relationship building. Cultural connections are important.

“Latino communities are beautifully diverse so we have to be intentional with our goals by applying cultural, linguistic, and emotional sensitivity in the way we develop, execute, and monitor programs.”

—Juliana Ospina Cano.

“One size does not fit all” prompted panelist Núñez to share her family’s experience as immigrants. Everyone in her family immigrated here at different times in their lives. Even coming from the same household, they all have different accents and completely different experiences as immigrants. Discussing STEAM programs, Núñez said, “Sometimes if things work, you want to replicate them. But things change.... I might think I know how to implement a program with one community, but the next community is completely different. Training for educators has to be different because not every group of educators is the same.” For Núñez, these differences mean that “we are learning how to do this job all the time.” She emphasized the need to keep listening all the time and the importance of understanding that people are ever-changing. Also, it is important to recognize that the Latino staff in ISL institutions can thrive in work environments that make space for multifaceted personal passions to be integrated with science (for example, theater or folkloric music and dance).

“We are learning how to do this job all the time.”

—Verónica Núñez

Tijerino agreed that it is important to listen and understand that things are different in every city where you might have a program. For him, these differences mean that “program people have to be the CEOs of their programs. Leaders have to trust that they know what they’re doing.” He also said it is important to trust young people to lead and to reach their peers, using social media to gauge interest and engagement over time. He recommends that programs have the audacity to think they can make an impact

“As a leader, I must be adaptive and agile.”

—Antonio Tijerino

without external funding. He also celebrates taking risks and accepting imperfection for the goal of moving forward and building relationship with the community. “The key to everything is follow-up. Otherwise it’s just a ‘drive-by’ STEM experience.”

RECOMMENDATIONS

The following recommendations emerged from the panelist presentations and subsequent participant discussions during plenary and as a result of the breakout groups.

TAKE RISKS AND BE AGILE

When developing a STEAM activity, program, or exhibit for Latinos, taking risks will deepen the experience for the staff at the ISL institution and will allow the organization to explore options with the community. Rapid prototyping requires the organization to change directions, adapt, be agile, and be flexible.

Start with the confidence to fail. While discussing his long history of taking risks, Tijerino said “It starts with the confidence to fail. You have to have the absolute confidence to stumble and learn from those stumbles.” He shared an example of taking his daughter’s eraser away when she was drawing and telling her, “Stop trying to make art right. You have to be able to accept the mistake and go in a different direction.” He has the same view about leading a program or organization. “When you’re hit with things like recession and funding challenges and problems in your organization, you have to be able to weather them. You can have all the plans you want until you get hit in the face, and how you react to that punch in the face is most important.” He sees his role in his organization a cheerleader, a facilitator, and a connector.

Tijerino says “Try to think about the qualities you see in others—and yourselves—in different ways. For example, what some people describe in me as impetuous, impatient, scrambled, or scattered, others describe as agile, innovative, and action-oriented. What some see as reckless, others realize as a risk-taker.”

VALUE NEW PERSPECTIVES

When implementing a program or event, even if it’s been done before, it is beneficial to look at it with fresh eyes, paying attention to the continually changing landscape of Latino audiences. Every time the program is implemented it presents a new opportunity to learn something new about the community that is in constant evolution. As the Latino community grows, expands, and changes, programs need to respond, since what worked before might not be what’s called for in the present. Each time, programs need to be implemented with a sense of curiosity and openness.

Work with partners that are rooted in the Latino community. OMSI works with an organization called *Adelante Mujeres*. It is rooted in the community. It’s very small. They hire from within the community and they do programs in the community—from agricultural to educational to business projects. They come to the museum and we go there to implement some of OMSI’s programs. The museum staff connects what they are doing to what is already happening in the community. When communities feel valued, they will make the program theirs even after the grant is done.

SEEK AND RESPOND TO FEEDBACK FROM THE COMMUNITY

Listening to the people attending programs and events, as well as to team members, is essential, even though not necessarily easy. It requires program developers to ask questions that will allow them to understand the audience experience. To be able to respond to feedback, it may require incremental steps to be able to integrate one change at a time.

