Statewide Census of Environmental Learning in Maine

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Maine Mathematics and Science Alliance

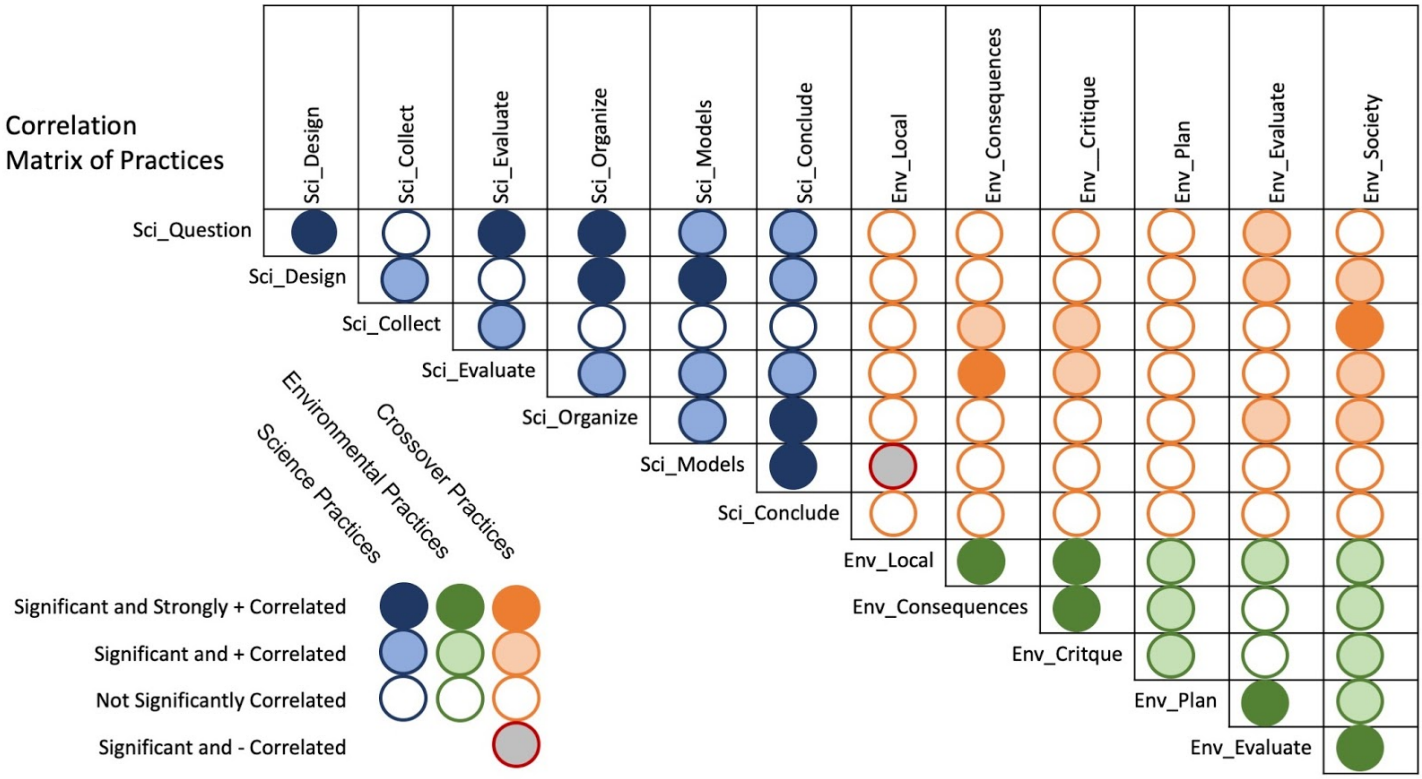
Examining 'High-Mastery' Projects: Bridging Science and Environmental Action Practices

Rationale and Methodology

Relationships between practices were analyzed by conducting a series of correlational models to determine the strength of associations between the thirteen Science Inquiry and Environmental Action practices the projects. These correlation models were run for each of the cluster groupings separately (Emerging, Progressing, and High-Mastery) in order to capture some of the nuanced patterns in the way each of these groups incorporated these practices.

We broke these correlational models down into three zones:
1) Associations between the science practices and themselves in a project
2) Associations between the environmental actions and themselves in a project
3) Crossover associations between a science practice and an environmental action.

The correlation matrix below is only for the High-Mastery grouping. Our initial run of correlations for the other groupings (Emerging and Progressing; even the sub-progressing groups) produced no significant correlations in the Crossover practices zone. By analyzing the correlations in the High-Mastery grouping we were able to better understand how these crossover associations might be more effectively incorporated into projects to bridge science inquiry and environmental action practices. These insights allow us a unique insight into designing more impactful professional development opportunities around key project design elements.



