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THE IMPORTANCE OF PLACE, CULTURE, AND TRUST IN SUSTAINABLE ENGINEERING EDUCATION

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Synopsis:

In both sustainable engineering design and engineering education, enduring solutions must incorporate place, culture, and trust. This paper describes a project that aims to both advance sustainable engineering design practice and engineering education within the Oglala Lakota Tribal Community through a National Science Foundation (NSF) funded Pre-Engineering Education Collaborative program developed between mainstream universities and a tribal college in South Dakota.

The Importance of Place, Culture, and Trust in Sustainable Engineering Education

In both sustainable engineering design and engineering education, enduring solutions must incorporate place, culture, and trust. With regards to the practice of sustainable design, there are numerous examples in literature concerning the failure of design when stakeholder participation is not incorporated in the design practice; in many of these instances, trust and mutual understanding of culture has not been fully integrated. Similarly, with regards to education, the promotion of participation of underrepresented groups in Science, Technology, Engineering, and Mathematics (STEM) fields can be sustainably promoted by fostering relationships based in trust, while engaging students in service learning projects that emphasize place and culture. This paper describes a project that aims to both advance sustainable engineering design practice and engineering education within the Oglala Lakota Tribal Community through a National Science Foundation (NSF)-funded pre-engineering collaborative between the South Dakota School of Mines and Technology (SDSMT) and the Oglala Lakota College (OLC). One of the striking lessons learned through this collaboration, which incorporates project-based service learning (PBSL) to engage students and increase Native American participation in STEM-fields, is the resounding importance of focusing on place, culture, and trust. The focus on “place” is essential for promoting student engagement; the service learning projects, including such projects as geologic mapping and water quality studies, inherently focus on a geologic and ecological setting that is unique in its natural beauty. Respect of Lakota Culture is incorporate through engineering projects that engage students by evaluating the performance and resulting indoor air quality of net-zero energy research homes; in the Lakota language, there is no equivalent word to describe the idea of “sustainability,” because the concept of caring for the earth and sustaining human life is ingrained into Lakota culture and way of life. Listening and establishing mutual trust is key to both engineering design and education. In design, incorporating stakeholders and cultural awareness are key to the acceptance of engineering design and ecological preservation efforts; in education, for students to transition from the tribal college to completing their engineering degrees at a mainstream university, understanding of culture and way of life are key for success. Establishment of trust prior to transitions is a critical, as students are likely to be encouraged by friendly faces and a community that promotes mentoring.