Place, Cultural Context, and Geoscience Teaching

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Earth Educators’ Rendezvous 2017
Albuquerque, New Mexico
(shown here as seen from the West Mesa volcanoes)
Goals for this two-day morning workshop:

• Review the essential characteristics of place, sense of place, and place-based/culturally informed teaching.

• Exemplify the process of leveraging place and culture in geoscience teaching and assessment.

• Identify opportunities to introduce or increase use of place-based and culturally informed modalities in our own teaching.

• Discuss the relevance of place-based and culturally informed geoscience teaching to fostering natural and cultural resilience and sustainability in our home communities.

• Review the essential components of a context diversity model for adoption in teaching and research using place-based learning.

• Be able to evaluate aspects of your teaching that may be more conducive for different student populations using a context diversity model.

• Be able to build curricula that are conducive to multicontextual learning.
Place, Cultural Context, and Geoscience Teaching

Introductions:
Your name, and the place that you identify most with

08:30 to 08:45 am
Place, Cultural Context, and Geoscience Teaching

Introduction to *place* and *sense of place* and their relevance to geoscience

08:45 to 09:00 am
When we envision, name, explore, inhabit, or in any other way experience a locality, we make it a **place**.

What begins as undifferentiated space becomes **place** as we get to know it better and endow it with value. *Yi-Fu Tuan, Space and Place (1977)*

**Places are human constructs.**

*e.g., Grand Canyon National Park*
Places populate the cultural landscape just as landforms, water, and biota comprise the physical landscape.

[Landscape] may be defined as an area made up of a distinct association of forms, both physical and cultural. Carl Sauer, *The Morphology of Landscape* (1925)
Place is relevant to geoscience because we **teach and learn about the Earth** by means of places, whether *in situ* or by proxy.

Our access to space and time is how they happen in a given place.

*Edward Casey, philosopher*
As we make meaning in places, we also tend to form emotional attachments to meaningful places.

**Enchantment**: a feeling of being attracted by something interesting, pretty, etc. *Merriam-Webster Dictionary* (2017).
People are naturally connected to places. **Sense of place** operationalizes this connection in a way that is useful for research and teaching alike.

Sense of place is the set of all meanings and attachments held by an individual or a group for any given place.

People imbue places with diverse meanings

People form attachments to meaningful places

Both can be measured, whether quantitatively (surveys) or qualitatively (interviews, observations, analyses of artifacts)

*e.g.,* Williams & Vaske, 2003; Williams & Semken, 2011

*e.g.,* Brandenburg & Carroll, 1995
The power of place as an organizing theme for contextualized teaching has long been understood and used by some.

**John Dewey (1916):** Learning should be experiential and active, and situated in the learner’s immediate physical and cultural surroundings.

Indigenous (e.g., Native American) philosophies of education are place-based: prioritizing and transmitting locally situated knowledge for long-term sustainability (e.g., Cajete, 1994).

Río Tanama, Puerto Rico
In the case of students whose cultures and identities are deeply rooted in place (e.g., Native Americans, Native Alaskans, Latinos/Latinas, Native Hawaiians, Pacific Islanders) science teaching that contradicts or minimizes their senses of place can deter them from scientific study and careers.

[Kawagley et al., 1998; Aikenhead & Jegede, 1999; Riggs, 2005; Semken, 2005]
“Place-based research that incorporates indigenous landscapes and ways of thinking is one way to attract indigenous students. Indigenous peoples are underrepresented in the Earth sciences despite these cultures having a rich sense of place when it comes to the natural world.

Incorporating concepts like ethnogeology (how geological features are interpreted by cultures) into lessons can increase the accessibility of the Earth sciences. Presenting the Earth sciences in a way that is commensurate with, rather than in opposition to, native perspectives of Earth systems has had some success and is worthy of EAR education resources.

The lessons learned in developing place-based Earth science education for native cultures may also be transferable to other groups, such as…urban students.”

*Finding 3, pp. 84-85.*
There are also signs of a much broader estrangement from place with serious consequences.


