Community and Online Resources Leading to National Impact -- Lessons from SERC

Sean Fox
Technical Director

Science Education Resource Center, Carleton College

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SERC in one Slide:

- We work collaboratively on national-scale projects to improve STEM education
- Grant funded (100+ NSF grants over 17 years)
- Online resources are key in most of our projects:
  - 38,000 pages of content
  - 5 million annual visitors
  - Participants/contributors from over 1100 institutions

https://serc.carleton.edu

Example #1: On the Cutting Edge

- Professional Development Program for Undergraduate Geoscience Educators
- Improved teaching practice nationally over 10 years.
- 5,000 page website
- 118 workshops directly reaching 2800 participants

https://serc.carleton.edu/NAGTWorkshops/
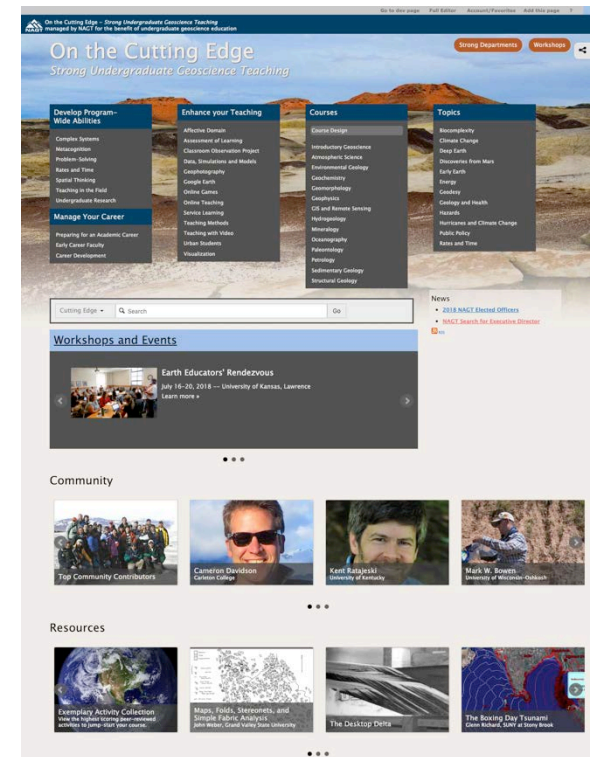
Manduca, C.A., Iverson, E., Luxenberg, M., Macdonald, R.H., McConnell, D., Mogk, D., and Tewksbury, B., 2017. Improving undergraduate STEM education: The efficacy of discipline-based professional development, *Science Advances*, Vol. 3, no. 2.

On the Cutting Edge

- Focused on changing teaching practice but organized around course content and disciplinary interests
- The model:
    - Work with groups of interest peers
    - Contribute your current best stuff
    - Discuss/refine/review in the context of generic best practices
    - Make it all visible for peers who weren't present

Example #2: InTeGrate

- *Interdisciplinary Teaching about Earth for a Sustainable Future*
- A shift in the undergraduate curriculum
- Project started in 2012 with materials available starting 2015
- So far has reached over 1,000 instructors, 100,000 students

InTeGrate

- Multi-institution teams developed new course materials (36 different 2-12 week modules)
- Parallel focus on institutional change
  - Profiled the larger scale change at 17 institutions
    - Serve as exemplars
  - Extracted 5 core strategies
    - Provide guidance on how to execute the strategies drawing on examples from the exemplar profiles.
  - Use the materials to drive webinars and traveling workshop program.

Strategies that have worked -1
- Align your approach carefully with work people already have to do.
    - Who are the correct change agents?
    - Why is doing your thing more important (to them) than what's already on their plate?
    - How to engage with the existing players/partners?

Strategies that have worked -2
- Have the community build the resource
    - Have them share the best of what they are doing (how to motivate this?)
    - Engage in reflection/revision informed (gently) by research/best practices
    - Make visible through a collection that supports a positive reinforcement loop via social norming.
    - Synthesize themes out of the collection
    - May require multiple overlapping collections to appeal to group identities.
    - Tools and processes need to be carefully aligned.

Strategies that have worked -3
- Get it used
  - Sense of ownership can drive use because of norming and trust of peers.
  - Use it to drive traditional professional development (workshops, webinars, etc…)
  - Integrate with existing national and institution efforts that hit the right audience with an overlapping interest.
  - Traveling workshop model
  - Everything visible on the web and structured in way that aligns with its likely use (takes extra effort)