Exploring the Relationship Between Continuous Improvement Culture and Afterschool STEM Program Quality

The role of afterschool programs in the science, technology, engineering, and mathematics (STEM) learning ecosystem has grown over the past two decades, which has led to increasing efforts to support and improve program quality. These efforts include developing STEM programs and curricula, creating standards for facilitating informal STEM learning experiences, building networks of support, and developing tools for assessment and evaluation. However, such efforts may have limited impact in terms of ongoing quality improvement. STEM curricula vary in disciplinary focus, quality and may not apply to local contexts and needs. Many afterschool programs resort to using simple STEM kits or online activities rather than rigorous curricula with support for educators. The project will study how the California Department of Education's (CDE) efforts to change organizational culture to support continuous quality improvement (CQI) have affected the offerings and quality of afterschool STEM in the state's more than 4,500 publicly funded afterschool sites. The EPISTEMIC project will contribute new research findings on how CQI can increase access to higher quality STEM learning opportunities for underserved youth. Even more important, the project will provide new insights on how organizational culture affects participation in and implementation of afterschool CQI.

The team will use an organizational theory framework and a mixed methods approach to conduct three research activities: (1) Describe the organizational context through interviews, participant observations, and artifact analysis to map and describe the overall support system as a context for understanding organizational culture change; (2) Describe change over time in organizational culture, CQI processes, and STEM program offerings and quality through surveys/interviews of afterschool youth, staff, directors, and grantee representatives; and (3) Generate explanations about the relationships between organizational culture, CQI, and STEM quality in different contexts through in depth case studies. Bringing organizational culture, CQI, and STEM offerings and quality into shared focus is the most important intellectual contribution of this work. Organizational theory's sensemaking concept will guide analyses to describe, exemplify, and generate theoretical explanations for patterns in organizational culture, CQI, and STEM program changes, with attention to relevant contextual factors.

Continuous quality improvement provides tools for afterschool STEM staff to identify needs and ways to improve. The EPISTEMIC study will contribute recommendations on the systemic, organizational, and cultural aspects of improvement strategies relevant to policymakers, funders, support providers, and afterschool organizations in California, as well as other state or nongovernmental support systems around the country. The study will also produce CQI guidelines for reflecting on and incorporating changes to organizational culture as part of CQI for afterschool staff and site directors. These will be helpful for practitioners around the country. The study's focus on three organizational contexts -- school district, national afterschool, and local afterschool -- will extend the relevance of the findings and recommendations, which will be disseminated through forums, workshops, and articles in practice and policy-oriented publications. The study will also benefit the research community by providing a framework and methods for studying organizational culture and CQI. The findings on the relationships between organizational culture, CQI, and STEM offerings and outcomes will provide a foundation for further research on how these relate to STEM learning outcomes for youth. EPISTEMIC is funded by the Advancing Informal STEM Learning (AISL) program, which seeks to advance new approaches to, and evidence-based understanding of, the design and development of STEM learning in informal environments. This includes providing multiple pathways for broadening access to and engagement in STEM learning experiences, advancing innovative research on and assessment of STEM learning in informal environments, and developing understandings of deeper learning by participants.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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