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CURRENT INSIGHTS

Recent Research on Students' Identities: Advancing Theory and Practice to Disrupt Inequities

Julia Gouvea

This installment of Current Insights features recent research on identity development, with implications for equity in science and mathematics education.

MEETING REPORT

Undergraduate Biology Education Research Gordon Research Conference: A Meeting Report

Erin L. Dolan, Michelle Borrero, Kristine Callis-Duehl, Miranda M. Chen Musgrove, Joelyn de Lima, Isi Ero-Tolliver, Laci M. Gerhart, Emma C. Goodwin, Lindsey R. Hamilton, Meredith A. Henry, Jose Herrera, Bethany Huot, Stacey Kiser, Melissa E. Ko, Marcy E. Kravec, Mark Lee, Lisa B. Limeri, Melanie E. Pepper, Debra Pires, Juan S. Ramirez Lugo, Starlette M. Sharp, and Nicole A. Suarez

This report provides a broad overview of the 2019 Undergraduate Biology Education Research Gordon Research Conference, titled “Achieving Widespread Improvement in Undergraduate Education,” and the associated Gordon Research Seminar, highlighting major themes that cut across invited talks, poster presentations, and informal discussions.

ESSAYS

Resources for Teaching and Assessing the *Vision and Change* Biology Core Concepts

Janet L. Branchaw, Pamela A. Pape-Lindstrom, Kimberly D. Tanner, Sarah A. Bissonnette, Tawnya L. Cary, Brian A. Couch, Alison J. Crowe, Jenny K. Knight, Katharine Semsar, Julia I. Smith, Michelle K. Smith, Mindi M. Summers, Caroline J. Wienhold, Christian D. Wright, and Sara E. Brownell

A suite of resources aligned with the core concepts of *Vision and Change* are presented to help instructors teach and assess student understanding of the core concepts.

Signaling Inclusivity in Undergraduate Biology Courses through Deliberate Framing of Genetics Topics Relevant to Gender Identity, Disability, and Race

Karen G. Hales

This essay explores topic-specific inclusive frameworks and classroom approaches for genetics concepts related to gender identity, disability, and race.

Scientific Societies Fostering Inclusive Scientific Environments through Travel Awards: Current Practices and Recommendations

Verónica A. Segarra, Leticia Vega, Clara Primus, Candice Etson, Ashley Guillory, Ashanti Edwards, Sonia C. Flores, Catherine Fry, Susan L. Ingram, Mark Lawson, Richard McGee, Stephanie Paxson, Laura Phelan, Kirsta Suggs, Elizabeth Vuong, Latanya Hammonds-Odie, Michael J. Leibowitz, MariaElena Zavala, J. Luis Lujan, and Marina Ramirez-Alvarado

This essay compares the approaches that scientific societies in the ACCESS meta-organization use to implement and assess travel award programs for URM trainees and presents a set of recommendations, including both short- and long-term outcomes assessment in populations of interest and specialized programmatic activities coupled to travel award programs.

Communicating Complex STEM Program Evaluation to Diverse Stakeholders

Philip M. Reeves, Aiyana Bobrownicki, Melanie Bauer, and Mark J. Graham

This methods essay describes a three-stage method for developing progressively less complex visualizations to improve communication about program evaluation with wider audiences by engaging each stakeholder with respect to his or her knowledge of the program and/or his or her knowledge of the evaluation process.

ARTICLES

The Tyranny of Content: “Content Coverage” as a Barrier to Evidence-Based Teaching Approaches and Ways to Overcome It

Christina I. Petersen, Paul Baepler, Al Beitz, Paul Ching, Kristen S. Gorman, Cheryl L. Neudauer, William Rozaitis, J. D. Walker, and Deb Wingert

This article proposes that a content-coverage approach to teaching can be a barrier to adopting more learner-centered active-learning approaches to teach biology. It includes strategies that instructors can implement to move to a learner-centered approach incorporating active learning.

The Academic Career Readiness Assessment: Clarifying Hiring and Training Expectations for Future Biomedical Life Sciences Faculty

Laurence Clement, Jennie B. Dorman, and Richard McGee

The Academic Career Readiness Assessment (ACRA) represents the qualifications and levels of achievement required to obtain a faculty position in the life sciences across institutions, providing trainees with the information needed to prepare for a faculty position, regardless of the knowledge or abilities of their mentors.

