Examining Community-Based Approaches to Decolonizing Environmental Science Education

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Abstract: Decolonizing science education takes many forms. One important facet of this work is connecting school-based projects to meaningful community engagement. A subset of science education that occurs in community context is environmental education. Engagement and diversity in environmental education are important initiatives. However, this field has low levels of diversity in its staffing now and historically. This paper examines strategies to develop justice, equity, and inclusion work in this area through professional development. Emerging literature offers practical and applicable strategies for improving inclusion and diversity work in environmental education. Periodic evaluation of the field indicates where challenges remain in employee professional development and adult education. Lastly, a specific example of this type of work provides a case study of how the community plays an important role in environmental education.

Keywords: environmental justice, community-based science, professional development

Environmental science education—particularly *informal* environmental science education—occurs in and outside of schools. Some examples are community-based environmental programs, such as clubs or nonprofit environmental organizations, while other examples include specific places or facilities, such as nature centers and parks, that focus on this work and bring students to these sites for place-based environmental science education. In either case, community-based approaches to environmental science education are increasingly focused on justice, equity, diversity, and inclusion initiatives to serve the mission of the organization and the communities in which they are situated. In some cases, this is impacting the focus or the mission of the organization itself. Programmatic growth and staff training remain two areas of focus in these organizations. Staff training and continuing education are needed to address this need, which is frequently addressed through employer sponsored professional development. This article examines a broad reach of programming efforts and innovations, a structured assessment of this work, and a case study of putting theory to action.

Background

Program examples and success stories abound in this work. One such example was compiled in 2022, when *CLEARING Magazine* published a special issue focused on justice, equity, diversity and inclusion in environmental education. *CLEARING Magazine* is intended for educators, managers and practitioners in environmental education. Many ideas, best practices and professional development resources are shared in this publication. In the process of compiling these articles, many themes and innovations in approaches to implementing diversity programs were identified. These represent programming across many ages, geographies and topics. Arias

& Drossman (2022) provide examples of how long term, field based immersive college projects can improve dialogue and engagement for students. Matsaw, et al. also explored long format immersive experiences on the land, reconnecting ancestral lands with youth today (Matsaw, J., Matsaw, S. & Miller, B. 2022). Land acknowledgements are increasingly used in organizations, talks and in education. Finding and sharing tools to support educators is critical to helping delivery in the classroom to be accessible and meaningful (Crowley-Thomas 2022). Foreman, et al poise important reflections on how we provide moving through and out of the pandemic-

> What if we returned from this pandemic with a deep and profound commitment to a new way of being? What would it look like if, instead of this crisis making our work towards equity slower and less important, it became an opportunity for the field to work towards equity faster and make that work a higher priority (Foreman, J., Payan, R., Rodriguez, L., & Strang, C. 2022)?

These examples from the special issue provide inspiration for the work need to be done in JEDI, as well as example rationale and methodology for applying approaches to other staff training projects.

Approach

Grant funding from the Mellon Foundation supported research staff to conduct a survey of the field of environmental science education, diversity initiatives therein, and professional development need for adult employees in these careers. Looking at a specific sample of informal educators in environmental science provided insight into were the field currently is on this issue, where gaps may lay, and what next steps may be. In 2015 a version of this study went out across the state of Wisconsin to gauge many aspects of training and professional development in this field, the results of which where published in 2017 (Hougham, R. J., Kerlin, S., Liddicoat, K., Ellis, K., & Crampe, E., 2017). In 2019 a version of this study was published that identified that half (50%) of organizations dedicated time to justice, equity, diversity and inclusion work while at the same time the majority claimed it was an organizational priority (Hougham, R. J., Herde, I., Zocher, J., Morgan, T., & Olsen, S. (2021). Further, in this version of the study recognized that opportunity to address the persistent science, technology, engineering and mathematics (STEM) achievement gap in Wisconsin could, in part, be met by strengthening the training the environmental science educators received as it pertains to justice, equity, diversity and inclusion. Essentially, environmental education can be a venue to strengthen the formal STEM field in addressing the achievement gap. In the most recent version of this report it is clear that an important, initial matter is to delineate and address the gap being diversity, equity and inclusion efforts that are tolerance minded and those that can have inclusion as a lasting outcome (Hougham, R., Bauer, J., & Burgess, S. 2022).

Best Practices

As a specific case study, Science Strikes Back provides an example of community engagement to adult learners as well as professional development for environmental educators whose organizations are committing to strengthening their diversity, equity and inclusion work. Science Strikes Back is a community science fair, whose mission is to encourage community members in Milwaukee to critically analyze environmental issues and solve problems in their communities.

Through the development of collaborative relationships between students, educators, and content specialists from locally based organizations, Science Strikes Back supports a strong network in Milwaukee for continued environmental education and natural resource stewardship. Science Strikes Back categories include a wide array of STEM topics and emphasize collaboration and community voice in the project process. Science strikes back approach includes pre-event programing that facilitates project refinement. Pre-event efforts also include professional development that includes teachers, informal educators and volunteers. The day of the event, peer judging uses a rubric to score each project. Science strikes back was started in 2017 and has evolved over that time to include a more focused lens on social justice and youth voice. Barriers to overcome in a model such as this include integration or coordination with in-classroom expectations (Zocher & Hougham 2020). This event brings kids together from an array of different schools, from different parts of Milwaukee and it lets them see what other people are working on. We see a variety of ages and we see people from all over the city come to this event. They are from schools, homeschool networks, different universities, different businesses, different nonprofits. A science fair like this is important for the kids and parents because it shows them what our environment would look like in the future or what it looks like now. Community based science is one of the approaches we use to reframe who does science and what do we do science for. By situating it in the context of a community, we hope that it broadens the imagination around who participates in solutions and asking questions in their own hometown or neighborhood. Science Strikes Back is relatively unique, here in Milwaukee. It really excites a lot of new partnerships and new relationships between youth and schools, and schools and their community. Here in Milwaukee, looking at the quality and condition of the three rivers, or looking at the great lake are all venues for the questions that we are asking and the types of actions and activities students apply their skills to. We hope by continuing to support this event, we have a venue that increases Great Lakes water literacy for our students and schools that participate but for the community at large, as well. Integral to that potential is continuing training, education and professional development that supports staff to thoughtfully engage this work.

Discussion

The context for change is an important consideration when engaging this work. Beyond a literature review and assessment, as was done in this example, it is important to appreciate the local context for science education. The community context found in our example of Science Strikes Back is novel and is evolving. We have new relationships every year to bring in and learn from.

As scientists may shift in thinking how to teach science, we will certainly have to address anti-racist methods of teaching and of the scientific practice in general. In a recent article published in Nature, the author begins to unpack the methods for science teaching that will create more impact for students "*...teachers should facilitate "learning to think in a different way, and there's real expertise in how to guide people to do that". Many education experts promote active-learning techniques, such as getting students to work together to solve problems." (Dance, 2023).* Dance (2023) continues in suggesting that

A small but growing number of scientific faculty members are focusing on the science of teaching. They often transition to education research from a scientific discipline after becoming interested in improving their own classrooms. Although education research is sometimes perceived as low status by department heads, it can yield papers, grants and public impact, just like other disciplines — and it helps universities to adopt science-based teaching methods. (p. 204)

While many universities seek and claim to be diversifying the STEM field, teaching in this way is not a matter of recruitment but truly changing our practices in community-based science reaching the classroom- and vice versa.

Acknowledgement

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