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**GOAL:** The purpose of this research is to advance theoretical and practical understanding of how participation in citizen science fosters and/or supports lifelong science learning. We are specifically examining the relationship between engagement, science learning, and science identity.

**DESCRIPTION:** Citizen science involves the public in authentic scientific research. Our current work uses mixed methods to study engagement, learning, and identity in adults participating in six citizen science projects representing a continuum of project types (contributory, collaborative, co-created).

### INSIGHTS – Dimensions of Engagement

- Participants in all projects **engage** in all aspects of science, regardless of type of project.
- **Motivations** include concern over environmental issues, desire to contribute, and interest in science and nature.
- Common **barriers** to participation include time, weather, health, and cost of resources.
- **Facilitators** that enhance project engagement include opportunities to expand participants' role or social network, a supported community of practice, and convenience.
- Some form of **experiential learning** was described by 83% of interviewees.
- *"I feel like I'm involved in something larger than just our site ... I feel connected to people that I haven't even met ... so that makes me feel part of a larger community of concerned people who are also trying to do everything they can, to not only promote this particular species, but getting outdoors and celebrating the natural world and learning as much as possible."* – (EELS, high engager)

**Mixed methods, longitudinal study:** Four in-depth qualitative interviews with project participants over 3-4 years (83 in Year 1, 71 in Year 2) across all engagement levels; quantitative survey of 1,000 participants using DEVISE scales for science and environmental learning outcomes; multivariate analyses.

### RQ1 Engagement

What are the dimensions of citizen science engagement and how can we measure them across different project types?

### Most Common Engagement Activities

- Collect data/samples
- Communicate about project
- Share findings with others
- Learn protocols
- Submit data
- Coordinate participant activities
- Explore data
- Recruit participants
- Attend meetings
- Train participants

### RQ2 Learning

Within and among projects, what is the relationship between engagement activities and individual learning outcomes?

6 Projects  
83 Interviewees  
140+ Interviews  
300+ Hours of conversation  
~ 1,000 Quantitative surveys

### RQ3 Science Identity

How does degree and quality of participation in scientific research develop and/or reinforce science identity?

### Science and Environmental Learning

- Self-efficacy toward science
- Self-efficacy toward the environment
- Science identity
- Science process skills
- Environmental stewardship behaviors
- Environmental identity

### INSIGHTS – Science Identity

- When asked explicitly whether they **saw themselves as contributing to science**, participants from all engagement levels used **hedging language**, but proportionally, **high engagers were more certain that they saw themselves as contributing to science** versus medium and low engagers.
- Key theme emerging from the data was **"seeing oneself as using science to effect positive change."** Most were **high engagers from co-created projects**.
- *"It's the training [in air-quality sampling] and insight that I've gotten from GCM that have ... prepared me to pursue this community monitoring project."* – (GCM, high engager)
- *"GCM gave me the opportunity to try to make changes into the community by taking and looking at the [air] samples, finding out exactly how these chemicals affect the body ... Science is what we need to do 'cause that's what governments look at otherwise, they're not gonna pay attention. But now we have that scientific data."* – (GCM, high engager)

**CHALLENGES:** Examining large, encompassing, and sometimes overlapping constructs such as identity, learning, and engagement!

**NEXT STEPS:** Conduct two more follow-up interviews; survey 1,000 participants, conduct multivariate analyses; triangulate between quantitative and qualitative data.

## PROJECT PARTNERS

Contributory (scientist driven)

Collaborative

Co-created (community driven)



Monarch Larva Monitoring Project



NestWatch



Community Collaborative Rain, Hail, and Snow



Hudson River Eel Project



Global Community Monitor



Alliance for Aquatic Resource Monitoring

### AUDIENCE

Our work helps citizen science practitioners and ISE researchers better understand the link between project activities, engagement, and science identity.

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