LAND/WATER BASED TEACHING AND LEARNING: SCIENCE/ENVIRONMENTAL EDUCATION FOR JUST, SUSTAINABLE, AND CULTURALLY THRIVING COMMUNITIES

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Paintings by Carl Ray
GOALS FOR TODAY

• 1) Share some theoretical principles, framing ideas, and research to consider and continue to grapple with

• 2) Share some ideas about designing learning environments
  • Going to talk about Native youth specifically but largely applicable to good teaching and learning for all youth.

• 3) Share some pedagogical practices

• 4) Try and answer questions
Identity, Learning and Development are cultural processes.

21st century challenges demand increased abilities to reason and make decisions about socio-ecological issues and systems.

Need to uphold, re-design, and imagine anew ethical and healthful nature-culture (human) relations.

Learning environments reflect and facilitate specific nature-culture relations that shape learning and identity.
KNOWLEDGE AND KNOWING ISN’T NEUTRAL: CULTURE, HISTORY AND POWER ALWAYS INTERACTING

- **Decolonial and anti-racist education:** Refusing Indigenous erasure and deficit models through “presencing” Native peoples.
  - Refusing settler enclosure and inevitability (See Decolonization is not a Metaphor, Tuck & Yang, 2012)

- **Indigenous resurgence:** Teaching and learning that emerges from and contributes to Native youth, families, and communities thriving.
  - Also contributes to all youth and communities thriving.
KNOWLEDGE CLAIMS
SHAPE SOCIO-POLITICAL POSSIBILITIES
AND DECISION MAKING

The New Zealand Herald
Agreement entitles Whanganui River to legal identity
By Kate Shuttleworth  5:56 PM Thursday Aug 30, 2012

The Seattle Times
The National Energy Board acknowledges that the pipeline expansion would be detrimental to the environment, but beneficial to Canadian national interest.

Lake Erie just won the same legal rights as people
Ohio voters passed groundbreaking legislation that allows citizens to sue on behalf of the lake when it’s being polluted.
By Sigal Samuel | Updated Feb 26, 2019, 11:00pm EST

“Different orientations towards time and space, different positionings within time and space, and different systems of language for making space and time ‘real’ underpin notions of past and present, of place, and of relationships to the land…” (Smith, 2012)

In dominant Cartesian & colonial logics, humans are positioned as “standing over and against our surroundings as uninvolved or disengaged observers of them. (Shotter, 2006, p. 588)

The foundations of human entitlement and extraction.
EDUCATION SYSTEMICALLY ERASES NATIVE PEOPLE

- 87% of standards in the US dictate the teaching of Indigenous peoples in the context of pre-1900 U.S. history and tend to emphasize conquest narratives (Shear et al. 2015).
- Cultural inclusion often fails to recognize Indigenous knowledges – focus on narrow views of culture.
- No recognition of Native diaspora.
- Denial of ontological and rhetorical presence (e.g. Lyons, 2000)

The deeply rooted processes of settler colonialism physically alter the landscape and its organising structures to secure settlers’ futures, and simultaneously try to erase Indigenous presence. These processes ensure the collective capacity of the settlers while disrupting and eventually eliminating the collective continuance of Indigenous people. One outcome of this disruption is a dramatic increase in Indigenous suicide. (Elliot, 2016; Elliot, Forthcoming)
ALL TEACHING AND LEARNING IS POLITICAL & ETHICAL

The design of learning environments is a powered and creative process of deciding what and how (onto-epistemologies) children can/should engage in and develop and what values/ethics (axiological) horizons and social futures (e.g. Deloria, 1978; Vizenor, 2004; Tuck & Yang, 2012; Engestrom, 2011; Lee, 2008 Espinoza, 2008; Nasir; 2011) are made possible. That is deciding what matters and to whom (Gutiérrez & Jurrow, 2016; Jurrow & Shea, 2015).

- What should students learn?
- Why should they learn it?
- How should they learn it?
- Where should they learn it?
- Who should teach it?
- Who should students be and become?
SOME KEY REFLECTIVE QUESTIONS & RECOMMENDATIONS

• How are you explicitly designing for dimensions of race, culture, and power in your learning environments?
• What stories and narratives of land/water are you teaching?
• How are Indigenous peoples and expertise part represented and narrated in your work?

