Transforming Teaching at the Intersection of Hawaiian Places, Practices, Values, and Language

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Exploring Ways to Transform Teaching Practices to Increase Native Hawaiian Students' Interest in STEM

**Research Question:**
Will transforming STEM Instruction to intersect with Hawaiian culture and language in ahupuaʻa where students live and teachers work increase Native Hawaiian students’ interest, engagement, and learning in STEM (Science, Technology, Engineering, Math)?

Illustration courtesy of Kamehameha Schools.
Teacher Expertise/Agency: Ability to Intersect Knowledge Domains

Teachers develop & intersect place knowledge in three domains (Sewell, 1992):

• Hawaiian Science
• Place/partners
• Hawaiian culture & language.

Figure 1. P Chinn
Why are culture and language important?

Culturally developed knowledge and skills are essential for functioning and well-being (Moll, et al 1992).

Metaphors: shared understandings (norms) guide everyday life and intersect cultural structures (Lakoff & Johnson, 2003):

Contemporary metaphor:

“The ocean is your refrigerator.”

Lani Alo-Chu: “He pūkoʻa kani ʻāina, A coral reef that grows into an island” (Pukui, 1983). P. Chinn
Hawaiian Culture: Sustainable Ecosystems

Hawaiian sense of place and health/well-being (Oneha 2001, Maly 2001):

• Traditional ecological knowledge
• Subsistence lifestyle
• Deep place-based knowledge
• Place-based identity.

Metaphors & sayings (Pukui, 1983):

Land-sea-sky-season-culture:

• When the wiliwili blooms, the sharks bite. *Pua ka wiliwili nanahu ka manō.

Values oriented to sustainability:

• The land is a chief, man is the servant, *He aliʻi ka ʻāina; he kauā ke kanaka.*
Why is **knowledge of place** important?

Each *ahupua‘a* is unique. Hawaiian culture rooted in land (Maly, 2001):

- Cultural attachment: identity, sense of place depends on well-being of whole entity.
- Place-based identity: “*He kalo kanu o ka ʻāina, A taro planted on the land.*”
- Natural cycles in *ahupua‘a* foundation of family, social, political, religious structure.

*Lo‘i kalo* (Taro pond fields) Ka‘ala Cultural Center, a community partner.
Why is Place-based STEM important?

Experiential knowledge is foundation:

- for teaching science, technology, engineering, math;
- for place, problem and project-based learning;

Limahuli Ahupuaʻa, National Tropical Botanical Garden, Kauaʻi. Photo: P. Chinn
Aligning Assessment with Policies

1. **NGSS disciplinary core ideas** should “relate to interests and life experiences of students or...societal or personal concerns that require scientific or technological knowledge” ([www.nextgenscience.org/three-dimensions](http://www.nextgenscience.org/three-dimensions))

2. **Nā Hopena Aʻo** General Learner Outcomes: belonging, responsibility, excellence, aloha, total wellbeing and Hawaiʻi (HIDOE, 2015).

3. **ESSA 2015** (Every Student Succeeds Act): “[Work] closely with stakeholders to choose evidence-based interventions that are tailored to local needs” (p.1, ESSA, n.d.).
**Findings:** Intersecting place, Hawaiian culture, and STEM

1. Supports teacher agency and expertise,
2. Engages teachers and students,
4. Develops new science knowledge,
5. Increases students’ STEM interests,
6. Supports curricular integration,
7. Encourages community partnerships,
8. Supports equity in science education,
9. Yields positive academic and Nā Hopena A’o outcomes.

Photo: Art and ocean acidification, Jackie Camit, P. Chinn.
Place-based science orients teaching to “the process of learning... linked to changing the root causes of environmental destruction or damage” (pp. 170-171, Hall, 2004).

Photo: Teachers restore lo‘i kalo in Waipiʻo Valley, Hawaiʻi, P. Chinn
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Selected References


Tuition-free: NSF EDCS 640 Place-based STEM starts Sat., Aug. 19, 2017

Focus: Waiʻanae and Ala Wai Watersheds

Interested?
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