National Girls Collaborative Project

NGCP

EDC Education Development Center

ADVANCING THE CONVERSATION

on Scaling National Informal STEM Programs

Conference Summary

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ADVANCING THE CONVERSATION
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Document Overview

The following document is a summary of the planning, implementation, and findings from the Advancing the Conversation on Scaling National Informal STEM Programs conference, held on Monday, May 22, 2023 – Wednesday, May 24, 2023, at the Education Development Center (EDC) offices in Washington, D.C. The conference was funded by the Advancing Informal STEM Learning (AISL) division of the National Science Foundation (grant #2214449.)

Table of Contents

I. Background

Advancing the Conversation on Scaling National Informal STEM Programs grew from years of conversation between the National Girls Collaborative Project (NGCP) and the Education Development Center (EDC), who have worked together to disseminate and evaluate several national informal STEM education (ISE) programs. They noticed that much of the current research on scaling educational programs is rooted in formal K-12 educational spaces and does not consider the unique opportunities and barriers across the informal learning setting. Moreover, few scaling frameworks examined equitable STEM practices and the experiences of program implementers. This project aims to bring together key stakeholders to redefine principles for scale that center on equitable informal STEM education from the perspective of those working directly with youth.

II. Conference Planning

The conference was co-created with a conference planning committee comprised of the project team and seven ISE program implementers and developers *(Section IV)*. The committee met four times from January – May 2023 to develop the conference purpose, objectives, guiding questions, and agenda. Project advisors *(Section IV)* also met twice in January and March to guide the conference direction.

III. Conference Goals and Agenda

The conference's purpose was to collaboratively challenge and redefine the conversation on how we scale informal STEM education programs through the lens of equity and inclusion and grounded in the perspectives of program implementers. The conference was designed to interrogate current conceptions of scaling, identify essential elements for equitable and inclusive scaling, and determine future actions and deliverables, leveraging the collective knowledge of conference participants.

Conference Agenda:

- **Monday, May 22, 2023**
  - 12:00 – 12:40 – Call to Action and Norms
  - 12:40 – 1:00 – Collaboration Networking
  - 1:00 – 3:00 – Fostering Equity in Your STEM Programming
  - 3:00 – 5:00 – Deconstructing Current Conceptions of Scale
- **Tuesday, May 23, 2023**
  - 9:00 – 10:20 – Centering Equity Plenary Panel
  - 12:00 – 1:00 – Working Lunch
  - 1:00 – 3:30 – Building a Concept Map for Equitable Scaling
  - 3:30 – 5:00 – Concept Map Review
- **Wednesday, May 24, 2023**
  - 9:00 – 10:00 – Lingering Questions
  - 10:00 – 11:00 – Immediate and Long-Term Impacts
  - 11:00 – 12:00 – Next Steps and Closing

IV. Conference Participants

The project team strategically invited participants representing the diversity of informal STEM stakeholders in job focus, career stage, geography, race, ethnicity, and gender. Most participants represented informal STEM implementers from afterschool networks, museums, and libraries. Significant effort was made to invite those who serve historically excluded populations in STEM, including girls, youth of color, indigenous youth, youth with disabilities, and neurodivergent youth.

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- **Project Team Members:** Tara Cox, PI, NGCP; Erin Stafford, Co-PI, EDC; Dr. Leslie Goodyear, EDC; Emily Early, NGCP; Candid Mack, NGCP
- **Project Advisors:** Emma Banay, Overdeck Family Foundation; Dr. Katari Coleman, NCASE @ EDC; Tiffany Gipson, CAN; Dr. Anita Krishnamurthi, AA; Catherine McCarthy, ASU; Dr. Sandra Toro
- **Evaluation Advisors:** Dr. Angelicque Tucker Blackmon, ILC; Dr. Karen Peterman, CCG
- **Conference Planning Committee:** April Caldwell, Girls Inc., NYC; Perrin Chick, MMSA; Rachel Kessler, OregonASK; Sylvia Perez, NYSCI; Erin Prentiss, Augusta-Richmond Public Library; T'Noya Thompson, NAAEE
- **Attendees:** Dr. Stephen D. Alkins, TERC; Dr. John Baek, NOAA; Amber Blackwell, High Ground Neighborhood Development Corp; Lyla Crawford, Do-It Center; Dr. Lorena Harris, CSTEP; Stephanie Hawkins, Museum of Nature and Science; Deana Ingraham, GSAN; Sheila James, OAN; Rita Karl, Consultant; Dr. Lisa Kovalchick, PennWEST University; Laura Lerman, Cal Academy; Yun-Yi Lin, Princeton Public Library; Dr. Dale McCreedy, Discovery Center of Murfree Springs; Dr. Diane Miller, Detroit Zoo; Melissa Moritz, Overdeck Family Foundation; Kevin Nichols, The Social Engineering Project; Keturah Pelle, S. Bronx Overall Economic Dev. Corp; Hannah Pickar, Public Profit; Dr. Ariana Riccio, EDC; Dr. Amanda Roberts, University of the Incarnate Word; Dr. Tiffany Smith, AISES; Dr. Lisette Torres-Gerald, TERC; Anthony Wilkes, GSAN; Dr. Darryl Williams, TFI
- **NSF Program Officers:** Dr. Monya Ruffin, Dr. Alicia Santiago, Dr. Robert Russell