Possible harm to physical and mental health: Louv, *Last Child in the Woods* (2005)

Obliviousness to the aesthetic, cultural, ecological value of local places and communities: Orr, *Ecological Literacy* (1992)

Acquiescence in the environmental and social degradation of one’s surroundings: Meyrowitz, *No Sense of Place* (1985)


Disinterest in geoscience and other natural science studies and careers? Levine et al., *JGE* (2007)

“Relationship with place is fundamental to our identity as individuals and communities” de Jong, in *Cultural Ecology* (2013)
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Activity

Concept sketching:

Senses of the places where we teach

09:00 to 09:20 am

Depict in a sketch a place or region where and by which you teach geoscience, with the objective of evoking a rich sense of that place or region.
The American **Southwest** is a region widely recognized for its distinctive landscapes and cultures.

Sunshine

Grand Canyon and other canyons

Red rocks

Rugged topography

Forested highlands

Dust

Deserts

Aridity

The Southwest is a distinctive place to the American mind...

**Donald W. Meinig**—geographer (1971).
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Discussion of the essential characteristics of place-based geoscience education, with practical examples of each characteristic.

09:30 to 10:00 am
Place-based education (PBE) is situated in specific places: regions, landscapes, environments, communities.


Place meanings and attachments contextualize ideas.

Sense of place is an authentic, assessable learning outcome.

Place-based curriculum is a continuum: (Chinn, 2007; Ault, 2008; Endreny, 2010)

“Textbook examples” from instructive places

Trans-disciplinary, culturally rich, multilingual: place is the subject
Five essential characteristics of place-based
geoscience education

1. It focuses explicitly on the geological and other natural attributes of a place.

2. It integrates or at least acknowledges the diverse meanings that place holds for the instructor, the students, and the community.

3. It teaches by authentic experiences in that place or in an environment that strongly evokes that place.

4. It promotes and supports environmental and cultural sustainability in that place.

5. It enriches the senses of place of students and instructors alike.

(Lieberman & Hoody, 1998; Kawagley & Barnhardt, 1999; Cajete, 2000; Woodhouse & Knapp, 2000; Gruenewald, 2003; Semken, 2005; Semken et al., in press.)
1. Place-based geoscience education focuses explicitly on the geological and other natural attributes of a place.

(Semken and Morgan, 1997; Semken, 2005)
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“Rugged and dry” American Southwest (Semken, 2011)

USGS

PRISM Project
1. Place-based geoscience education focuses explicitly on the geological and other natural attributes of a place. 

*(Chinn, 2006; 2011)*

**Ahupua‘a**: traditional Hawaiian geological, climatic, and socioeconomic subdivision of land for sustainable community

*(HawaiiHistory.com, 2017)*
1. Place-based geoscience education focuses explicitly on the geological and other natural attributes of a place.

(Kirkby, 2014)

St. Anthony Falls, Mississippi River: important to local communities from indigenous Dakota people to modern multicultural Minneapolis.

(U.S. Army Corps of Engineers, 2017)

(MN Historical Society, 2011)
2. Place-based geoscience education integrates or acknowledges the diverse meanings that place holds for the instructor, the students, and the community.


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**Pennsylvania anthracite region: blend of immigrant cultures and place knowledge, with modern environmental and socioeconomic sustainability issues.**

*(Vice and Aurand, 2014).*
2. Place-based geoscience education integrates or acknowledges the diverse meanings that place holds for the instructor, the students, and the community.

Study of artistic and other humanistic representations of place provides engaging context for the scientific ideas presented in a place-based course.
3. Place-based geoscience education teaches by authentic experiences in that place or in an environment that strongly evokes that place.

(Wahrhaftig, 1984) (McCann-Murray, 2001) (Orange County Coastkeeper, 2015)
3. Place-based geoscience education teaches by authentic experiences in that place or in an environment that strongly evokes that place.

(Bursztyn et al., 2017)
4. Place-based geoscience education promotes and supports environmental and cultural sustainability in that place (by actively engaging with local sustainability issues).

New climate report holds dire predictions for the Southwest

Global climate change is baking Southwestern cities, intensifying wildfires and straining water supplies, and the worst is yet to come, scientists say in the latest National Climate Assessment released Tuesday.

