Susan Cozzens, Jameson Wetmore, Michael Bernstein, Rafael Castillo, Diran Soumonni

Addressing the Community Engagement Gap in Engineering Education: A Short-Course Approach

Subtitle

Funded a by the National Science Foundation under cooperative agreement #0937591 to the Center for Nanotechnology and Society at Arizona State University and by a National Science Foundation Graduate Fellowship to Thomas Woodson.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation

Thomas S. Woodson

Thomas.woodson@stonybrook.edu

Educating better engineers for community development

Cape Town, April 2014

Weak linkages between technical students and communities, despite demand

No engagement training in most technical programs

Community engagement workshop

Atlanta

↳ Cape Town

↳ Montreal

↳ Phoenix

↳ Clemson

2 Days, 15-25 Students each workshop

Environmental Nano Group,
University of Western Cape, 2011

Review literature & experience: The challenge of normativity

Engineers define/fix problems

From Schneider et al., 2008:313; Downey, 2005

Intangibles

Self-reflection

Empathy

Humility

Humor

Patience

ASU student and children of Domeabra, Ghana

Skills

Listening

Planning

Evaluation

Concordia EWB Student in Ghana

Ten Lessons

ASU students and faculty with
community members from Domeabra,
Ghana

Ten Lessons

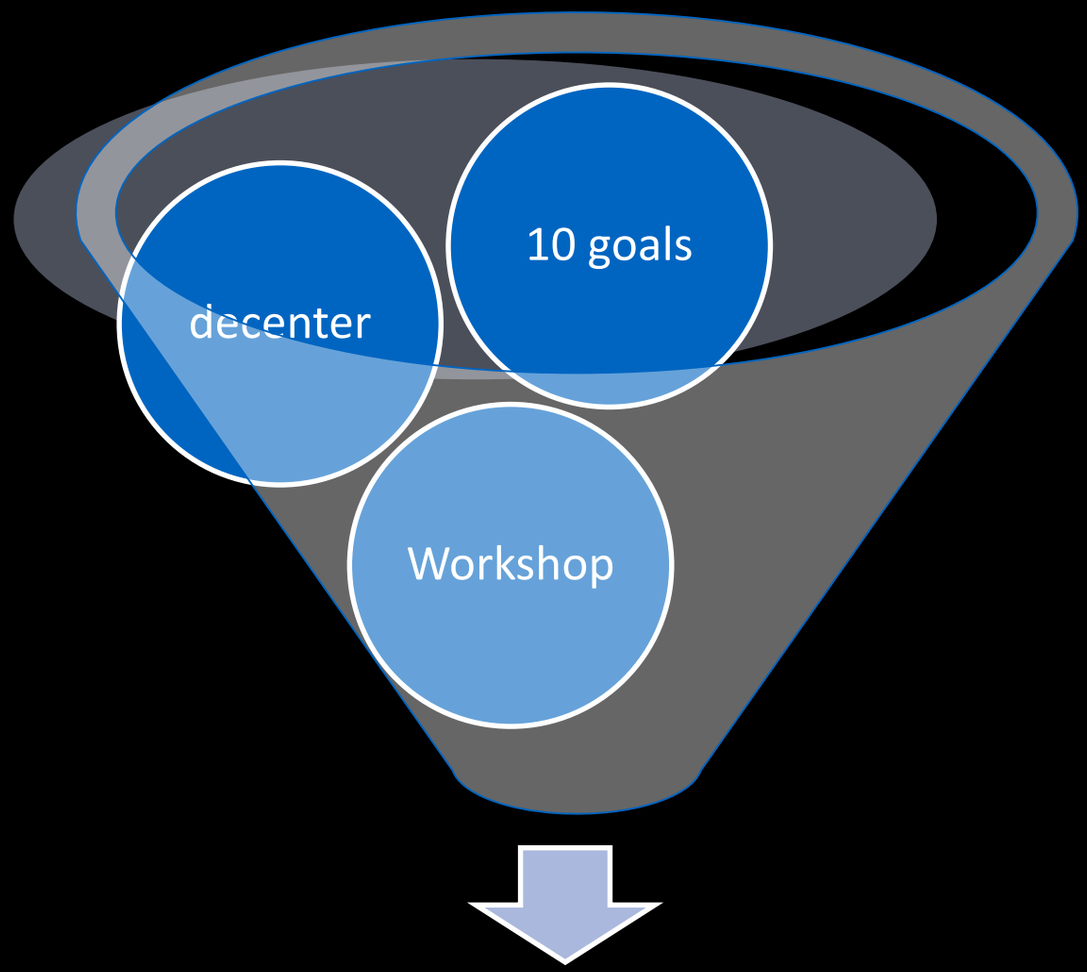
1. Reflect on your motivation, existing knowledge and training
2. Strive to understand community context before starting any technical work
3. Act with the community
4. Build capacities and empower community members
5. ‘De-center technology’ (Nieusma and Riley, 2010:31)
6. Keep power differentials in mind
7. Strive for equitable process and outcomes
8. Think about structural issues surrounding your work
9. Assess often
10. Effective engagement takes time