V. Key Conference Activities

a. **Fostering Equity in Your Informal STEM Programs (Fishbowl Conversation)** - The full-group activity took place in four rounds of questions in which participants could self-select and join the conversation at the front of the room while others listened. Below are prompts for each round:

- Tell us about your experiences implementing or supporting STEM learning in your program. What strategies do you use to ensure equity?
- What opportunities and barriers exist in developing and implementing equitable and scalable programs?
- How do we tell stories of successful, equitable models and lessons learned so that we stop reinventing the wheel?
- I am involved in [implementing, developing, funding researching/evaluating] nationally scaled programs because…

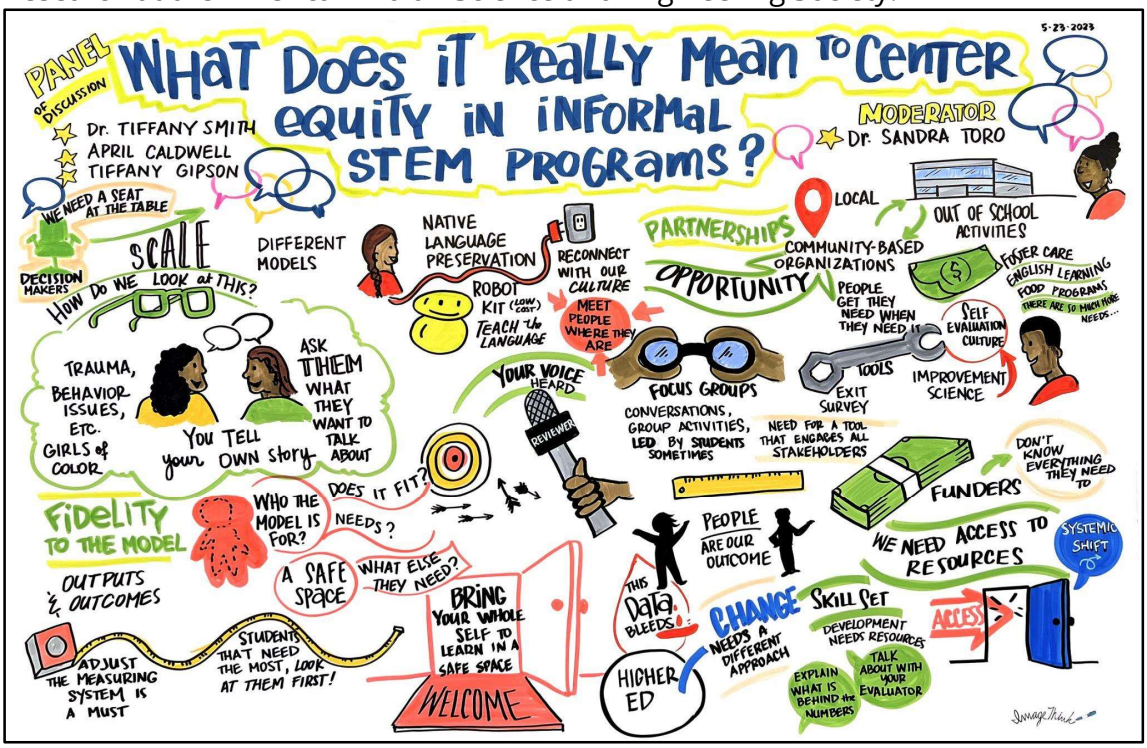


b. **Deconstructing Current Conceptions of Scale (World Café)** - In small groups, participants considered current conceptions of scale to rethink, revise, or reshape the ideas to align with their experiences. The following conceptions discussed are based on common ideas from the literature on scaling educational programs.[1]