Uncovering Factors Influencing Instructors’ Decision Process when Considering Implementation of a Course-Based Research Experience

Elizabeth A. Genné-Bacon, Jessica Wilks, and Carol Bascom-Slack

This paper discusses the results of a qualitative study, framed in diffusion of innovations theory, which explores the decision-making process of undergraduate instructors interested in implementing a short-duration, modular, course-based undergraduate research experience (CURE).

Fear of Negative Evaluation and Student Anxiety in Community College Active-Learning Science Courses

Virginia R. Downing, Katelyn M. Cooper, Jacqueline M. Cala, Logan E. Gin, and Sara E. Brownell

Twenty-nine students enrolled in community colleges were interviewed to probe factors that affect their anxiety in active-learning science courses. Student anxiety decreased when students perceived that active learning enhanced their learning, and fear of negative evaluation was the primary construct underlying student anxiety in active learning.

An Exploratory Study of Students with Depression in Undergraduate Research Experiences

Katelyn M. Cooper, Logan E. Gin, M. Elizabeth Barnes, and Sara E. Brownell

This study explored the undergraduate research experiences of 35 students who identify as having depression. It identified ways that depression affects students’ research experiences and ways that research negatively and positively impacts undergraduate depression.

Entering Research Learning Assessment (ERLA): Validity Evidence for an Instrument to Measure Undergraduate and Graduate Research Trainee Development

Amanda R. Butz and Janet L. Branchaw

The *Entering Research Learning Assessment* (ERLA) measures undergraduate and graduate research trainee learning gains in the seven areas of trainee development described in the *Entering Research* conceptual framework. Validity evidence for the ERLA trainee self-assessment and mentor assessment of trainee learning gains and recommendations for use are presented.

Developing the DELTA: Capturing Cultural Changes in Undergraduate Departments

Courtney Ngai, Mary E. Pilgrim, Daniel L. Reinholz, Joel C. Corbo, and Gina M. Quan

Understanding departmental culture is important for sustained change, so the Departmental Education and Leadership Transformation Assessment (DELTA) survey was developed to characterize departmental culture around undergraduate education. A five-step process was used to develop and validate the items in the DELTA survey. This survey can be used to quantitatively characterize a department's culture.

Diving into the Details: Constructing a Framework of Random Call Components

Alex H. Waugh and Tessa C. Andrews

Random call has potential benefits and costs for students, yet little is known about how it is actually implemented or the reasoning underlying implementation decisions. This interview study investigates how 12 random call users make decisions. A framework of components of random call that can inform future studies of effects on students is proposed.

Gender Differences in Student Participation in an Active-Learning Classroom

Stephanie M. Aguillon, Gregor-Fausto Siegmund, Renee H. Petipas, Abby Grace Drake, Sehoya Cotner, and Cissy J. Ballen

Gender gaps were observed in multiple categories of student participation in an active-learning biology course. Despite similar performance on in-class assessments, student surveys suggest that men and women experience the classroom differently. The results suggest that active learning is not a panacea for equitable participation in science, technology, engineering, and mathematics courses.

Positive Impact of Multiple-Choice Question Authoring and Regular Quiz Participation on Student Learning

C. Daniel Riggs, Sohee Kang, and Olivia Rennie

Active-learning exercises such as the generation of exam questions are a proven method of increasing student engagement and promoting critical-thinking skills. Students were encouraged to use questions generated by their peers to help promote learning of course materials. A statistically significant correlation between use and performance is reported.

“Accepting Evolution Means You Can’t Believe in God”: Atheistic Perceptions of Evolution among College Biology Students

M. Elizabeth Barnes, Hayley M. Dunlop, Gale M. Sinatra, Taija M. Hendrix, Yi Zheng, and Sara E. Brownell

In two studies, it was found that the perception that evolution is atheistic is related to less comfort while learning evolution, more perceived conflict between religious beliefs and evolution, and lower acceptance of evolution among religious undergraduate college biology students.

On the Cover

Daniela Malide. NIH3T3-co5FPs_Mouse fibroblasts NIH-3T3 cells cotransduced with five fluorescent proteins. 2nd place image. 2019 ASCB Green Fluorescent Protein Competition.