Empowering Communities and Project Teams: The Role of Equity Advocates in Informal STEM Education

Smirla Ramos Montañez, Scott Pattison, Gina Svarovsky, Annie Douglass, Julie Allen, Viviana López Burgos, Nelda Reyes, and Cecilia Garibay

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Introduction

As researchers and practitioners in informal STEM education (ISE), we recognize the critical role that informal settings—such as museums, community programs, and homes—play in shaping STEM-related engagement, interests, and identities for individuals and communities. Many of our professional goals focus on creating environments and programs that offer *all* learners meaningful STEM education opportunities. However, in our experience, achieving this goal requires more than simply increasing access. While years of effort have expanded some opportunities for individuals from underrepresented communities to engage with STEM, these initiatives have often failed to dismantle the systemic barriers and the deeply ingrained ideologies that perpetuate inequities and uphold exclusion in the field.

Advancing equity in informal STEM education demands ongoing, field-wide commitment through reflective, intentional, and sustained efforts that are responsive to the unique strengths and needs of diverse communities. There is no one-size-fits-all solution to advancing equity, as each community, context, and project comes with its own unique challenges and opportunities. However, coming together as a field and sharing lessons across projects and experiences creates opportunities to learn about promising strategies and approaches that can support our efforts of creating more just and inclusive STEM learning environments.

In that spirit, in this article we offer reflections on one such strategy: *equity advocacy and coaching*. Drawing from experiences within a multi-year ISE project, as well as broader dialogue with collaborators, we explore what equity coaching can look like in practice, the value it brings, and the tension and complexities that can arise in its implementation.

Equity Advocacy and Coaching in the HSE Project

Head Start on Engineering/Ingeniería y Head Start (HSE) is a National Science Foundation-funded initiative focused on empowering families to use engineering to help their children thrive. A research-practice partnership and collaboration between TERC, Oregon Museum of Science and Industry (OMSI), University of Notre Dame, Mt. Hood Community College Head Start, and the Immigrant and Refugee Community Organization (IRCO), the project engages early childhood educators and families with preschool-age children (3 to 5 years) through culturally relevant engineering programming. Using design-based research approaches, it also advances knowledge about how families and children develop interests related to engineering and how those interests can be supported by ongoing experiences. As part of the project, the team has developed a bilingual (Spanish and English), 6-month family engineering program that includes parent and caregiver workshops, take-home engineering activity kits, online videos and resources, classroom activities, professional development for staff, and a field trip for families and staff to the local science center. The take-home engineering activities,

introduce families to engineering in narrative-based contexts and connect engineering to everyday problem solving. For example, in the *Pollitos* activity, which is based on a popular children's song in Spanish, families work together to build a structure out of blocks and cardboard that can keep a hen and her chicks safe and cozy.

From its inception, the project aimed to develop programs and conduct research in ways that are responsive to various languages and cultural backgrounds. The project team, which included education researchers, engineering experts, early childhood educators, program developers, and community engagement specialists from a diversity of ethnic, racial, cultural, and linguistic backgrounds, has been working with an external evaluator and equity advocate to articulate and refine a series of equity priorities. With support from the project's *equity advocate*, the team identified priorities that guided the work and focused on transforming systems of inequity in STEM education. These priorities revolved around disrupting and transforming power structures present in education and research. Central to this effort was centering family voices and perspectives to position educators, researchers, and community members to work together in new ways and re-envision engineering to reflect and incorporate the assets, goals, values, and lived experiences of families.

> **HSE Equity Priorities:** We aspire to understand and disrupt persistent forms of minoritizing and disenfranchising communities by:
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> *(1) Working together in new ways*—Through centering family voices and perspectives and positioning educators, researchers, and families to work together in new ways, we can help to transform traditional power structures that perpetuate inequities in STEM education.
>
> *(2) Re-envisioning STEM disciplines*—Through collaborating with educators and families to re-think and broaden our understanding of engineering and authentically incorporate the goals, perspectives, and values of families, we can amplify family assets and develop a more equitable vision of STEM learning.

As part of their role on HSE, the equity advocate collaborated with the project team to shift from an initial aim of measuring equity as an outcome to instead embedding the equity priorities across the different processes, goals, and strategies of the project. The equity advocate also focused on advocating for communities while acting both as a guide and accountability partner for the team. While the full scope of their work is difficult to capture, key aspects included:

- Regularly meeting with the team and engaging in reflective discussions;

- Conducting interviews with project team members and program participants;

- Providing feedback on program and research documents, instruments, and products;

- Attending, observing, and reflecting on program events;

- Identifying equity-related challenges and opportunities; and

- Sharing strategies, theoretical frameworks, and approaches to support the project.

The experience of working with an equity advocate has been invaluable for the project team and has directly contributed to the project's success and broader impacts. The project team deeply appreciated the opportunities to reflect about the work, document shifts in the team's thinking and approaches, and gather feedback from partners and participants. They also greatly valued the accountability that came from embedding the coaching and the equity approach in both the research and programmatic aspects of the project.

Additional Perspectives on Equity Advocacy and Coaching

Conversations within the authorship group and with colleagues outside the HSE project surfaced complexities related to equity advocacy and coaching that can influence the ways that this strategy is leveraged and implemented across other projects or contexts. Below, we share key themes that emerged from these discussions, which we believe can be valuable not only for our work but also for other groups interested in integrating equity coaching into their projects.

The Role of an Equity Advocate

Conversations with colleagues reinforced that while equity advocacy and coaching can be situated within and aligned with evaluation efforts, it can represent a broader approach. In the proposal stage of HSE, the project team initially envisioned equity advocacy and coaching as part of the evaluation process, focused on assessing equity as a key project outcome. However, as the program launched amid a global pandemic, it became clear that centering equity would require new and adaptive approaches and could not be limited to just measuring impact alone. Equity advocates guide project teams to reflect on their practices, challenge assumptions, and develop strategies that address equity-related issues at both the project level and across the ISE field.