- Spread and replication are the best measures of scale.
- Fidelity to the program model is key to successful scaling.
- National programs need to be universally designed to fit any context.
- Programs designed with equity in mind will be scaled equitably.
- Building educators' capacity to implement STEM activities is key for scaling programs.
- Program outcomes should be defined by program developers.

[1] Conceptions were based on articles by Coburn (2003) and Coburn & Dede (2013).

c. **Centering Equity in Your Informal STEM Program (Plenary Panel)** - The panel was guided by the question, "*What does it really mean to center equity in your informal STEM program?*" It was moderated by Dr. Sandra Toro and featured panelists April Caldwell, Chief Program Officer of Girls Inc., NYC, Tiffany Gipson, Director of Quality and Equity at the California Afterschool Network, and Dr. Tiffany Smith, Director of Research at the American Indian Science and Engineering Society.

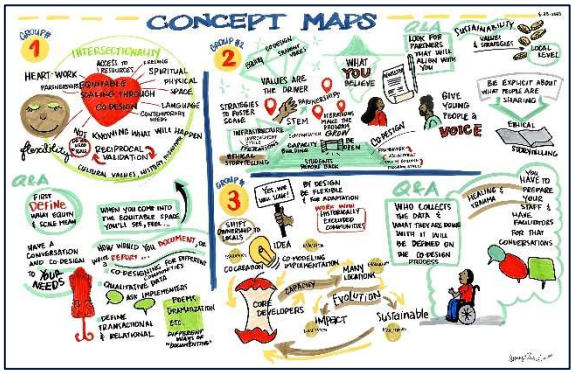


d. **Re-Engineering Scaling** - Each small group collaborated to develop an equitable model for scaling using a mock scenario. Scenarios were based on typical examples of national informal STEM programs.

- Scenario 1: A university in a large urban center has developed a three-week engineering program for middle schoolers that they piloted in three afterschool programs in their city. The program aims to help introduce youth to the engineering design process. They have received a grant to scale the program to other afterschool programs nationally.
- Scenario 2: A chemical company's community outreach department has developed a summer intensive for high school students focused on mentorship and career development. They piloted it with a group of fifteen students and now want to scale their reach across the region.
- Scenario 3: A museum has developed a traveling exhibit on the brain designed for libraries. The exhibit comprises six interactives and informational displays to introduce the public to neuroscience concepts.

They did an intense pilot study in three libraries while developing the exhibit. They received a federal grant to scale the exhibit to fifteen libraries.

e. **Building a Concept Map for Scaling** - Small groups collaborated to determine what concepts and strategies lead to equitable scale. Groups were asked to develop a concept map challenging and redefining current conceptions and adding new elements.



f. **Immediate and Future Impacts** - Participants brainstormed what actions they would "start, rethink, and continue" following the conference, immediately related to their work and long-term about the field of informal STEM education.

VI. Key Conference Findings

The following overarching themes emerged through conference activities detailed above:

1. **Program scaling should not be transactional.**

   Notions of scale in the current literature, including the spread of programs, replication of curriculum, and fidelity of implementation, have colonialist underpinnings. When program scaling is driven by the interests of the program developer or their funder, the people receiving the program become a means to an end. The effort becomes very transactional. Transactional scaling can lead to unequal power structures and racial, geographic, and cultural inequity. To decolonize approaches to scale, we must ask ourselves, *"Who demands this program? What is the intent of scaling it, and whom am I inviting to participate in its conception and implementation?"* and prioritize equitable partnership practices like power-sharing and co-creation.

   We must also change how we determine outcomes from being developer- and researcher-driven to community-led. Developers and researchers must enable participants to determine outcomes that benefit their community. To center equity, the field must shift outcomes towards self-advocacy, skill building, relationship building, social justice, and a sense of belonging in STEM. When focusing on these

outcomes, program developers, funders, and researchers can be more inclusive of community needs.