The Earth is heating unevenly, and in recent decades, the Southwest has warmed by an average of 2 degrees Fahrenheit, said Gregg Garfin, a University of Arizona geoscientist who was a lead author of the report’s Southwest section.

The region will heat up an additional 1.5 to 3.3 degrees by midcentury under the current trajectory of greenhouse gas emissions, according to the report, and by up to 9.5 degrees at century's end.

Drying creek beds, such as the Little Colorado River, on the Navajo Reservation, will become more prevalent if climate forecasts hold true. (WXshift, 2015)

(DAKOTA ACCESS PIPELINE ENVIRONMENTAL IMPACT STUDY

Deadline: Feb. 20, 2017

www.drcinfo.org/DAPLstudy

NEW YORK CITY

28

(Pacific Island Times, 2017)
5. Place-based geoscience education enriches the senses of place of students and instructors alike (fostering interest in and concern for the places they study).

Encourage students to express their senses of place creatively, or to share their knowledge with the local community through service learning.
**Sense of place** functions as an authentic and assessable learning outcome for place-based education.

**Quantitative:** Likert-scale psychometric survey instruments

<table>
<thead>
<tr>
<th>Place Attachment Inventory (PAI)</th>
<th>Young’s Place Meaning Survey (YPMS)</th>
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<tbody>
<tr>
<td><em>(Williams &amp; Vaske, 2003; Semken &amp; Butler Freeman, 2008)</em></td>
<td><em>(Young, 1999; Semken &amp; Butler Freeman, 2008)</em></td>
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| This place is a part of me. | Ecologically important? |
| This place is the best place for what I like to do. | Exotic? |
| This place is very special to me. | Important to preserve? |
| No other place can compare to this place. | Remote? |
| I identify strongly with this place. | Educational? |
| I get more satisfaction out of being at this place than at any other. | Unspoiled? |
| I am very attached to this place. | Unique? |
| Doing what I do at this place is more important to me than doing it in any other place. | Authentic? |
| Being at this place says a lot about who I am. | Scientifically important? |
| I wouldn’t substitute any area for doing the types of things I do at this place. | Adventurous? |
| This place means a lot to me. | Fragile? |
| The things I do at this place I would enjoy doing just as much at a similar site (reverse scored). | Unusual? |
| | Important for Native culture? |
| | A privilege to visit? |
| | Historical? |
| | A privilege to live here? |
| | Ancient? |
| | Tranquil? |
| | Spiritually valuable? |
| | Scenic? |
| | Overdeveloped? |
| | Relaxing? |
| | Dangerous? |
| | Wilderness? |
| | Crowded? |
| | Beautiful? |
| | Threatened? |

Sense of place functions as an authentic and assessable learning outcome for place-based education. Quantitative: Likert-scale psychometric survey instruments.
**Sense of place** functions as an authentic and assessable learning outcome for place-based education.

**Qualitative: Application of ethnographic techniques.**

*Behavioral observations* in learning environments and recreational settings

*Interviews* and *focus groups* (including *Delphi groups*)

(Artifact analyses (of student or participant products, such as concept sketches)

*(Williams and Semken, 2011; Ward et al., 2014)*
Geoscience **knowledge and skills assessments** for place-based teaching should also be place-based, and **culturally valid**.

- Many geoscience assessments are written to accommodate a **mainstream** cultural perspective and experience.
- Such items may not be valid for use with under-represented-minority and cultural-minority students.
- Assessments should be **culturally validated**
  - Maximize **local** relevance and interest
  - Use—and **name**—local examples whenever possible
  - Be aware of applicable cultural norms and potential conflicts
  - Seek input and review from **cultural experts**, including culturally expert educators

*(Ward et al., 2014)*
Activity: 

*Teaching and assessing in place-based ways*

10:10 to 11:00 am

Think about applying one or more of the **5 essential characteristics** of place-based geoscience education to one of your own courses, activities, assessments, or scholarship—and prepare digital demonstrations or summaries that can be posted to the group workspace.

**Break**

In there somewhere
Five essential characteristics of place-based geoscience education

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Discussion and lead-in to second day

11:00 to 11:30 am
Don’t miss Dr. Greg Cajete’s talk at 4:30 today!

Hasta mañana!