SAGE 2YC

2yc Faculty as Agents of Change

SAGE 2YC: Sustaining Faculty Learning

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Implement Active Learning Strategies

"Learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, apply it to their daily lives. They must make what they learn part of themselves."
~~Arthur W. Chickering and Zelda F. Gamson, "Seven Principles for Good Practice"

Coming Soon!

Active learning is a broad term for student-centered approaches to teaching and learning in which the responsibility for learning is placed upon the student, often working in collaboration with classmates. In active learning teachers are facilitators rather than one way providers of information. The presentation of ideas, often introduced through straight lecture, is de-emphasized in favor of interactive class discussion, problem solving, cooperative learning, and writing exercises (graded and ungraded). A large list of active learning strategies is found on the Pedagogies in Action (PIA) website.

Each of the many engaged teaching strategies are designed for specific purposes, and although they are all uniquely appropriate for different contexts, they share some common threads. As a group, active learning pedagogies:

- are purposeful, meaningful, and congruent with work done in the discipline (good "approximation of practice")
- are aligned with outcomes and assessments
- promote student-student and instructor-student interactions
- respect diverse talents and ways of learning

Why Use Active Learning?

The data from education research studies are clear that:

- student engagement increases with student-centered learning techniques.
- engaged students are more successful and fail less often.
- active learning promotes learning competencies and habits of mind which are often more valuable to employers than simple content knowledge.

PIA: Why Use Engaged Pedagogies? »

Broaden Participation through Diversity and Inclusion

Bringing new ideas and people into the geosciences (and STEM more broadly) is going to be increasingly important as society tackles the large, complex issues facing it over the coming decades. Geoscience needs to attract students from populations traditionally underrepresented in the discipline and support their participation and success in order to reach into communities that will be affected by a changing world.

Broadening participation in geoscience by students from these groups includes drawing them into the discipline in the first place, supporting them through critical transition points, helping them persist in the discipline through graduation, and preparing them to be successful in their career after graduation. Much research has been done into what practices have shown success and there is a list of selected references at the bottom of the page.

Strategies for Broadening Participation

Develop Students' Science Identity
Students who are able to envision themselves as scientists are much more likely to graduate from a STEM field and enter a career in that field than those unable to do so. Actively helping students build such an identity for themselves is particularly important for those from groups from nonstereotypical backgrounds as well as those with no close connection to a scientist role model.

Mitigate the Impacts of Stereotype Threat and Solo Status
Stereotype threat affects members of any group about whom there exists some negative stereotype, and can lower students' performance. Solo status is the experience of being the only member of one's particular community present in a group, which can also compromise learning. These are common concerns for minority or non-traditional students. This web page offers four strategies for alleviating these potential setbacks.

Support First-Generation Students at Two-year Colleges
Many students from underrepresented groups are among the first in their families to attend college. Faculty who understand how to help first-generation college students be successful will be able to support all of their students better.

Design and Adapt Instruction to Make Courses Accessible
Diversity and inclusion should not be limited to racial or cultural considerations. Many students with physical or mental disabilities

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Develop Students' Science Identity

"If students hold stereotypes that portray scientists as a different 'kind of person' than themselves, those students might conclude they are not 'science people.' This mismatch between a student's personal sense of identity and a science identity can hamper persistence in STEM."
--- Schinske et al., 2016

Science Identity

Every individual encompasses multiple identities. When students are considering their future careers and educational pathways, one of the factors involved in their decisions is whether or not they can align their perception of a career with one or more of their personal identities. If they cannot see "someone like them" (whatever that means to them) doing a job, it is less likely that they will follow that particular path (Margolis and Fisher, 1997). Indeed, having a strong science identity is one of the only good predictors of moving into a science-related career field after graduation (Stets et al., 2017).

Studies have shown this to be a significant factor in the lack of diversity in STEM fields (Carlone and Johnson, 2007; Hurtado et al., 2009; Zahra et al., 2013). Even though some progress has been made in recent decades, these fields continue to be dominated by white, cis-gendered males which can make it hard for other kinds of students (people of color, women, gender-nonconforming, etc.) to see a place for themselves in STEM. In addition, many students do not come from families or communities where they were exposed to role models from the sciences.

Faculty can help students develop a Science Identity by showcasing examples of scientists who do not fit common stereotypes, helping students see scientists as whole people they can relate to, giving students opportunities to practice doing and talking about science, and highlighting content topics that are relevant to students' lives.

Related: Mitigate Stereotype Threat and Solo Status »

Strategies to Promote Science Identity Development

Jump Down To: Practice Doing Science | Highlight Topics' Relevance to their Lives

Showcase Nonstereotypical Scientists
A powerful way to help students see a place for themselves in STEM is to feature scientists who, collectively, present diverse examples of who scientists are and how science is done (Shin et al., 2016). Explicitly show diversity in your teaching. Use a

Building a Science Identity
Goal: Promote the development of a science identity in your students.

Example Scientist Spotlight
Dr. Karletta Chief is an assistant professor and extension specialist in the Department of Soil, Water,

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Implement Active Learning Strategies

Research is clear: students learn more and retain what they learn longer when faculty implement active learning strategies. This suite of pages supports faculty using a variety of active learning strategies effectively and in expanding their active learning toolkit.

The information on how to use these pedagogies will include:

- A set of posters developed by Rachel Beane (Bowdoin College) with guidance on implementing several common active learning strategies.
- Recommendations about which methods are good for common teaching and learning objectives.
- Links to the extensive teaching modules and resources at Pedagogy in Action.
- Guidance from the **Cutting Edge Classroom Observation Project** on making a more student-centered classroom.

Diversity and Inclusion

The geoscience workforce is significantly less diverse than the US population, and even lags behind other STEM disciplines. Yet there are evidence-based practices for broadening participation. This suite of pages supports 2YC faculty in implementing those practices.

- Develop Students' Science Identity
- Mitigate the Impacts of Stereotype Threat and Solo Status
- Support First Generation Students at Two-Year Colleges
- Design and Adapt Instruction to Make Courses Accessible
- Support the Whole Student

In addition, resources from partners like InTeGrate and GETSI have been included to provide faculty with additional information guidance.

- Develop Cultural Competency
- Address Societally Relevant Issues

Develop Students' Science Identity

Showcase Nonstereotypical Scientists
From pictures on the syllabus and website to spotlights of interesting scientists research course content, draw students' attention to individuals who don't fit the scientist stereotype so that more students can a future for themselves in science.

Practice Doing Science
Any activity in a course that mimics what scientists do can be used to "remind" students that they are doing science. Lab activities, field trips, even short in-class activities that involve building skills or habits of mind can reinforce students' identity as a scientist.

Highlight Topics Relevance to Students' Lives
Real-world examples can show how geoscience is relevant to students' families and communities because it can address issues they care about. This kind of work transforms abstract classroom materials into concrete actions that students can relate to.

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http://serc.carleton.edu/sage2yc/strengthen_faculty.html