
Science Education for Civic Engagements & Responsibilities

A
Community of
Transformation

Why SENCER

Our Democracy cannot afford to invest in educating a generation that merely acquires knowledge without understanding how they can put this knowledge into practice to the benefit our local communities, and the improvement of our society and our nation.

We (the community of SENCER practitioners) believe this is our obligation towards the next generation to provide our students with the knowledge, skills an experiences to be active citizen and to be able to participate in science.

What is a Community of Practice?

A community of practice is a group of people – like us right here-- who want improve something that we are passionate about.

Two key elements to a CoP:

- There is a need for learning that is shared within the group. The drive to learn is the bond that connects the members of the community.
- The community organizes to meet this need. The community shares and evolves through the development of common values and practices.

When does a STEM Community of Practice become a Community of Transformation?

Is the community striving to **SIGNIFICANTLY** impact the entire field of STEM education, so that it not only changes the individual faculty member, but their department, their institution, their discipline, and eventually, the national landscape for STEM learning?

Features of Communities of Transformation: Kezar and Gehrke 2015

1. Each community supports a shared philosophy, a common theoretical basis or foundation. This can be referred to as the ethos, values or ideals of the community.

The SENCER ideals include:

- Connecting science and civic engagement by teaching “through” complex, contested, current, and unresolved public issues “to” basic science.
- Putting scientific knowledge and the scientific method to use on matters of immediate interest to students.
- Revealing the limits of science by identifying the elements of public issues where science does not offer a clear resolution.

Defining Features

2. Each Community of Transformation shares a pedagogy that requires **interdisciplinarity** that goes beyond knowledge to action.

Form follows function which means that if we want active participatory students we must create active participatory classroom and experiential learning opportunities.

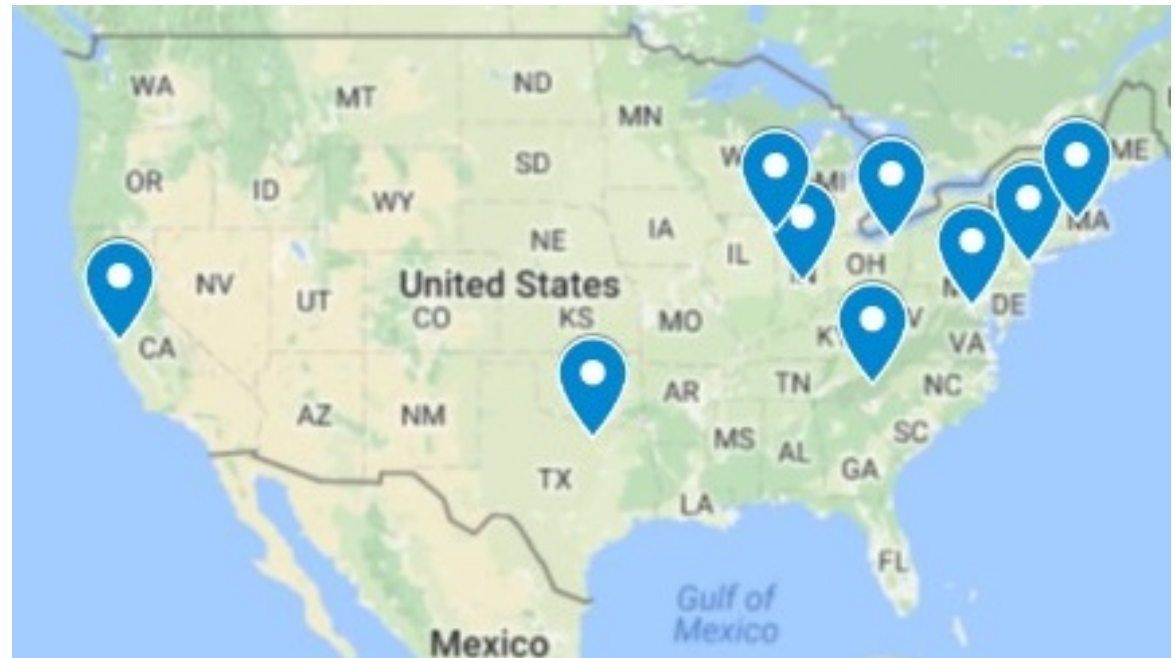
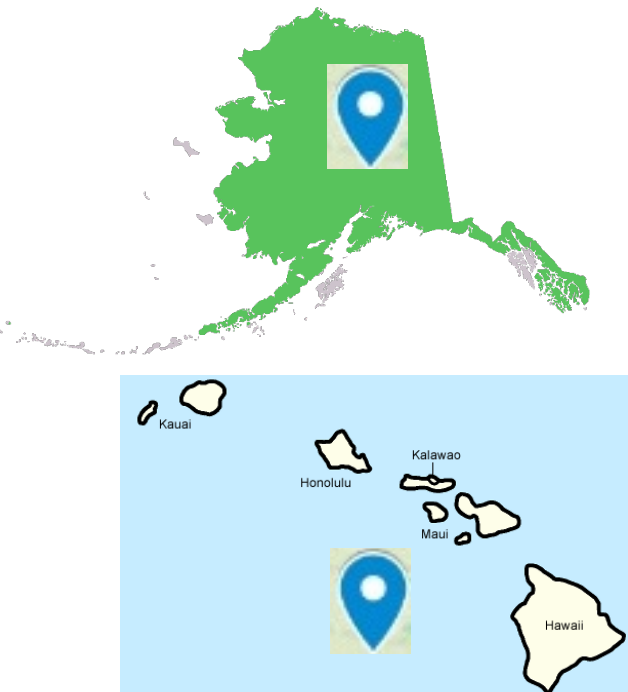
We must also provide hard problems that require diverse skills and interdisciplinary thinking for teams to work together to make learning authentic, relevant, challenging, and MEANINGFUL