Some things to try:
• Educate yourself and your networks about settler-colonialism and commit to upholding tribal sovereignty.
• Refuse invisibility and erasure by meaningfully engaging Indigenous presence. Some examples:
  • Always recognize whose territories you are on and do it in meaningful ways (see AERA recommendations)
  • Refuse historicized narratives of Indigenous people or “non-modern” characterizations.
  • Form partnerships with tribal communities
SO... EVEN IF YOU’RE GOOD ON THESE DIMENSIONS...

WHAT ARE LEARNERS EXPERIENCING IN THE WORLD THAT AS EDUCATORS WE ARE ETHICALLY RESPONSIBLE FOR?
IMAGINE A SCIENTIST.

Think of:

• 3 words that describe that scientist.
• 3 words that describe what that scientist does.
• 3 interactions that you have had with that scientist.
MOST PEOPLE (TRUE GLOBALLY) HAVE THIS IMAGE ASSOCIATED WITH SCIENCE.

- Children (and adults) largely see scientists as white men, with facial hair, lab coats, glasses, tools (beakers/microscopes), books, etc.
- Children largely have stereotypical or inaccurate images of what scientists do.
- Images of scientists and storylines about scientist are correlated with interest and achievement over time.

(e.g. Chambers, 1983; Sumrall, 1991, Finson, 2002)
CRITICAL NEED TO CHANGE NARRATIVES (and thus students’ perceptions of) OF:

- KNOWLEDGE GENOLOGIES,
- WHO SCIENTISTS ARE/CAN BE,
- WHY THEY ARE SCIENTISTS,
- WHAT SCIENTISTS DO.

By middle school students have “disciplinary identities” and conceptions of the nature of science that often are defined by western ways of knowing, whiteness, and maleness.
SETTLER-COLONIALISM IN SCIENCE (ENVIRONMENTAL?) EDUCATION

• Establishes western epistemologies as normative power (Mignolino, 2006) with specific constructions of human-nature relations.
• Engages in determining what’s counts or doesn’t count as scientific (circles of inclusion and exclusion).
• Often times science education isn’t even aligned with edges of western science.
• Nature and culture are separate realms - humans are distanced or apart from the world (including other life forms)
• Nature is a commodity or resources for human entitled to domination (anthropocentrism)
• For Native youth, learning environments have typically engaged in epistemic (Marker, 2006) as well as ontological violence. A key site of the erasure of Indigenous Knowledge Systems.
WHAT WOULD IT TAKE FOR THESE IMAGES TO BE WHAT WE ALL IMAGINED AS PART OF SCIENCE?
TAKING A CLOSER LOOK AT A SPECIFIC LEARNING ENVIRONMENT
EXPANSIVE MEANINGS AND MAKINGS IN ARTSCIENCE

IWOK: COMPLEX SOCIO-ECOLOGICAL SYSTEMS REASONING AND DECISION-MAKING

ISTEAM CHANGING LANDS AND WATERS: NATIVE YOUTH LEARNING ABOUT CLIMATE CHANGE

• Seattle urban Native community members: Elders, adults and youth
• Red Eagle Soaring After-school arts program
• Native Alaska Corporation (Sealaska)
• Ocean Scientists/Climate Change Scientists
• Native Artists
• Graduate Students
FORMING PARTNERSHIPS WITH INDIGENOUS COMMUNITIES

• Own why you want to be in a partnership and are you really committed?
• Do your homework first
• Go to community and be present
• Learn how to ask appropriately (Don’t expect or demand help)
• Make formal memorandums of partnership with expectations articulated
• Make sure that you are engaging reciprocity
  • Refine goals and change plans as community needs
• Be patient – shifting relations takes time.
• If you you don’t get what you want – don’t perpetuate subtle or overt racist narratives.
ISTEAM: LAND/WATER BASED SCIENCE EDUCATION

“Indigenous education is not Indigenous or education from within our intellectual traditions unless it comes through the land, unless it occurs in an Indigenous context using Indigenous processes ….we should be concerned with re-creating the conditions within which this learning occurred, not merely the content of the practice itself” (Deloria, 2001, pp. 58-59; See also Smith, 2012; Simpson, 2014).

