

Research Articles and Essays**Going Beyond the Classroom: Service-learning to Apply STEM Skills in the Community**

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Abstract

Our current ways of teaching and learning STEM have forgotten indigenous methods of learning and knowing about our world around us, leaving Native Hawaiian students feeling disconnected to the learning in the classroom. The wealth of knowledge that once upon a time their ancestors shared are no longer cherished. This disconnect has created a gap in the number of students pursuing STEM fields.

Keywords: culturally responsive education, service learning, indigenous, STEM

Our current ways of teaching and learning STEM have forgotten indigenous methods of learning and knowing about our world around us, leaving Native Hawaiian students feeling disconnected to the learning in the classroom. The wealth of knowledge that once upon a time their ancestors shared are no longer cherished. This disconnect has created a gap in the number of students pursuing STEM fields.

The U.S. Bureau of Labor Statistics (2019) and The Condition of STEM 2016 (ACT, 2016) show that Native Hawaiians and other indigenous groups are significantly underrepresented in STEM fields. STEM fields often require specialized skills and a

minimum of postsecondary education, but not enough students are also completing postsecondary degrees to fill the STEM job positions. A study conducted by Crouse, Harmston, and Radunzel (2016) showed that students who have expressed and measured STEM interest were more likely to graduate with a STEM major than those students who only expressed interest or only measured STEM interest.

Thus, there is a need to intentionally increase students' interest and readiness from early years and provide a supportive environment for talent growth as attitudes towards STEM developed in these formative years along are the foundation of a child's attitudes and motivation towards learning STEM for any future experiences they have with STEM (Garriott et al. 2014; Rice et al., 2013; Wang & Degol, 2013). Studies have shown that students benefit when programs bridge the gap between home and school by providing resources and opportunities for parents to participate in STEM-related assignments, activities, or events (Bottoms et al., 2017; Galindo & Sheldon, 2012; Mantzicopoulos, Patrick, & Samarapungavan, 2013).

To provide intentional opportunities for Native Hawaiians students to thrive in STEM, we developed the Ka Pilina No'eau (KPN) math and science learning (MSL) model for K-5th graders. In the model, we use Native Hawaiian and local cultural context to teach Native Hawaiian students and other local students STEM knowledge and skills. The model helps the students, as well as their parents, learn STEM concepts through culture and make *Pilina* (connection) to daily living.

One part of the MSL model is going beyond the classroom to apply their STEM skills through a one-day service-learning. Service learning can be defined as learning through participation in activities that address community needs (Brown & Howard, 2005). In our project, we view service-learning activities as: (1) showcasing Native Hawaiians applying

STEM in culturally relevant ways in modern settings; (2) cementing knowledge gained in the classroom through hands-on activities; and (3) experiencing the importance of giving back to the community.

As much as possible, we partner with organizations that can embrace traditional Native Hawaiian practices and Native Hawaiian knowledge of place. In addition, we work with and feature Native Hawaiian practitioners who can speak as to how STEM is used in their jobs.

Over a year and half of MSL model implementation, four different service-learning activities were implemented. In these service-learning activities, students and their parents learned (1) *mo'olelo* (story); (2) how *mo'olelo* explain geological features and phenomena; (3) how to use STEM to care for these places; (4) what indigenous methods were used to care for the land and resources; and (5) how communities benefit from people giving back to them. These community-based activities further cement the language and *mo'olelo* that were introduced and taught in our classes. Through these service learning, second and third graders felt more connected with Hawaiian culture and demonstrated a stronger sense of belonging and place. Fourth and fifth graders also demonstrated stronger connectedness with Hawaiian culture, making statements such as: "I understand the Hawaiian ways of understanding the world," "I know what I do affects people around me."

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