Language matters. Recognize the importance and complexity of it. UnidosUS programs value funds of knowledge. Children's language is valued and valuable. Effective STEAM experiences need to work with communities to understand the complexity of language and why it's important. Often, it is not just a functional need for multiple languages, it is an emotional need. It's all part of valuing culture.

There are innovative ways to address the language issue. For example, some educators are teaching computer coding as a second language, in Spanish, to English speakers during Spanish class, providing English speakers with two new languages.

In the ISL realm, making exhibition signage in Spanish in museums is not a panacea. Any multilingual strategy needs to define exactly who the intended audience is and what needs are being met. Once you identify the needs, you can respond to them. You can be culturally sensitive and culturally relevant, even if signage is only provided in English. On the other hand, sometimes it is important to highlight and enhance usage of science domain language in Spanish to increase understanding of scientific concepts. This strengthens confidence and allows multigenerational groups to participate.

BE A GOOD LISTENER

When partnering and collaborating with the community, one of the best ways of learning about them is to ask questions, be a good listener, and very present in the conversations. Answers may not come easy and multiple opportunities may be needed to observe and listen.

Develop agency and celebrate culture and language. UnidosUS partnered with Frost Science to implement the Children Investigating Science with Parents and Afterschool (CHISPA) program, funded by NSF, in 12 states. Children are gaining exposure to science concepts through a hands-on curriculum, in Spanish and English, and parents are learning more about how they can support their children's STEAM education. Partnerships between local CHISPA science museums and their local community-based organizations have invited many families to experience hands-on science for the first time, helping them begin to feel comfortable visiting their museum, and see it as a valuable community resource.

EMPOWER MULTIPLE GENERATIONS AND VOICES

Often, programs for Latino families include multiple generations. ISL organizations need to take this into account and prepare to serve a diversity of ages, backgrounds, and relationship dynamics. Additionally, the diverse Latino staff in an institution need to be empowered to be effective leaders within and outside of the institution.

I exercised my voice as a Latina in power. When the Escalera STEM program offered by UnidosUS in the Gulf Coast was not initially successful, Ospina Cano asked her supervisor to travel there and spend time observing the program. She met with the school district superintendent, teachers, and parents, and started to learn how the community saw the program. It wasn't working because "they didn't know what Escalera STEM was; they didn't know what STEM was. They were barely learning English in school, let alone science." Ospina Cano invested a semester "building intentional and honest relationships. I was being all of myself: authentic, a first-generation Latina with an accent." Little by little, enrollment in the program grew, and the instructor has now expanded the program with outside funding. Ospina Cano explained, "I exercised my voice as a Latina in power. I had limited power, but I exercised my voice with a business plan. Now Escalera STEM is in six markets outside the Gulf Coast. It was hard. But if we don't go there, take the risk, then who will go there?" For Ospina Cano, the experience was a good lesson on exercising judgment, but backing it up with data and sound business practices.

MAKE SPACE FOR THE ENTIRETY OF LATINO CULTURAL IDENTITY IN THE WORKPLACE

Making space for Latino and other staff to bring the entirety of their culture to bear in their work is important during the development of culturally relevant STEAM experiences.

Bring other passions to bear into your work. Núñez also discussed finding her voice in terms of "bringing other passions and loves into work. I needed to bring something I really love to the table." She described a project she was doing at OMSI on engineering, and at the same time she was doing a theater show—*Cinderella* with puppets. The puppeteer was not an engineer, but he was doing engineering work: iterating, trying new things. So Núñez thought about bringing him into the OMSI classes, to talk about other ways of approaching the engineering process. Now, the theater is doing a show about female engineers with puppets and birds. In terms of bringing her interests to her program, Núñez said, "Sometimes it hasn't worked—it's clearly something to rethink. In taking those risks, I have found that some things can really work. Usually when I am passionate about something, the outcome will shine. I bring projects or topics that I like, people that I like. My family serves as volunteers in the museum all the time."

It took time for Núñez to feel comfortable enough to start taking these risks, but as she explained, "I found my voice and have found that people more senior often want to incorporate my voice. In the last few years I have felt really empowered in the museum.... It's about finding my voice and believing in myself; as I do that, people approach me more."