Fitting this all in?
The challenge of time

MODEST GOALS:
Introduce complexity
listening
asking questions

PEDAGOGY
Learning-by-doing
Interactive
Case-study focused
Repetition
With community Partners

Focusing



Understanding Community Context

Empowerment

De-centering Technology

Day 1

Introduction
Answer with your feet, Images of Development, Motivations

Look Beyond Technology
Soc-Tec Sys Mapping, Nano Around the World, Ghana Stoves

Understand Community Context
Listening Pairs, El Cajon Dam

Community Dialogue
Local issues

Day 2

Introduction

Empowerment
Models of politics advocacy, Feeling powerful and powerless

Group Work

Presentations and Debrief

1. Background
2. Learning Goals
3. Structure & Approach
4. Evaluation & Future

Look Beyond Technology

NRC

Ghana Stove Project

Listening

Empower and Build Capabilities

Our colleague, Nalini Chhetri in Ghana

Shifts in Mindset

Members of Our Team at a Community Nano Water Filtration Project in South Africa

Community Partners: The challenges of expectations

Cape Town Science Centre

The Project:
The challenge of specificity

Introduction to Team Project

THE SICKLE CELL FOUNDATION OF GEORGIA, INC.

SCF of Ga., Inc.

FOUNDED 1971

TOGETHER, WE CAN BREAK THE SICKLE CYCLE!

JOIN THE RACE TO BREAK THE SICKLE CYCLE

Do the participants learn anything?

Pre and Post Surveys, Concept Maps, Observational Notes, Participatory Evaluation

Project Approach Survey

You have just joined a team working with the City of Montreal on a new transportation system project. Your team is tasked with developing recommendations for actions that the City can take to reduce traffic congestion and related issues.

Questions:

1. What are the first three things you propose to do to get started on the project?

2. What are initial questions you would ask to help get started on these things?

Concept Mapping: Community Engagement

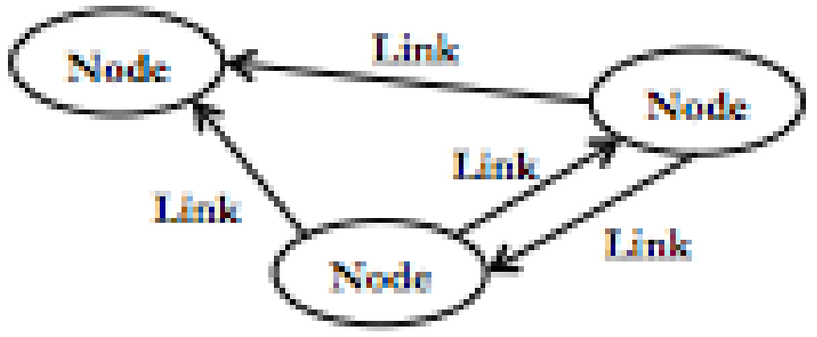
Please draw the web of people, organizations, things, or factors that compose, influence or are influenced by food supply and distribution systems.

Nodes: people, organizations, things, or factors.

Links: verbs that describe the relationship between the nodes.

Arrows: can go one direction or both.

Please take no more ten minutes.



Five digit ID code:

___ ___ First and last letters of birth city (ex: Phoenix= PX) ___ First letter of mother's name (ex: Sue= S) ___ ___ Month of birth (ex: June= 06)

Your area of study/department:

Food Supply and Distribution System

Concept Map

Put as much on paper as possible, and don't worry about creating a perfect map.

Think brainstorm!

Percent with increase in # activities with social components	78%
Percent with increase in # questions with social components	61%
Percent with increase in # questions	61%

Scaling up and out

Participants: The challenges of recruitment and retention

Stand alone vs. embedded in course

Main Sources

- Lucena, J., Schneider, J., and J.A. Leydens. 2010. Engineering and Sustainable Community Development. Synthesis Lectures on Engineers, Technology, and Society 11, 1–218.
- VeneKlasen, L. and V. Miller. 2007. A New Weave of Power, People and Politics. Practical Action: Rugby.
- Dodge, C. P. and G. Bennett. 2011. Changing Minds – A Guide to Facilitated Participatory Planning. IDRC: Ottawa.

Open to suggestions (for future workshops)

Thank you!!

Thomas.woodson@stonybrook.edu
matthew.harsh@concordia.ca

1. Background 2. Learning Goals 3. Structure & Approach 4. Evaluation & Future