Places produce and teach particular ways of thinking about and being in the world. They tell us the way things are, even when they operate pedagogically beneath a conscious level (Cajete, 2000; Kawagley, 1995).
CORE DESIGN GOALS

1) Develop forms of learning that contribute to just, sustainable and culturally thriving communities demanded of the 21st century.

2) Immerse Native students in learning environments based in Indigenous Knowledge Systems and also engage them in western climate and ecological science.

3) Cultivate onto-epistemic heterogeneity (Rosebery et al. 2010) and agentic navigation between IKS and Western science in student sense-making.

4) Develop and enact learning and relations that cultivate possible Indigenous presents and futures.
THE DESIGN OF LEARNING ENVIRONMENTS IS AN ACT OF EDUCATIONAL SELF-DETERMINATION AND MAKING INDIGENOUS FUTURES. PLACE DESIGNING IS A METHOD FOR DESIGNING THAT WORKS TO ENACT LAND/WATER AS THE FOUNDATION OF TEACHING AND LEARNING.

“Our ancestors’ primary concern in “educating” our young people was to nurture a new generation of Elders – of land based intellectuals, philosophers, theorists, medicine people, and historians who embodied Nishnaabeg intelligence in whatever time they were living in because they had lived their lives through Nishnaabeg intelligence. (Simpson, 2014, p. 13)”

“Design is a sequence of decisions made to balance goals and constraints…These are decisions about (a) how the design process will proceed, (b) what needs and opportunities the design will address, and (c) what form the resulting design will take” (Edelson, 2002, p. 108)”
SO WHAT DID WE DESIGN TOGETHER?

Big Questions:
• How are our homelands & waters in the Pudget sound being impacted by climate change and ocean acidification?
• What should we do? What are our responsibilities?

KEY CONTENT FOCUS:
- Changing lands and waters
- Relations
- Biodiversity in different ecosystems
  - Oceans
  - Forests
  - Wetlands
  - Prairies
- Species relations
- Land/water management
Map layers

- Lands/waters
- Community/Cultural Places of Significance.
  - Stories and Histories of Places.
- Language
- Phenomena & Learning Opportunities.
- Learning Objectives.
- Institutions, Organizations, Infrastructure connected to places.
- Connections to professions.
- Other layers we need!

“The ultimate aim [of Native science] is not explaining an objectified universe, but rather learning about and understanding responsibilities and relationships and celebrating those that humans establish with the world. Native science is also about mutual reciprocity, which simply means a give-and-take relationship with the natural world, and which presupposes a responsibility to care for, sustain, and respect the rights of other living things, plants, animals, and place in which one lives.” – (Cajete, 2000).
SOME KEY FEATURES/PRACTICES

• Stories & Songs
• Remake Relations (e.g. Plant and Beach Relatives)
• Engage in observation and explanation
• Harvesting & restoration work
• Explore the challenges and resiliencies of more than human relatives in the context of changing lands and waters
• Engage in Making
• Consider what decisions and actions can and should be taken

• We asked children to witness and carry forward what we were doing
• We had 2 rules:
  • Be respectful,
  • Be safe
• We worked from a core heuristic: Roles, Relations, Responsibilities, and Gifts
• We engaged in walking pedagogies
• We followed our students
Exemplar Activity Arc: Western Red Cedar

- Start with a traditional story about Cedar
- Form a relationship with Cedar
- Learn about their roles in ecosystem
- Make observations of cedar trees: Repeated spot and mobile throughout the forest
- Learn about challenges cedar trees face and ways to help them
- Make and share with cedar
THINKING WITH OUR STORIES: GRANDMOTHER CEDAR EXAMPLE

• A Samish story
• Stories are our theories – our frameworks for how to know and be in the world (e.g. Archibald, 2004; Brayboy, 2008).
• Started inquiries with a story – wove that story into instruction.
• Key themes in the story:
  • Grandmother protects her grandson from too much sun, wind, rain, other animals eating him.
  • Also attends to his emotional well-being.
  • She grows old and weak – he grows strong.
  • He demonstrated reciprocity and plays the same roles for the old grandmother tree and she did for him when he was young.
  • Story shows inter-species relationships of caring, completion/food, and helping-reciprocity.
PLANT RELATIVE WALK

- Learned about plants, their relations and roles and what challenges each plant was facing because of climate change

- Youth were in multi-age groups and learned about a focal plant relative. Two groups:
  - Nathan (11), Derrick (13), Anthony (10)
  - Yuna (9), Renee (12), Sarah (11)

- Given some tools to scaffold learning. Teachers supported observation.

