Paper Number: 1240

Place-based geoscience education: A narrative from the Southwestern United States

Semken, S.[1]

[1]School of Earth and Space Exploration, Arizona State University, Tempe, Arizona 85287-1404 USA

When we name, explore, inhabit, or in any way experience a locality—for example, the rugged and arid lands of the Southwestern United States of America—we make it a *place*. Humans are naturally connected to places, often forming intellectual and emotional ties (the *sense of place*) to places that are meaningful to us in some way. *Place-based education* (PBE) situates content and practice in the landscapes and communities of specific, typically local, places and regions. PBE is applicable to formal teaching in classroom, lab, field, and community as well as to free-choice teaching or interpretation as practiced in museums, parks, and in educational media. Its curriculum is organized according to the attributes of place, and sense of place is used as an authentic learning outcome and assessment measure. PBE is trans-disciplinary and fosters environmental and cultural sustainability of the places and regions taught. A place-based approach to geoscience education empowers learners to engage with readily accessible and more familiar Earth features, processes, and history; illustrates connections among geoscience and local environmental, economic, and public safety issues; and prepares students for subsequent study of the Earth system at global scale.

Because places are cultural constructs as well as spatial localities, fully realized PBE draws useful examples and cases from other pertinent disciplines in the natural sciences, social sciences, and humanities; and local or indigenous place knowledge as is culturally appropriate; all to furnish richer context for geoscientific inquiry. Further, pedagogy actively encourages students' interest in and concern for these places. In this way trans-disciplinary PBE can not only foster learning but also environmental and cultural resilience and sustainability of and in the places where teaching occurs.

Mixed-methods research on effectiveness of PBE is to date still limited, but recent work in the United States of America [*e.g.,* 1 - 6] lends support to the practice of actively leveraging or integrating the senses of place of students and instructors in STEM teaching for diverse student populations—particularly members of indigenous or historically resident cultures (such as Native Americans and Chicanos in the southwestern United States, long underrepresented in geoscience studies and careers). Wider implementation of PBE in this region is challenged by, but may also benefit from, the growth of virtual and online education.

References:

[1] Apple J et al. (2014) Journal of Geoscience Education 62(1): 1-4
[2] Ward EG et al. (2014) Journal of Geoscience Education 62(1): 86-103.
[3] Williams D and Semken S (2011) Geological Society of America Special Paper 474: 49-62.
[4] Palmer MH et al. (2009) Journal of Geoscience Education 57(2): 137-144.
[5] Semken S and Freeman CB (2008) Science Education 92(6): 1042-1057.
[6] Semken S (2005) Journal of Geoscience Education 53(2): 149-157.