TEACHING THE STUDENTS YOU HAVE: INSIGHTS AND STRATEGIES FOR INCLUSIVE INSTRUCTION

Karin B. KIRK, Freelance Educational Writer, Bozeman, MT
Katherine M. KULICK, Modern Languages and Literatures Department, College of William and Mary
Sharon H. DEFUR, School of Education, College of William and Mary
Virginia MCLAUGHLIN, School of Education, College of William and Mary
John R. MCDARIS, Science Education Research Center, Carleton College
Eric M.D. BAER, Highline College
R. Heather MACDONALD, Department of Geology, College of William and Mary

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ABOUT THIS PROJECT

SAGE 2YC
Advancing and Supporting Geoscience Education in Two-Year Colleges

Two-year colleges play an increasingly important role in producing earth-science literate citizens, developing a competent and creative geoscience workforce, teaching science to pre-service K-12 teachers, and providing a foundation for broadening participation in the geosciences.

Through its website and workshops, the SAGE 2YC project disseminates advances in STEM education to
- improve teaching
- support students in geoscience technical training
- help prepare geoscience majors and pre-service teachers for college transfer.

Students arrive in our classrooms with a variety of backgrounds, strengths, beliefs, phobias, and reasons for enrolling in a particular course. While this mix can present challenges for students and faculty alike, it also offers rewarding opportunities to engage with students from many walks of life.

This poster highlights 5 new modules designed to help faculty teaching diverse audiences. However, the insights and instructional strategies presented here have utility beyond these specific student populations and beyond the two-year college setting.

Science Education Resource Center @ Carleton College

http://serc.carleton.edu/sage2yc

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THE PIONEERS OF THEIR FAMILIES

First Generation College Students

First generation college students are those whose parents have not obtained education beyond high school. But beyond that most basic definition, this diverse group of students has traits, motivations, and challenges that distinguish them from other types of students.

- Two-thirds of first generation students are women.
- First generation students are slightly older than traditional college-age, with a median age of 24. About one-third of first-generation students at 2YCs are minorities.
- First-generation students have lower household income than continuing-generation students.
- They are likely to be pursuing education to build job skills, increase earning power, and/or make a career change.
- They tend to be were more satisfied with their college experiences than their cohorts whose parents attended college (Nomi, 2005).

Family challenges

- First-generation students do not have the benefit of a family culture in higher education.
- Families may not understand the demands of college life.
- Ultimately, first-generation students can feel marginalized by both the family culture they are leaving behind and the academic culture they are trying to join.

Academic challenges
- Unfamiliar with how to navigate academic systems like financial aid, advising, office hours, and other aspects of college life.
- Often enter college with weaker academic preparation than continuing-generation students.
- Higher likelihood of leaving college without a degree. Attrition is particularly acute during the first year of college.
- Only one forth of first-generation college students obtain a bachelor's degree; compared to two-thirds of continuing-generation students (Chen 2005).

http://serc.carleton.edu/sage2yc/studentsuccess/firstgen/

Strategies for first-generation student success

- Build career connections into course topics
- Provide guidance through the intricacies of the academic system
- Create a validating classroom environment
- Build academic self-efficacy
- Develop self-regulated learning skills
- Build a sense of community
- Be sensitive to the needs of ELLs
- Mitigate the impacts of stereotype threat and solo status
- Develop cultural competency

TEACH STUDENTS *HOW* TO LEARN

Self-Regulated Learning

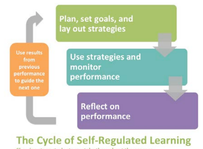
Self-regulated learning addresses how students approach their learning, work toward goals, and evaluate their performance.

Students who practice self-regulated learning can
- improve their academic performance,
- find value in their own learning process,
- continue to be effective learners once they enter the workforce.

It seems as though self-regulated learning can make the difference between academic success and failure for many students.

Zumbrunn et al. (2011)

These strategies can be especially profound for students who are
- trying to learn unfamiliar topics,
- who come to college academically underprepared,
- who are frustrated or de-motivated by setbacks.



Ultimately, students benefit by learning about themselves, what their strengths and weaknesses are, and how they can manage their time and their learning strategies most efficiently (Zimmerman, 2002).

Activities that Develop Self-Regulated Learning

- Think-pair-share
- Retrieval practice
- Sorting, "chunking," and organizing information
- Reading reflections
- Exam wrappers
- Self-reflection
- Class notebooks

http://serc.carleton.edu/sage2yc/studentsuccess/self_regulated/

BUILD FROM KNOWN TO UNKNOWN

English Language Learners

English Language Learners are currently the fastest growing segment of the public school student population (K-12) in the United States. Two-year colleges have already begun to provide instruction to this new wave of undergraduate students.

Cultural Challenges

Non-native speakers of English, and those who teach them, face challenges in the classroom often due to the cultural perspectives that they bring to the tasks of learning and teaching. We each view the world through our own cultural lens and miscommunication may occur when we do not recognize or understand these cultural variations.