- They spread out along a trail and then cycled through the trail to teach each other about their plant relative – 9 plants total
Plant cards:
• Seasonally & life cycle organized
• Incorporated perspective taking
• Note language inclusion

Youth learned with teacher first then shared with other students. Teachers supported youth to “see” in real time.
Some Design Features:
- Perspective Taking & Systems Orientation
- Navigation across knowledge systems
- Plants with personhood

Observing My Relations
(if you aren’t sure that’s ok look and imagine some ideas)

Forest Overstory: Habitat Above Me
- What is growing above me? How does that impact me?
- What’s my relationship with the sun? How do I look at the top of me?

Neighbors
- Who lives around me? What roles do they play for me? What roles do I play with them?
- Who makes me home? How do you know?

Forest Understory: Habitat Below Me
- What is growing below me?
- What is the soil like around me? Is there water near me?

Imagine Me at a Different Time!
- How do I change with the seasons?
- What is impacting me?
- How will it shape me over time?

...disciplinary perspective...habitat & under/over story
Monday 7/19/16
Wolf Tree Loop
Plant Relatives Observation Walks
* RILEY POV
Designated stops
Designated teaching stop
Emergent in walk
Stop not on video
Video cut-off

S1 - Launch
S2 - Skunk cabbage
S3 - Horsetail
S4 - Stinging Nettle
S5 - Big Leaf Maple
S6 - Red Huckleberry
S7 - Vine Maple
S8 - Salmonberry
S9 - Salmonberry
THINKING WITH STORIES, LAND, AND EACH OTHER
WHAT DO YOU NOTICE ABOUT KIDS THINKING?

Yuna (S, 9): Oh yeah I have one more thing. So the, when the leaves of the maple tree die they fall on the ground and they compost and that’s really good soil for the rest of the plants. And over towards here there’s sproutlings, I’m not really sure what plant but there’s some right around here. [crouching down]...

Renee (S, 12): Also shielding.

Yuna (S): They’re kind of like the Grandma Cedar tree they kind of shield the other plants.

Renee (S): Smaller ones

Nathan (S): Those are big. (looking at plants near VLM)

Greg (T): So why do they grow in such, ah non-straight ways.

Derrick (S, 14): they split

Yuna (S): Um, I believe that’s a way that that’s kind of - they’re trying to help out other plants by, um, moving around - having their trunks move around so it will cover more areas.

Derrick (S): [crosstalk] Well it could also be

Nathan (S): [crosstalk] they’re covering, they’re covering-

Renee (S): they need more sun [crosstalk]

Yuna (S): Yeah they need more sun.

Derrick (S): They spread out so they can get more sunlight.

Yuna (S): And they take it from the leaves -

Derrick (S): Cause more leaves – more trunks equals more leaves. Equals more photosynthesis.

Renee (S): Also since they shield it off

Yuna (S): when the leaves drop it gives sunlight to these

Renee (S): Also the the little trees don’t burn up, and they also don’t drown in too much water
Yuna (S, 9): Oh yeah I have one more thing. So the, when the leaves of the maple tree die they fall on the ground and they compost and that's really good soil for the rest of the plants. And over towards here there's sproutlings, I'm not really sure what plant but there's some right around here. [crouching down]...

Nathan (S, 11): Is that all.

Yuna (S, 9): Are you trying to be sarcastic

Renee (S, 12): Also shielding.

Yuna: They're kind of like the Grandma Cedar tree they kind of shield the other plants.

Renee (S, 12): Smaller ones

Nathan (S, 11): Those are big. (looking at plants near VLM)

Greg (T): So why do they grow in such, ah non-straight ways.