CONCLUSIONS

The panel was very dynamic and brought up important points about working with Latino and diverse communities. It reinforced the idea of responding to needs and authentically owning up to the reality that communities are ever-changing and that ISL institutions need to be there to listen and respond.

At the center of this work are relationships—honest and compassionate relationships with communities and the organizations that work closely with them. These relationships are key to understanding their needs and

desires, serving as the starting point from which effective programs and experiences can be developed that are close to the heart of those communities.

Throughout the session, many audience members were sharing their thoughts via Twitter, focusing on the meaning of “one size does not fit all.” The emphasis running through the tweets supported that programs will not fit every Latinx community, and mistakes will be made. The tweets reflect an appreciation of the idea of trying something, making mistakes, and being proud of the effort to make changes to reach children and their families. They want to embrace their failures and learn from them. The word *mistake* doesn’t have to imply a negative connotation—with time, mistakes and failures can yield their own payoff as lessons learned and an opportunity for improvement. Giving space for iteration, trial and error, and experimentation to find the things that truly resonate and motivate our audiences is precisely what is exciting about this work. Like science, our work is always growing, changing, and evolving.

BIBLIOGRAPHY/RESOURCES

Bexell, S. M. et al. 2007. “Observing Panda Play: Implications for Zoo Programming and Conservation Efforts.” *Curator: The Museum Journal* 50(3): 287–297.

Center for Advancement of Informal Science Education (CAISE) 2013. [“Evidence Wiki: Culturally Relevant Experiences in Informal Science Education Institutions.”](#)

[Children Investigating Science with Parent and Afterschool \(CHISPA\) Project.](#)

Cox-Petersen, A., Melber, L. R., and Patchen, T. R. (2012). *Teaching Science to Culturally and Linguistically Diverse Elementary Students*, 1st Edition. Pearson Education.

[“Environment for the Americas: Connecting Cultures in Birding and Bird Conservation.”](#) 2014. The lack of ethnic diversity in the sciences has been a national issue for many years. Now, it is also a growing concern among bird conservationists.

[Hispanic Heritage Foundation.](#)

[Informal Science.](#)

[“The Latino Tech Gap and How STEM Can Build a Bridge.”](#)

[Latino Outdoors.](#) “We bring *cultura* into the outdoor narrative and connect Latino communities and leadership with nature and outdoor experiences. We connect familias and youth with nature, engage and inspire Latino leadership, empower communities to explore and share their stories in defining the Latino Outdoors identity.”

Lettvin, E. E. 2015. “Federal Collaborations: Bringing Authentic STEM Experiences to High-Need Communities Through the Nation’s Largest Out-of-School Program.”

[Monterey Bay Aquarium Watsonville Area Teens Conserving Habitats.](#)

[Movimiento de Arte y Cultura Latino Americana](#). MACLA/Movimiento de Arte y Cultura Latino Americana is an inclusive contemporary arts space grounded in the Chicano/Latino experience.

[Oregon State University 4-H Youth Development Programs: Resources](#)

Peticolas, L. M., Mendez, B., Hawkins, I. and Whitorth, C. 2008. "Effective Strategies for Engaging Latino/Hispanic Audiences in Astronomy." *Astronomical Society of the Pacific's Conference Series* (400): 422. Edited by M.G. Gibbs, J. Barnes, J.G. Manning, and B. Partridge. San Francisco: Astronomical Society of the Pacific. Presents best practices in professional development in astronomy and space science.

President's Council of Advisors on Science and Technology. 2010. [Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math \(STEM\) for America's Future.](#)

Russell, R. L. 2009. Expanding Informal Science for Latinos Conference, Albuquerque, NM (NSF 0742157). Panels highlighted best practices for planning informal science for Latino students and families. There is a [brief video](#) of the conference and a [press release](#) about it.

SciGirls. ["Engaging Latino Families: Key Ingredients for Successful STEM Programs."](#) (DRL 0937314, PI Richard Hudson). SciGirls offers tips for developing culturally sensitive approaches that engage Latino families in informal science education.

UnidosUS (formerly National Council of La Raza).

Zeigler, M. C. 2015. ["Engaging Audiences Underrepresented in STEM Fields."](#) Presented at the Public Libraries & STEM Conference. Denver, CO.