Improving Racial Diversity in STEM with Culturally Responsive Pedagogy

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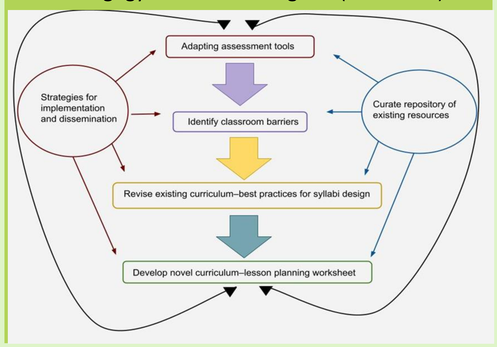
SAB

Meet UNIDE

The Undergraduate Network for Increasing Diversity of Ecologists and Environmental Scientists (UNIDE) focuses on

- Identifying socio-cultural bias in disciplinary knowledge in environmental fields (EE)
- Developing research-informed teaching practices and interventions to increase diversity of ecologists.
- Building a network of collaborators and Student Advisory Board (SAB) change agents
- Pedagogy subcommittee goals (see below)



1.Curate Repository of Existing Resources

Audience	Students	Discipline	Practice	Setting	Affective	Ideological Issues	Theory
Instructors	Asian	Bio	Active Learning	Classroom	Belonging	Language, Terminology	Framework / model
Departments	Black	EE	Assessment	Curriculum	Identity		
Faculty of Color	Disabled	STEM	Case studies	Field	Imposter syndrome		
Grad Students	First-gen	Any	Classroom barriers	Lab	Self-efficacy		
Other	Indigenous		Culturally responsive	Online	Other		
	Latine		In-class	Pre-college			
	Low SES		Mentoring	Other			
	Neurodivergent		Pre-class				
	Students of color		Research Experience				
			Service Learning				
			Writing				
			Other				

Fig. 1 UNIDE - Zotero literature tag categories

Our preliminary Google literature search using factors that affect recruitment and retention of URM in EE fields led to above tag categories for literature since 2015.

Join our UNIDE Resource Group and give us feedback! Scan QR code

2. Identify Classroom Barriers

Faculty

- Institutional and cultural barriers
- Lack of compensation for teaching, recognition for mentoring, and competency and PD opportunities

Graduate Teaching Assistants

- Time needed to prepare to teach, grade papers and hold office hours

Students

- Lack of representation/role models
- Family and cultural barriers
- Psychosocial barriers (e.g., stereotype threat, lack of belonging, etc.)
- Academic preparation
- Financial
- Institutional (classroom)
- Racial (racism, exclusion)
- Inquiry-based curriculum

EE-specific: based on focus groups, literature, SAB (e.g., field-safety, cultural mismatch on views of environment and human-nature relations)

3. Revise Curriculum

Our UNIDE syllabus evaluation rubric uses a criterion Likert scale 0-3 to identify whether the syllabus contains criteria identified as culturally responsive in EE courses

Categories unique to UNIDE mission include:

- Syllabus narrative addressing lack of inclusion issues
- Focus on learning using different cultural/societal lenses
- Focus on promoting belonging and growth
- Placing course content in a larger context
- Required readings include those written by a diverse array of authors
- Syllabus addresses biases in the practice of science
- Includes student-centered active learning that elevates human dimensions of ecology and environment

Add your syllabus:
Scan QR code below

Steering Committee

Conclusions and Moving Forward

- Overturning barriers and biases in undergraduate education is critical to developing an equitable future for ecology and environmental sciences
- A wealth of resources exist, and UNIDE is working to synthesize these for practical use by instructors and course designers
- Our long-term goal is to sustain a community of practice comprising of ecology/environmental science instructors and pedagogy researchers
- We are working towards this by taking an inventory of current practices, reflecting and identifying areas of change, and starting with small steps!

Acknowledgements
We are thankful for the NSF RCN grant #2018939 Community members who have given their time in conversation and resources.

References: Scan the QR Code (see Zotero folder)

4. Implement and Disseminate

Implementation and dissemination is ongoing, primarily focused on:

- **Presentations** at relevant conferences, including ESA, SABER, NAAEE, etc.
- **Sharing online resources** (e.g., reference lists, syllabi, toolkits, etc.) through existing repositories and communities
- **Engaging an advisory board** of professionals engaging BIPOC students in environmental coursework, along with STEM BIPOC Student Advisory Board (SAB)
- Continuing to **build the network** of professionals developing and implementing culturally responsive pedagogy tools to update and improve them
- Fundraising to grow a **community of practice**

Want to join the network? Scan the QR code

5. Adapt Assessment Tools

Goals:

- Review and curate existing assessment tools
- Test tools in different contexts
- Collaborate with the SAB to understand inclusive practices that have been effective from student perspective

Challenges:

- Existing rubrics not ideally suited for structured evaluations of cultural responsiveness and inclusive course design in ecology/environmental science context
- Need an assessment method for identifying how teaching audiences get connected to place and habitat where we teach

6. Develop Novel Pedagogy Tools

Guided questions and resources for lesson planning, connected to ESA's 4DEE framework.

- **Ecological Concepts**: What are the sources of authority and methods of delivery (e.g. poems, news, podcasts, peer-reviewed articles, etc.) used to teach concepts?
- **Ecological Practices:** How is inclusivity and bias addressed in specific ecological practices (e.g., natural history, fieldwork, quantitative reasoning, working collaboratively, applying ecology)?
- **Human-environment:** How is cultural diversity integrated into human dimensions?
- **Cross-cutting themes:** Across lessons, how is ecology situated within broader themes of science, and how are biases challenged?
- **Classroom, and institutional climate:** What strategies are used to foster instructor approachability, student belonging, transparent expectations, and flexibility?