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1) Narrates ecological “helping” relationships:
   • Tree life cycle -> impacts soil -> helps other plants
   • Tree canopy shades sproutlings
   • Trees have internal states “trying to help other plants”

2) Invokes cultural story as the explanatory framework

3) Engages in spatial toggling that locates the phenomena in the visual field and embodied perspective taking
Derrick (S): [crosstalk] Well it could also be
Nathan (S): [crosstalk] they're covering, they're covering–
Renee (S): they need more sun [crosstalk]
Yuna (S): Yeah they need more sun.
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1) Continues spatial read of the trees in front of them.
2) Collectively describe growth behavior of BLM and function of growth.
3) Reasoning with internal states of tree (need) and agentic behavior (get, take)

1) Agree with individual plant need narrative and relayered their original narrative
2) Returns to shielding relationship with new details of behavior and function relationships across species and/or life cycle.
3) Continues spatial read and toggles between species and plants
• Thinking around systems and relations
• Stories are alive and shaping student emergent thinking and sense-making
• Take up “cutting edge” science and socio-scientific phenomena – things that matter!
  • Meets multiple demands of science standards
• Engaged in perspective taking
• Refusing normative power & historicity: Creating conditions and expectations that students, families, and communities are and are becoming expert knowers and knowledge sharers
  • Students show knowledge of ”expected answers” but are not limited by them.
• Students utilize Indigenous and Western approaches to making sense of phenomena from new powered relations
Salmon & Hummingbird: Ethical deliberations & decision making in a week of instruction
Thursday Opening Circle:
Mistakes & Ethical Repairs in Decision Making -
Making a Memorial for Hummingbird

It demonstrated that he didn't have the right relationships with those hummingbirds......sometimes as human people, when we see a hurt animal person, we want to help. And we should do that sometimes, Sometimes that is the right thing to do. And sometimes maybe how human people want to help is not quite the right way to do it for animal people or for plant people. It's hard to know sometimes. And part of what we heard yesterday is that the Suquamish people are trying to help the salmon people again right, that that's part of what that hatchery is about is trying to help the salmon people again, because the human people long while ago made some bad choices...that they overfished or they hurt the lands and so human people are always making choices about how we might be in good relationships with our plant relatives and our animal relatives right.....
So we're doing this so we can have a bowl.
C: We should make a story a long time ago...there was a man and he was smart in his own sense but he was careless and then one day he was showing these people that came up every year in the summertime and then when he was showing them how he helped the salmon people he was careless and then accidentally stepped on the hummingbird. and uh... But that was a mistake but what made it bad was that he picked it up and threw it into the woods... that was so messed up.

L: Into the woods...

C: and then

Kailyn: This is the hummingbird

C: And this man was so disrespectful to hummingbirds he... he got...and the baby hummingbird was mad at him. So then those people sent him a letter and then they made graves for that hummingbird and then they never forgot.

Yuna: Memorials

C: memorials

K: The man picked it up by the tail and threw it into the woods like it was trash.

C: What did you learn? You shouldn't step on baby animals.

L: You shouldn't really step on anything.

M: You shouldn't step on animals

C: And this story was called the careless man.

K: The careless man named Brian

Filiberto: You can also tell a story about a hummingbird and imagine everything that it lived before up until the point that that happened. And the story there is more about all the life that the hummingbird had right?
Fili: The inspiration actually came from the kids because they wanted to remember the hummingbird. Justine has this beautiful bracelet that was gifted to her and I basically borrowed the design from there and that's kind of what's in progress. You see here, there's nothing. There's still to be determined, but it should look something like that when we're done. I think the plan is this is a piece that will be gifted here to the group. I'm hoping that Justine, as the elder here in this group, that you can be the keeper of this and this is a story that you can retell, because I think there's important lessons in holding that story about the hummingbird for the next generation of kids that come through here.
Conclusions & Implications

- What kinds of design decisions are we making and what kind of futurities are being afforded?
- What forms of nature-culture relations and possible futures are enacted?
- It’s necessary for all of us to understand settler-colonialism and the human identity narratives it constructs.
- → How does one inhabit lands and uphold Indigeneity and sovereignty?
- Historicity and temporal constructions deeply shape identity narratives and learning environments make decisions about what kinds of historicity and resources are made engageable for youth? What are the political and ethical implications?

What stories are shaping our learning environments? What stories are we helping the next generation to imagine and make?
Chi miigwech!

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