

EMPOWER: Enacting Materials to Promote Ownership, Engagement, and Relevance

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Abstract: Fostering locally relevant and community-centered forms of science learning that develop students' critical science agency problematizes a "one-size-fits-all" model of teacher learning; teachers must examine how community needs and resources, local inequities and justice issues, and curriculum materials can converge to design novel learning opportunities for science learners. This paper presents the core commitments of EMPOWER, a cross-institutional effort that aims to support teachers' sensemaking and adaptations of curriculum materials to promote student ownership, engagement, and relevance at multiple sites across the U.S.

Guiding principles of EMPOWER

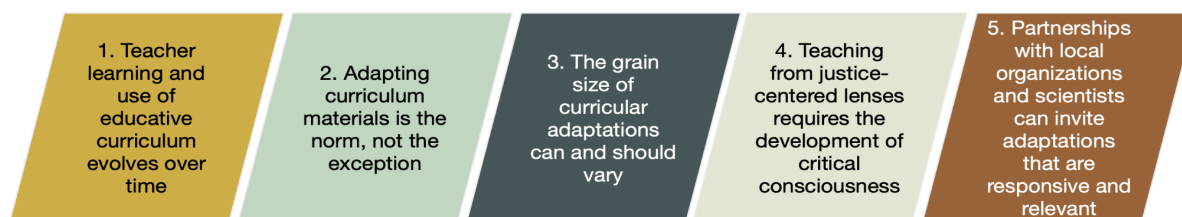
The EMPOWER (Enacting Materials to Promote OWnership, Engagement and Relevance) project aims to support curricular adaptations that support students' critical science agency: The understanding of and desire to transform oppressive power structures by exploring how scientific knowledge impacts communities and the natural world with an emphasis on ethical and moral decision-making (Basu, 2008; Learning in Places Collaborative, 2022). Cultivating locally relevant and community-centered forms of science learning that develop students' critical science agency problematizes a "one size fits all" model of teacher learning: Teachers must examine how community resources, local inequities and justice issues, and the curriculum materials converge to create learning opportunities for science learners. Such examinations involve grappling with the tensions inherent to NGSS-aligned pedagogies, building on students' and community resources, and challenging inequities and oppressive systems (Morales-Doyle, 2019; Rosebery et al., 2016). EMPOWER views teaching and learning as a contextualized and dynamic endeavor that requires careful adaptations of curriculum materials in ways that 1) attend to the design principles of the materials and 2) are responsive to their students and teaching contexts (Philip, 2019).

Commitments of EMPOWER

The EMPOWER project acknowledges the expertise that teachers draw on and the ongoing support they need to adapt educative curriculum materials (Davis & Krajcik, 2005) in a range of meaningful ways (Ko & Krist, 2019). Beyond familiarity with curriculum materials, we also seek to foster teachers' critical consciousness, so that they can evaluate the knowledge(s) represented in their curriculum, their positionalities in schools, and the histories and contributions of marginalized groups in the community. We partner with local organizations and scientists to understand what matters to students, their families, and their communities, and how that knowledge can be connected to (or problematize) the kinds of phenomena that are centered in NGSS curricula. Our five commitments (Figure 1) inform how we work with teachers, community partners, and researchers.

Figure 1

5 Core Commitments of the EMPOWER Project



Professional learning model and project structure

In our first year as EMPOWER, we focused our efforts on the first three EMPOWER commitments (Figure 1). The general structure of the professional learning sequence for Year 1 involved a week-long summer workshop followed by monthly academic year meetings. During the Year 1 summer workshop, teachers explored and refined their definitions of agency; they discussed how modifications opened opportunities for redistributing agency; and they worked in grade and/or content area groups to adapt lessons they planned to enact in the subsequent school year. Given these variations in school and district contexts, we varied the common activities while maintaining alignment with our core professional learning features. The focus of the academic year meetings has been to share successes and problems of practice that emerge from applying new NGSS-aligned pedagogies and/or adapted materials. The Year 2 focus (and beyond) will be to deepen links between shared understandings of agency, ownership, justice, and relevance, community-based phenomena, systemic underpinnings of those phenomena, and how science content is involved in making sense of and taking action. In Year 3, we will document and develop case studies showcasing teachers' curricular adaptations and illustrating trajectories of teacher learning. As we are implementing a similar (but deeply contextualized) program across sites, we are working to articulate a model of teacher professional learning (PL) that outlines "core" features of the EMPOWER program as well as how these features are instantiated differently across sites, based on their needs, experiences, curriculum materials and a district's history and commitment to NGSS-aligned instruction. So far, four features have characterized our Year 1 work with teachers: 1) surfacing current strategies and practices teachers already use to adapt curriculum for student relevance; 2) reflecting on student's experiences with NGSS-aligned curricula; 3) challenging deficit narratives of students through pedagogies of care; 4) introducing tools for attending to students' learning and experiences.

Conclusion: Tensions and wonderings for EMPOWER's future work

We are continuing to engage with teachers over the academic year and analyzing summer workshop data. As we look to Year 2, we are grappling with how to introduce commitments 4 and 5 in our work (see Figure 1). We anticipate this will involve engaging with community-based organizations (CBOs) and scientists, and deep analysis of community needs and local inequities to understand impacts on students. Our consideration of and plans to move towards these goals has raised questions for us, such as: "To what extent are certain pedagogical practices (NGSS-aligned or otherwise) a necessary precondition for enacting science instruction that promotes students' critical epistemic agency, or can such a focus be a starting point instead?" and "What kind of work do we need to engage teachers in to be able to make and enact these adaptations?" We recognize how engaging in this next phase requires attention to power dynamics at play within our research teams and in our collaborations with teachers. In other words we are paying careful attention to what we can learn as partners in this work.

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