Defining features of STEM Communities of Transformation: (Continued)

3. The benefits of participation resonate beyond the faculty member and classroom to the greater community.
 - SENCER projects are in 46 states and at least 2 countries I know outside U.S.
 - Over 4,000 faculty have participated just over the past 7 years.
 - We have networked over 9 regions with centers of innovation.
 - Over 500 two- and four-year colleges, universities, agencies, informal education venue, and community-based organizations have participated.
 - 57 model courses developed.
 - The impact of what we do!

Defining features of STEM Communities of Transformation: (Continued)

Each Community of Transformation creates networks evolved from the initial Community of Practice, which becomes expanded beyond a local network.



Communities of Transformation

Communities of Transformation have similar histories/ challenges:

1. A local innovation in teaching spreads regionally, nationally, even globally. SENCER emerged from the redefinition of traditional STEM courses, from disciplinary designations like “Cell Biology” or “Immunology” to “Cancer” or “HIV-AIDS”
2. One faculty member can be the catalyst, spreading an innovation beyond a classroom to new institutional programs, and even national adoption. (A field study course, led to a new experimental program, led to a degree and then a new college at GMU).
3. CoT follow a similar trajectory from course to institutional program to national effort. **Your courses made SENCER a national movement and a Community of transformation.**

Communities of Transformation (Continued)

4. Communities of Transformation face the same challenges facing interdisciplinary and systems thinking models, in that they require multiple levels of expertise and team-based collaboration. Team teaching is harder, more time consuming and more expensive as well as more authentic. The SENCER community has had to face these hurdles and the hurdle of leading change from lecture to active participatory learning not lecturing. We have our wounds!
5. Communities of Transformation rely on networks. National Center for Science & Civic Engagement works with 9 Centers of Innovation (e.g. SCI-West, SCI-NE) as well as EPSCoR, Campus Compact and others along with PoGil, PKal.

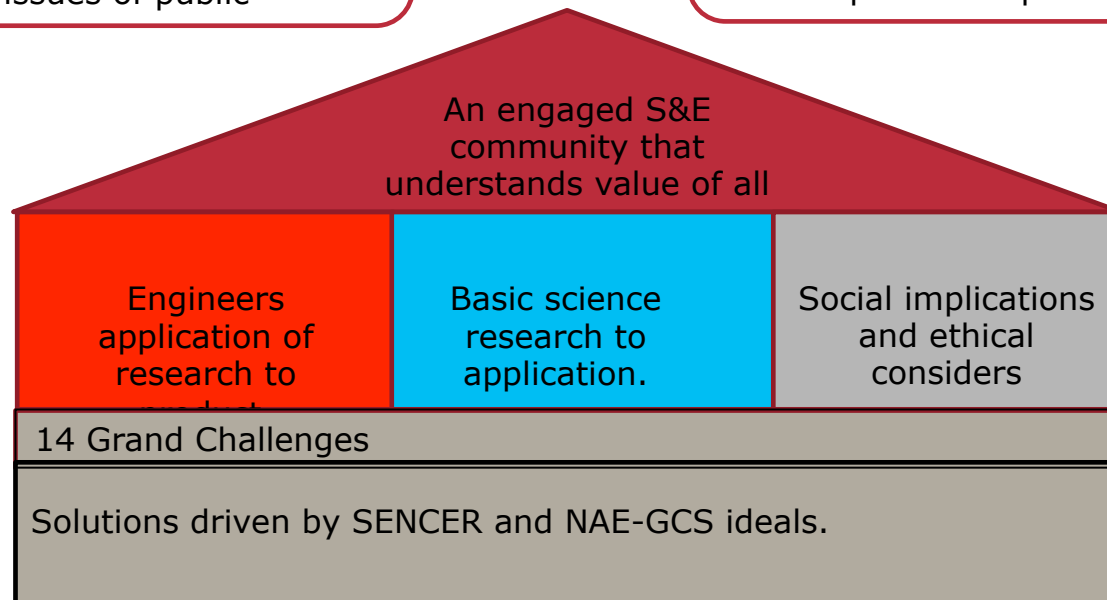
An Emerging Engineering CoT

Science Education for New Civic Engagements & Opportunities

- Focus contested complex issues
- Centers responsibility for student learning
- Reveals power and limits of S&E alone
- Teaches through issues of public

National Academy of Engineering Grand Challenge Scholars Program

- Interdisciplinary
- Global perspective
- Research
- Service learning
- Entrepreneurship



As a Community of Transformation

It is **our responsibility** to arm our students with multiple opportunities build their capacity as citizens and not just accumulate 120 credits or 45 courses. Our mission is to provide the *opportunity* for students to experience and develop their talents and use them throughout their lives for the greater good of society.

SENCER and the NCSCE *aims to empower citizens as responsible, lifelong learners to apply the knowledge, values, and methods of science to the complex civic challenges facing our democracy.*