Curriculum + Community Enterprise for Restoration Science (CCERS): Partners Collaborate to Enhance STEM-C Education in New York City

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ABSTRACT

The CCERS partnership is a three-year education research project. Ten organizations are working together to develop a curriculum to enhance STEM education in public middle schools. The lessons engage students and teachers in long term restoration ecology and environmental monitoring projects in collaboration with peers, citizen scientists, STEM professionals, and community groups. The educational model is envisioned as a set of five programmatic pillars in which partners collaborate to create and implement complementary lessons, activities, and exhibits focused on restoration science.

PROJECT GOALS

- Increase quality and effectiveness of STEM-C teaching and learning
- Increase teacher's knowledge and instructional skill
- Increase student's knowledge of and interest in STEM

METHODOLOGY

- Twenty-one project leaders from the partner organizations were interviewed on their experience collaborating on this project at two different time points of the project.
- During Phase I, Summer 2015, 15 project leaders participated in interviews, and 21 project leaders participated during Winter 2015-16 in Phase II. Thirteen project leaders participated in both phases.
- Researchers used deductive reasoning to create an open and thematic coding scheme.
- Themes will continue to be explored across time through longitudinal qualitative interviews to investigate how partners experience, interpret, and respond to changes in their collaborations with others in the CCERS partnerships.

PILLARS’ CONTRIBUTIONS & PARTNERS’ COMMENTS

Pillar 1: Teacher Development

Teachers in fellowship with scientists and other experts develop and refine new curriculum. Promote active learning of STEM-C with Project-Based Learning (PBL) and Bybee’s SE educational model. Teachers collaborate with scientists to share ideas for incorporating restoration science into their lessons.

- What are teachers saying about the fellowship?
  - Teachers collaborate with scientists to share ideas for incorporating restoration science into their lessons.
  - Cohort 1 teachers mentor Cohort 2, and demonstrate ways they've implemented lessons and activities through microteaching sessions.

Pillar 2: Student Learning

Classroom lessons and field site visits incorporate restoration science in students’ local environments. Increase students’ STEM-C content knowledge through harbor restoration including monitoring activities.

- What did students say they learned on field trip?
  - For this project to be a success it has to continue to grow and reach more students in and outside of school... it has to be advertised. There has to be more funding... We want to make kids aware of how important it is to be science literate citizens.

Pillar 3: Digital Platform

A digital repository for materials and data to be shared, discussed, and reviewed by teachers, students, and citizen scientists. Measurements and observations uploaded from restoration stations can be compared across school sites and time points.

- “It’s a technical thing but it's an educational thing as well."
- “The aim is to develop a digital platform that is student-based for science, technology, and computer education... to be used across all five settings of the project to enhance their use of technology, as well as the facilitation of the project in general."

Pillar 4: Afterschool Mentoring

Scientists and youth development experts collaborate on new STEM-C curriculum for out-of-school settings with few provided resources: Enhance student knowledge of restoration science by expanding learning time and engagement opportunities.

- “Our long-term vision is to create a curriculum that can be scaled up in any afterschool program to get kids excited and interested...”
- “Our challenge is to really try to replicate the skills that the kids would learn [through] nifty gadgets and web pieces without those resources. We’re creating something for a really ultra-low resource setting.”

Pillar 5 Community Exhibits

Interactive exhibits on biodiversity, restoration efforts, and the history and importance of oysters in New York Harbor focus on the services they provide throughout ecosystem, and promote students’ inquiry and increase connections between schools and cultural institutions.

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Principal Investigator: Lauren Birney, EdD

Co-Principal Investigators: Meghan Groome, PhD; Jonathan Hill, MBA, DPS; Robert Newton, PhD; & Nancy Wood

Researchers: Erica Watson-Currie, PhD; Michelle Maline, M.A.; & Joshua Penman, M.A.

Evaluators: Gaylen Moore & Alexis Nicolas