Elmina B. Sewall FOUNDATION
MMSA Maine Mathematics and Science Alliance
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Introduction

The *Census of Community-Based Environmental Learning in Maine* allowed us to gain a baseline understanding of the strengths and weaknesses in the field and how to build capacity to equitably meet the needs of learners today and tomorrow.

What is Community-Based Environmental Learning?

- Any educational initiative, occurring in **either formal school settings or out-of-school settings**, that works to **educate youth about their environment while connecting them to their communities.**
- Projects do not always need to take place outdoors, but they do need to connect to locally relevant content.
- Many terms for this type of learning including "Nature-Based Education," "Environmental Education," and "Place-Based Education."

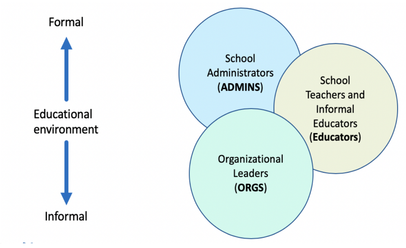
Goals of the Census Initiative

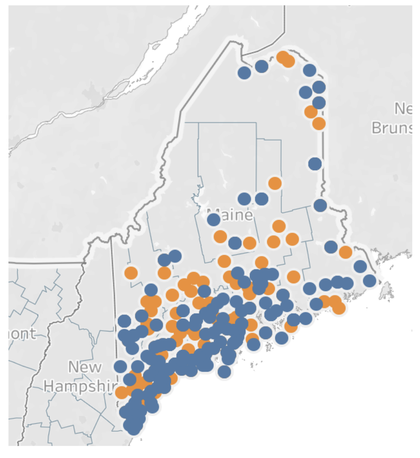
- Describe challenges/barriers to implementing CBEL and identify creative solutions
- Identify any inequities in access to CBEL programs
- Provide opportunities for improvement in practice
- Determine professional development needs of the field
- Celebrate the successes, creativity, and innovation in the field across in-school and out-of-school

Methodology

Sample

Our sample includes responses from **479 individuals** from **434 schools and organizations** who contributed **405 projects.** Responses came from all 16 Maine counties





These responses represented:

- 28% of schools
- 30% of libraries
- 40% of land trusts
- 28% of registered camps

Along with numerous nonprofit organizations, science centers, government agencies, and college/university programs.

CENSUS TIMELINE

The Census of Community-Based Environmental Learning engaged a stakeholder advisory group of leaders in EE in Maine throughout the entire process.

AUGUST 2018
Recruited **stakeholder advisory group** of leaders in the field of EE. Identified other survey instruments and intiatives.

SEPTEMBER 2018
Defined **Community-Based Environmental Learning** and drafted **survey items**. Developed **contact lists** and marketing strategy.

OCTOBER 2018
Finalized **survey items** and produced **short video** to market the initiative.

NOVEMBER 2018
Survey deployed on November 9, 2018. Marketed the survey through mass email blasts, personalized individual emails, social media marketing, newsletter announcements, listserv posts, attending network meetings, and personal communications

FEBRUARY 2019
Survey closed on February 28, 2019. **Initial results** presented to advisory group and discussed.

MARCH 2019
First annual Maine Environmental Education Association **Research Symposium** on March 14, 2019 where initial results were presented and discussed.

MAY 2019
Case Study candidates selected by advisory group to be featured in exemplar reports for the field.

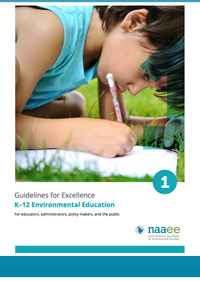
JUNE 2019
Case Study interviews and program observations conducted. **Full analysis** of survey dataset.

AUGUST 2019
Final report drafted.

Best Practices in CBEL Projects

We drew on the North American Association for Environmental Education's *Guidelines for Excellence in K-12 Environmental Education:*

Strand 1: Questioning, Analysis, and Interpretation Skills
Strand 3: Skills for Understanding and Addressing.



Results

Main Finding: Clusters of projects emerge that incorporate EE best practices in a similar way.

There emerged very distinct differences in the extent that various types of projects incorporated practices in their work--some were obviously just beginning in their projects, others focused more on science than the environmental actions, and still others were bridging the science and environmental practices in interesting and productive ways.

Emerging CBEL Projects

- Incorporate **practices** at a low level, many struggle to know what the practices were and were unable to answer the question
- Only 25% **provided by schools** (40% of the schools **maintain CBEL as a goal**)
- Lowest level of **NGSS alignment** (26%), 60% didn't know if their projects were aligned to NGSS
- Lowest levels of **evaluation**
- Lowest levels of **partnerships** (1.54/3)

Progressing CBEL Projects

- More fully incorporating the **practices** but may struggle to bridge the gap between SI and EA.

