The Humanitarian Engineering Perspective on Research Translation

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What is Humanitarian Engineering?

Signature educational program at the Colorado School of Mines

- Started in 2003
- Possibly first curricular program in the US with this name
- Minors, degree focuses, and an MS degree

Mission: Educate engineers and scientists to work as partners with communities seeking to enhance their social, environmental, and economic sustainability

Different way of thinking about and doing engineering: A way that harnesses the collective power of engineering and social science ...

Teaching engineers to bring a true sociotechnical approach to make a difference in the world through their professional careers, whether in community development or corporate settings

Social Concepts in Humanitarian Engineering

- Understanding structural conditions and power differentials among specific stakeholders of an engineering project
- Contextually listening to all stakeholders, especially those who are marginalized, to grasp their needs, desires, and fears surrounding a specific project, decision, etc.
- Collaboratively identifying opportunities and limitations of creating shared social, environmental, and economic value for all stakeholders, especially those who are marginalized
- Adapting engineering decision-making to promote those shared values, acknowledging situations in which this is not possible and engineering projects should not move forward
- Collaboratively assessing activities and outcomes with those stakeholders

Smith, J. and Lucena, J. Socially Responsible Engineering. In Routledge Handbook of Philosophy of Engineering.



Engineering students enacting SRE criteria in community engagement workshops



HE in Action Example

Maddie Urquhard MS HE Captsone Practicum Project,

Contextualizing Collaboration: Amplifying a values approach to combat inequities of water management through projects between engineers and Indigenous communities

Figure to Right: How to apply those social science concepts in a particular setting

Figure on Next Slide: Meeting a community where they and their values are at

CO-MANAGEMENT WITH INDIGENOUS **COMMUNITIEIS** WITHIN THE ESR CRITERIA • Acknowledge legacies of colonization UNDERSTANDING · Identify boundaries of **STRUCTURAL** Winter's Doctrine and Treatment as a State **CONDITIONS** Emphasize coexistence over dominion and assimilationist tendencies • Consider Adaptive Water Governance Approach collaboration diplomatically vs inquisitively CONTEXTUALLY and informatively LISTENING · Identify broad and Tribespecific significance of water as a resource and entity Promote continual collaborative conversation **COLLABORATIVELY** Consider Community Based Adaptation **IDENTIFYING** Incorporate cultural knowledge **OPPORTUNITIES** · Emphasize a continuum of AND LIMITATIONS involvement Facilitate social learning Acknowledge potential burdens on Tribal members and emphasizing benefits Act as coequal residents Strengthen relationships PROMOTING with Tribal leaders SHARED Identify Pivot Points within existing policy and VALUES management Respectfully integrate Indigenous ways of knowing Seek promotion of boundary work • Exercise epistemic and **COLLABORATIVELY** cultural humility Promote interdisciplinary ASSESSING teams that celebrate diverse funds of knowledge **ACTIVITIES AND** · Share power over **OUTCOMES** implementation and delivery Embody researcher-inrelation techniques

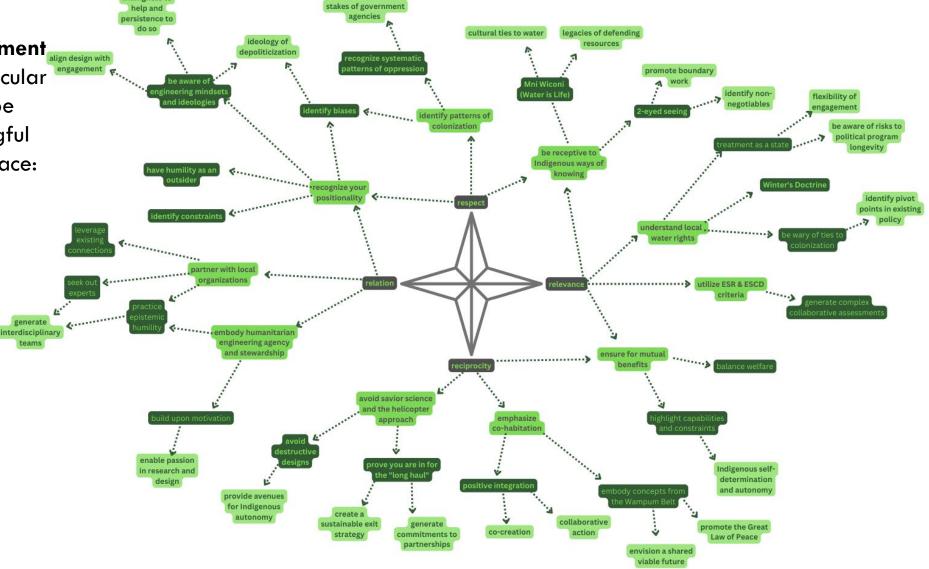
HE in Action Example

(cont.)

Principles of Engagement important to this particular community that must be met before a meaningful exchange can take place:

willingness to

- Respect
- Relevance
- Relation
- Reciprocity



R&D/Research Translation Must be a Co-Creation Activity, with Communinity

- Successful
 R&D/research
 translation requires
 - Community at the center
 - Co-creation with the community
 - Process that honors principles of community development