Equity advocates also play a critical role in helping teams examine and confront the systemic inequities that shape informal STEM education. They push teams to move beyond surface-level solutions and support reflective practices that lead to more sustainable, long-term change. In addition to working internally with project teams, equity advocates also serve the communities they represent—offering insights into how programs and research can be reimagined to authentically involve and empower community members. Their work ensures that initiatives align with the principles of equity, inclusion, and social justice, making informal STEM learning not only accessible but also meaningful and transformative for all.

In one project described by a colleague, for example, the equity advocate supported the leadership team in recognizing and addressing power imbalances between junior and senior staff. Junior staff were responsible for most of the project activities and shared a stronger cultural and linguistic

connection with the community being served. However, their ideas and perspectives were not being incorporated into the planning or development at the level they felt was necessary. The equity advocate helped the team surface this issue and made it visible not only to all project team members but also to the leadership at the organizational level. Throughout the project, the equity advocate consistently amplified the voices of junior staff and collaborated with the team to develop and implement strategies to shift power dynamics.

Given the complexity of the equity advocate role, it can be challenging to define the expertise required to serve effectively in this capacity. Outlining a "job description" seems nearly impossible. To be effective, an equity advocate needs a broad and diverse skill set that extends beyond theoretical knowledge of equity frameworks. While understanding theory is important, the most critical qualities include common lived experiences with the communities being served, a deep understanding of cultural and linguistic practices, and practical experience working alongside these communities. In addition, equity advocates must be deeply connected to both research and educational practices across disciplines and be willing to be flexible and adapt to the unique needs of each project. Given the nature of the work, an equity advocate must also possess the ability to mentor, advocate, and build bridges across stakeholders to foster collaborative and inclusive change.

Observing Growth and Change in Equity Work

Another area of complexity that emerged in conversations about equity advocacy and coaching is how to understand and observe progress in equity efforts within a project. Rather than seeking definitive metrics of "success," it is meaningful to focus on how teams and projects evolve over time, recognizing that equity work is nonlinear, layered, and deeply contextual. Growth may occur at multiple levels (e.g., individual, team, organization, system) and unfold in ways that are not always easy to quantify. Some strategies that can help to observe and support ongoing growth include the following:

Establishing a starting point

Because equity work is an ongoing and long-term process that often lacks clearly defined start or end points, it makes it challenging to track progress. Team conversations surfaced the idea that reflecting on current beliefs and setting goals for growth can support this work. For example, defining equity priorities can help establish a baseline and articulate specific strategies for assessing progress.

Embedding regular reflection and feedback

Equity advocates can help create and sustain opportunities for ongoing reflection. They support this process by posing critical questions, fostering inclusive and equitable participation, and guiding teams through difficult conversations when needed. These reflective moments support a culture of critical inquiry where teams can pause, recognize shifts in thinking, and identify areas that need further attention. They also keep equity visible and embedded

in all aspects of the work rather than remaining a separate or overlooked component of an initiative.

Noticing signs of growth

Equity work is not linear and rarely follows a clear path. However, equity advocates can notice and identify signs of change and growth. For example, a team might start with curiosity and then develop shared language and awareness of equity. Other signs of growth could include embedding equity more intentionally into their practices and decision-making. These shifts, however subtle, can signal deepening engagement with equity.

Across our conversations with colleagues, the importance of embracing a flexible and reflective approach to better notice and nurture these signs of change emerged as critical. While traditional forms of evaluation may fall short in capturing the full scope of equity work, a practice grounded in observation, dialogue, and responsiveness offers a more generative path forward.

Additional Considerations for Projects

While some of the complexities discussed here may seem daunting, hopefully they do not overshadow the immense value that equity coaching can bring to a project. As you reflect on whether this strategy might be beneficial for your projects, we want to share some final considerations from our experience and from conversations with our colleagues and collaborators.

First, time and continuity matter. Short-term projects may not provide sufficient time for the deep, transformative change that is required to address systemic inequities. Equity work is an ongoing journey that demands patience, persistence, humility, and commitment to change. Projects that can bring an equity advocate into the process early on and maintain their engagement and support throughout are more likely to achieve lasting, meaningful impacts.

Second, understanding the broader context is essential. Equity advocacy and coaching is most effective when grounded in the social, cultural, and historical realities of the project and the communities involved. A deep understanding of these contexts allows the equity advocate and the team to tailor strategies that resonate and are relevant to community needs, which in turn can contribute to sustainable change.

Finally, embracing a growth mindset is key. Even after measurable progress, there is always more to learn and room for growth. The equity advocate can help the team cultivate a mindset focused on continuous reflection, learning, and improvement, rather than seeing equity as a fixed goal or destination. Equity is not a separate component of a project—it is an evolving, integral part of the work that shapes and strengthens all other aspects.

Conclusion

In our experience, equity advocacy and coaching is a powerful strategy for fostering meaningful change in ISE projects. Reflections from HSE, along with the insights from other projects, highlight both the immense value of this approach and the complexities involved. Integrating equity coaching early in a project, maintaining its presence throughout, and embracing a mindset of continuous growth can help teams build more inclusive and responsive learning environments.

Equity advocacy and coaching can also help project teams move beyond surface-level commitments by embedding critical conversations and practices into all aspects of the project. However, this work requires intentionality, deep contextual understanding, and a commitment to ongoing learning and adaptation. While the complexities and challenges of the work may seem daunting, we hope the insights shared here serve as a resource for others and contribute to field-wide efforts to strive towards more equity-centered STEM education.

Acknowledgement