Subgroups:

Environmental-Action Focused Projects

- incorporate many more of the **EA practices** but incorporate science practices at a lower level (beyond questioning)
- 33% of projects **provided by schools** (about 75% maintain **CBEL as a goal**)
- 47% **aligned with NGSS** standards (less focused on science practices)
- Still struggle with **evaluation** and are more likely to do qualitative and reflection-based assessments
- More **partnerships** than emerging group (1.84/3)

Science-Inquiry Focused Projects

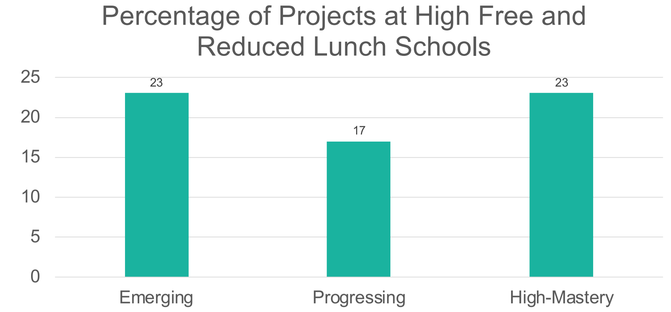
- Incorporate **science practices** at a very high level but struggle to link with EA
- 52% of projects **provided by schools** (about 50% maintain **CBEL as a goal**)
- 71% **aligned with NGSS** (may be related to greater focus on sci practices)
- More effectively **evaluating** impacts and more likely to use research-grounded pre-post surveys
- More **partnerships** than emerging group (1.84/3)

High-Mastery CBEL Projects

- Higher levels of **practice** incorporation across all of the science and environmental action practices (average between moderate and great extent of incorporation)
- 61% of projects **provided by schools** (91% maintain CBEL as a goal)
- 81% **aligned with NGSS**
- Greatest **evaluation** of impacts
- Most **partnerships** of all the groups (2.14/3)

Main Finding: Successful projects are not necessarily the best funded or at the more resourced school systems.

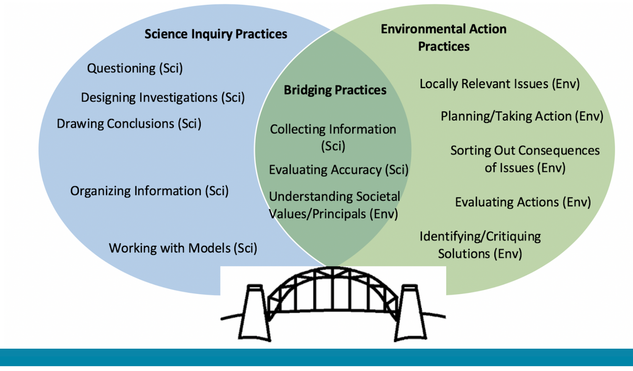
When looking at just school projects, schools providing High-Mastery projects had about the same Free and Reduced Lunch eligibility as the other groups. Thus, these projects are not just happening at more resourced schools.



Main Finding: High-mastery project patterns can inform "crossover practices" that bridge science inquiry and environmental action practices.

The strongest bridging practices were:

- **Collecting Information** (Science Inquiry)
- **Evaluating Accuracy and Reliability** (Science Inquiry)
- **Understanding Societal Values and Principals** (Environmental Action).



Conclusion and Recommendations

Recommendation #1: Generate targeted opportunities for project advancement by scaffolding best practices.

1. Science Inquiry- Begin with **questioning, collecting information, and drawing conclusions**.
2. Environmental action- Begin with **connecting to locally relevant issues, sorting out the consequences of issues, and understanding societal values and principals**.
3. Utilize **"Crossover" practices** that bridge SI and EA practices: **Collecting information, Evaluating Accuracy and Reliability, Understanding Societal Values/Principles**

Recommendation #2: Emphasize the patterns of high-mastery projects in supporting CBEL across all groups:

1. Build partnerships: High-mastery projects have the most partnerships, compared to progressing and emerging groups.

Offer training on strategies to build and sustain partnerships

2. Build leadership around CBEL as a goal (for schools): High-mastery school projects (91%) had CBEL defined as a goal at their school compared to 40% for emerging project schools.

Incorporate administrators into conversations about a school-wide vision for CBEL which may be a key pathway to advance projects.

3. Integrate *Next Generation Science Standards* (for orgs): Alignment with the *NGSS* occurred in 81% of high-mastery projects compared to 26% of emerging projects.

Organizations could benefit from alignment and thinking about the practices in new and innovative ways.

4. Develop methods for evaluation of CBEL projects: Evaluation/assessment of objectives is a characteristic of high-mastery projects.

Support training on how to evaluate and assess impacts of CBEL projects and how to incorporate feedback into revising project design.

Acknowledgements

Thanks to the Elmina B. Sewall Foundation for generously funding this project and to our stakeholder advisory group for providing knowledge and expertise from across the CBEL sector in Maine.