- Interpreting non-verbal behavior
- Differing concepts of time
- Understanding the role of silence
- Variations in narrative styles
- Class participation expectations
- The processes of science education

Language and Comprehension Challenges

Second language acquisition passes through a series of stages and takes more time than many people realize. At the point where students appear fluent and comfortable using English in social settings, their success in academic settings may still be at risk. The language skills needed for academic success are quite different from those necessary for basic interpersonal relationships and everyday life.

- Scientific notation
- Disciplinary use of vocabulary and syntax
- Make connections between what the student already knows and the new content material
- Provide appropriate scaffolding support
- Strategies for comprehension and problem-solving

Today, about one in four students in community colleges is an immigrant and the numbers are increasing"

- Crandall and Sheppard, 2004

The broad heading of "English Language Learners" includes several subsets of individuals who may have distinct instructional needs:
- International students
- Immigrant students
- Migrant students
- Generation 1.5 students (non-native speakers of English who were born or educated in the U.S.)

http://serc.carleton.edu/sage2yc/studentsuccess/geo_ell/

CREATE AN INCLUSIVE ENVIRONMENT

Supporting Students with Disabilities

Differing abilities are a natural part of human existence. Faculty are in a position to minimize challenges that a disability might create for students, and to then help these students change their college stories from struggling to success. As a community, the field of geoscience has demonstrated proactive leadership in the area of open access for all interested students.

- Students with disabilities comprise about 12% of the undergraduate enrollment in 2YCs (American Association of Community Colleges, 2015).

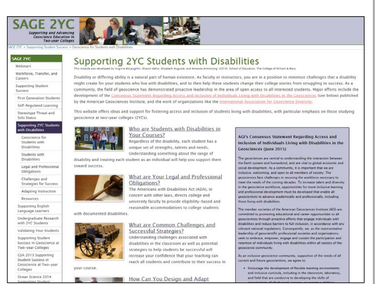
The disabilities most commonly reported among community college students include:
- Learning disabilities,
- Emotional or psychiatric conditions,
- Orthopedic or mobility impairments,
- Attention deficit/hyperactivity disorders,
- Health impairments (Barnett & Jeandron, 2009; Raue & Lewis, 2011).

In all instances, it is up to the student to disclose the disability. For a variety of reasons—particularly fear of stereotypes—students may be reluctant to self-identify.

Adapting instruction
- Consider **accessibility** with lab equipment, course web pages, for lectures, and for field work.
- Use **Universal Design for Learning**, a research-based set of principles to create learning environments that are accessible and effective for all.
- Provide **flexibility** in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged.
- **Reduce barriers** in instruction, provides appropriate accommodations, supports, and challenges, **while maintaining high achievement expectations** for all students.

For example, you might...

- Heighten student *engagement* by offering choices of readings, instructional media, and formats for interacting.
- Vary *representation* of content by videotaping lectures for review, facilitating small group and online discussions, and suggesting optional readings and resources.
- Allow for multiple means of *expression* as alternatives to typical papers and tests by encouraging projects and multimedia presentations.



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THE ANTIDOTE TO POWERLESSNESS

Empowering Students with Validation

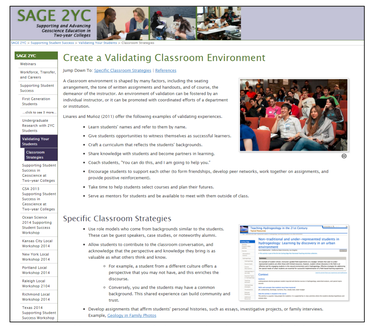
All students contribute value to the learning community, are worthy of being there, and are capable of success. That is the essence of validation. Taking steps to create an atmosphere of validation can be profound, particularly for at-risk students.

Specific Classroom Strategies

- Use role models who come from backgrounds similar to the students. These can be guest speakers, case studies, or noteworthy alumni.
- Allow students to contribute to the classroom conversation, and acknowledge that the perspective and knowledge they bring is as valuable as what others think and know.
- Build in opportunities for students to be successful, so they can begin to trust their abilities and boost their academic self-efficacy.
- Develop assignments that affirm students' personal histories, such as essays, investigative projects, or family interviews.
- Use geologic or geographic locales that represent students' backgrounds and cultures.
- Emphasize earth science issues that are relevant to students. For example, when studying climate change, urban students may find little connection to sea ice, but are more likely to be interested in the urban heat island effect.
- Point out how skills and content from your course are connected to the students' overall development. For example, using Excel to plot stream discharge or ocean currents also builds spreadsheet skills that are needed for accounting, business, management, and many other fields.
- Assign group work to coach students to work together, learn to validate each other, and build an academic/social network.

The impact of validation on students who have experienced powerlessness, doubts about their own ability to succeed, and or lack of care cannot be understated. Validation helped these students acquire a confident, motivating, "I can do it" attitude, believe in their inherent capacity to learn, become excited about learning, feel a part of the learning community, and feel cared about as a person, not just a student.

-Linares and Muñoz, 2011



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