2. **Program scaling must involve co-creation and authentic relationship-building.**

   Making resources more accessible through scaling may be acceptable when done with equity and community involvement at the center. To achieve this, program developers, funders, evaluators, and researchers must involve those implementing and receiving the program, including youth, from development to dissemination. Co-creation of programs helps dismantle unequal power dynamics between those designing and those engaging in the program. Co-creation relies on authentic relationship building, and authentic relationships are built on trust. To build trust, teams must establish a safe collaborative environment, especially in communities historically and presently harmed through discrimination and systems of oppression. The approach allows buy-in and may result in more culturally responsive programs that will not further harm marginalized communities.

   Programs should continue to be co-created as they are scaled and measured, as what worked in one community will not always work in another. This may require multiple rounds of adaptation and collective redesign. So, when programs are scaled and implemented in different communities, program developers must have mechanisms to allow for continued co-creation.

3. **Program scaling must prioritize flexibility over fidelity.**

   When scaling focuses on the exact replication of a program curriculum rather than providing opportunities for adaptation and ownership, it can be challenging for local implementers to adapt it to their specific context. Instead, we must develop curricula and programs that can be easily adapted to serve local community needs and move away from one-size-fits-all formats.

   Instead of fully developed programs, we should consider providing program skeletons that local implementers can expand upon in your program design. Furthermore, program developers should be explicit about what is flexible and what is essential to implementing the program. Moreover, we need to empower implementers with the knowledge, skills, and confidence to make adaptations through capacity-building. Flexibility must also extend to how programs are funded, researched, and evaluated. Rigid funding structures and research and evaluation plans do not support equitable scaling as they tend to prioritize replication and less variability across sites.

4. **The field should broadly define scaling in informal STEM education and include many models and perspectives.**

   First, we must recognize that not everything should be scaled, even if the program is considered high-quality. We need to better understand the ideal conditions for scale to make better decisions about when scale is appropriate. Additionally, while there are ways to scale inequitably, there is more than one way to scale equitably. To show all of the possibilities, we need to make the ecosystem of scale more visible so that individuals and organizations can better understand their role within the collective.

5. **The informal STEM field should strive to share its failures, not just its successes.**

   Programs should be designed intentionally with ample opportunity for iteration and the expectation that failures, course corrections, and learnings will occur. Program developers can provide more examples of their failures, successes, and pathways forward to inspire implementers with the agency to develop solutions as they encounter challenges. This approach will also demonstrate transparency between the developers and implementers to encourage empowered decision-making. Reflecting on your failures and lessons learned as you develop and share your program ensures that implementers know it is appropriate to fail and an expected part of program success.

6. **We must create interventions to help people think differently about scaling and maintain the network formed by the conference to co-create conference products.**

   The field needs better tools to identify ideal conditions for scaling, and we need to create interventions that help people think differently about scaling. Tools should articulate principles of equitable scaling and serve as a guide for practitioners. The development and dissemination of conference products should model the co-created approach of the conference and feature multiple voices. Additionally, we can broaden who is part of the network by considering how these tools can be used outside ISE.

VII. Lessons Learned

The following lessons learned emerged across conference feedback:

- More time could have been spent on introductions to understand where conference participants exist within the scale ecosystem and their experiences with scaling informal STEM programs.

- The conference activities did not spend a lot of time defining terms. Follow-up activities may have to consider how to create a glossary with definitions that have shared consensus.
- The question of "*Why scale informal STEM education programs?*" remained salient throughout the conference and was never fully resolved. This may be an area that is addressed in the conference products.

VIII. Next Steps

1. Summarize the conference findings and disseminate them back to conference participants.
2. Develop conference products, which will include:
    a. A **white paper that describes essential elements for equitable scaling** and empowers individuals involved in informal STEM education to understand their role within the informal STEM system in relation to scale.
    b. A **self-assessment tool/planning checklist** to help individuals challenge and shape their practice and implement equitable approaches to scale from wherever they sit within the informal STEM education ecosystem.
    c. **Stories from individuals** within the informal STEM education ecosystem (via a series of blog posts) using the self-assessment tool to reflect on failures, successes, and pathways forward.
3. Collaboratively disseminate products via newsletters and a national webinar in May 2024.