Increasing Awareness of Geoheritage Sites & Earth Science Literacy Through Teacher Developed EarthCaches

EarthCaching in Michigan: Geoheritage Sites & Earth Science Literacy

Creative thinking coupled with effective communication between the public, scientists and decision makers on a solid understanding of Earth Science is necessary for tackling the many challenges faced by society. Unfortunately there is a broad absence of Earth Science literacy in the general population. Geoheritage and other geoscience significant sites have the potential to increase literacy by engaging citizens in geoscience concepts through culturally relevant, place-based examples that evoke emotional attachments in individuals.

Methods

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<th>Research Questions</th>
<th>Methods</th>
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<td>How does visiting regional EarthCaches &amp; developing an EarthCache as part of a Science Teacher Professional Development improve teachers’ geoscience content &amp; skills, scientific inquiry/practices skills and place-based pedagogy?</td>
<td>Methods of EarthCache development described in the teacher professional development workshops.</td>
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<td>Do EarthCaches made by teachers create valuable resources for (formal &amp; informal) earth science education?</td>
<td>The methods were measured through a survey of teachers and an analysis of EarthCache data.</td>
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Results:

Effects on Teacher Participants: 1) improved geoscience knowledge & skills 2) development of place-based pedagogical skills 3) raised awareness of geoheritage sites

EarthCaches as Educational Resources: 1) Integration is limited in formal K-12 schools to those teachers with resources to implement (equipment, class size, class schedule) 2) General public visitors demonstrate increased understanding of geoscience processes & awareness of regional geoheritage locations

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Supporting MiTEP Partners:
Michigan National Parks, American Geological Institute, Grand Valley State University, Western Michigan University, & Grand Rapids Area Pre-college Engineering Program

Websites for Further Information:
MiTEP EarthCaches: mitep.mtu.edu
Geocaching: www.geocaching.com
GSA EarthCaching Program: earthcache.org

EarthCache published on the geocaching Website

Over 350 community members have visited Michigan geoheritage sites through EarthCaches published on the geocaching Website. 50 new EarthCaches have been developed in Four Regional Areas.

Keweenaw Peninsula
The natural beauty of this National Scenic Area contains important geologic heritage sites.

Southern Michigan
The Lower Peninsula’s placid landscape builds awareness of important geological features beyond typical rock strikes.

Michigan National Parks
The natural beauty of Michigan’s Parks create emotional connections to geologically shaped landscapes.

City of Thought
Urban Areas provide opportunities to connect geoscience concepts to the places we live and are familiar to us.

MITEP EarthCache Model: Exploring Geoheritage sites during Teacher Professional Development

Geologically significant places exist within, or nearby, most communities but may not yet be designated as Geoheritage sites. These special places can be valuable resources used to engage K-12 students in geoscience topics if integrated into existing curriculum. However, many teachers charged with geoscience instruction lack awareness of these sites, pedagogical experiences of using place-based examples or a firm background in Earth Science concepts.

Phase I: Visit EarthCache Sites during Professional Development
In-service teachers visit Geoheritage sites during Summer Field Institute to familiarize existing EarthCaches. Integrating EarthCaching into professional development activities provides a guided inquiry experience to learn Earth Science concepts and navigation.

Phase II: Teachers Develop an EarthCache
Teachers visit geoheritage sites with expertise from field courses or National Park Internships. Later they develop a "MITEP" EarthCache that connects to the K-12 curriculum. The experience of developing a "MITEP" EarthCache deepens teachers’ understanding of Earth science concepts, engages them in scientific practices and provides authentic pedagogical experiences in Place-Based & Inquiry-Based instruction.

Phase III: Using EarthCaches as Classroom Resources
A number of MiTEP teachers have adapted EarthCaching to fit into their K-12 classrooms. These experiences allow students to explore concepts through place-based instruction, utilizing Geoheritage sites instead of textbook examples.

"MiTEP" Style EarthCaches: How are teacher developed EarthCaches different?

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