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GENERAL ESSAYS AND ARTICLES

CURRENT INSIGHTS

Ethical Dilemmas in Current Uses of AI in Science Education

Julia Svoboda Gouvea

This installment of *Current Insights* reviews recently published articles which examine ethical dilemmas concerning the use of artificial intelligence (AI) in science education.

EVIDENCE-BASED TEACHING GUIDES

Supporting Student Competencies in Graph Reading, Interpretation, Construction, and Evaluation

Stephanie M. Gardner, Aakanksha Angra, and Joseph A. Harsh

This Evidence-Based Teaching Guide is a synthesis and summary of important instructional priorities, foundational research articles, and instructional resources to provide recommendations for instruction to improve undergraduate biology student competence with the practices of graphing.

ANNOTATIONS OF LSE RESEARCH

Anatomy of an Education Study: Asset-Based Research to Uncover Black Science Majors' Community Cultural Wealth

Tatiane Russo-Tait, and Rebecca M. Price

Annotations of LSE Research: Enhancing Accessibility and Promoting High Quality Biology Education Research

Kyle J. Frantz, Rebecca M. Price, Tatiane Russo-Tait, and Clark R. Coffman

ESSAY

Change as a Scientific Enterprise: Practical Suggestions about Using Change Theory

Daniel L. Reinholz and Tessa C. Andrews

This essay discusses how change theory can and should inform reform efforts in biology education and investigations of change. It clarifies terminology, showcases examples using change theory effectively, and provides suggestions and resources.

ARTICLES

Participation in Undergraduate Research Reduces Equity Gaps in STEM Graduation Rates

Heather Haeger, Elia Hilda Bueno, and Quentin Sedlacek

Results from this multi-institution study suggests that the higher rates of academic success for undergraduate researchers can be generalized beyond a single program or institution. As we seek ways to close education gaps and increase graduation rates, undergraduate research can be a meaningful practice to improve student success.

Emotion, Fact, and Anthropogenic Disturbances: Undergraduate Attitudes Toward Wildfire and Urbanization after a Brief Intervention

Mali M. Hubert, Maryrose Weatherston, and Elisabeth E. Schussler

Special attention has been given to understanding attitudes toward climate change; however few studies exist on understanding how people perceive other anthropogenic disturbances. This research assessed attitudes of undergraduate students toward two anthropogenic disturbances, wildfire and urbanization, and students' willingness to take action.

Designing Activities to Teach Higher-Order Skills: How Feedback and Constraint Affect Learning of Experimental Design

Eli Meir, Denise Pope, Joel K. Abraham, Kerry J Kim, Susan Maruca, and Jennifer Palacio

Active learning approaches enhance student learning, but what features promote optimal learning? By manipulating the design of a simulation-based tutorial on experimental design, we find specific immediate feedback has direct positive learning effects, while small changes in constraint has little effect, suggesting guidance for activity design.

Metacognitive Exam Preparation Assignments in an Introductory Biology Course Improve Exam Scores for Lower ACT Students Compared with Assignments that Focus on Terms

Diane K. Angell, Sharon Lane-Getaz, Taylor Okonek, and Stephanie Smith

Completing open-ended metacognitive assignments ahead of exams resulted in higher exam scores for lower ACT students compared to those assigned to define terms. However, asking students such open-ended questions about their understanding of the material and their overconfidence did not result in their adjusting their grade predictions.

Broadening Participation in Biology Education Research: A role for affinity groups in promoting social connectivity, self-efficacy, and belonging

Miranda M. Chen Musgrove, Melissa E. Ko, Jeffrey N. Schinske, and Lisa A. Corwin

Broadening participation in BER requires that we engage researchers from underserved groups. We investigated belonging in an affinity group aimed at engaging community college faculty (CCF) in BER. Social connectivity within the group correlated with persistent activity while group belonging correlated with self-efficacy and belonging in BER.

Try Before You Buy: Are There Benefits to a Random Trial Period before Students Choose Their Collaborative Teams?

Sukhada Samudra, Cynney Walters, Destiny Williams-Dobosz, Aarati Shah, and Peggy Brickman

Our efforts to maximize interactions between students before groups were formed did not significantly improve group diversity or lessen conflict. It did however result in avoidance of persistently poorly prepared students.

Christian Student Experiences During Peer Interactions in Undergraduate Biology Courses

Baylee A. Edwards, Chloe Bowen, M. Elizabeth Barnes, and Sara E. Brownell

By interviewing 30 Christian undergraduate students, we found that Christians perceive their identity is salient during peer interactions in biology. They feel revealing their identity to peers is beneficial, yet they rarely do so, largely because they anticipate stigma. However, they experience far less stigma than they anticipate.

Content Coverage as a Persistent Exclusionary Practice: Investigating Perspectives of Health Professionals on the Influence of Undergraduate Coursework

Brie Tripp, Sherri Cozzens, Catherine Hrycyk, Kimberly D. Tanner, and Jeffrey N. Schinske

Interviews with healthcare professionals suggest prerequisite course content misaligns with knowledge needed in the healthcare workforce and an overcommitment to course content might exclude capable individuals from the field. These findings challenge assumptions surrounding the justification for prerequisite STEM content for career preparation.

A Study Planning Exercise Associated with Decreased Distraction Levels among Introductory Biology Students

Elise M. Walck-Shannon, Shaina F. Rowell, April E. Bednarski, Ashton M. Barber, Grace J. Yuan, and Regina F. Frey

This article describes how students incorporated distraction into their study plans. During planning, students formed an implementation intention (IF[obstacle], THEN[solution]) statement. Students who planned for distraction obstacles reported less distraction during studying than students who planned for other obstacles.

Developing Student Expertise in Evolution: Cognitive Construals Complement Key Concepts in Student Representations

Kamali Sripathi, and Aidan Hoskinson

Cognitive construals enrich the developing picture of student expertise in evolution.

SPECIAL ISSUE ON COMMUNITY COLLEGE BIOLOGY EDUCATION RESEARCH

Family Helps Transform the STEM Pathways of Community College Women of Color STEM Majors

Melo-Jean Yap, Jasmine Foriest, Kalli Walker, Sara Sanford, and Adrienne Rice

Family influenced STEM career transformation by providing (1) sustained encouragement that feeds aspirational capital, (2) familial capital that fosters resource sharing and intellectual stimulation between siblings and (3) fortification of resistant capital from witnessing family members struggle with navigating oppressive medical institutions.

On the Cover

Enlarged late endosomes (green) embedded in meshwork of Lewy neurites (red). By Laura A Volpicelli-Daley University of Alabama, Birmingham