Unanswered from Q&A

Any thoughts on instructors acknowledging their positionality (present/historical) and its positive/negative impacts on classroom?

If we're going to acknowledge positionality into our classrooms, I think it's important for instructors to be intentional about how they incorporate that organizing concept in the course curriculum, in pedagogy and in learning community expectations. As faculty, we can model this by sharing aspects of our own identities as relevant to our role and identity as course instructor. I think it's really important to be intentional and thoughtful about this, so that students understand how this strategy is connected to the course. So, instructor positioning might be most effective when it is one of multiple integrated course activities that acknowledge the way that positionalities are critical to who sets and drives scientific agendas, who teaches and to whom, and what is being taught and learned in every science classroom.

Can we honor the charge of white supremist thinking in STEM by confronting it and unpacking it? We likely can't explain the extent of racial injustice in STEM as solely the impact of 'racists' in positions of power in STEM. So what are some examples of the race-unconscious, exclusive beliefs and policies and prerogatives that ostensible non-racists are deploying in our institutions that uphold white supremacy? And what is the theory of change for addressing these habits in the face of countervailing forces like individualism or academic freedom?

"I teach science, not sociology."
"I'm colorblind in the classroom. I teach everyone the same."
"Every student in my class has the same opportunity to succeed."

These are common sentiments from instructors who resist ideas of marginalization and bias (implicit or obvious) in the act of teaching, and who are perhaps also resistant to the idea that any learning is going on in a science classroom other than science content. I think these are all examples of a race-neutral, exclusive approach. I think practices can be race-neutral and exclusive too. For instance, the selection of students to participate in faculty research is often based on student academic performance, e.g. grade in the professor's course, precocious behavior in the classroom, etc. The students that stand out are the ones who get selected for this critical formative opportunity. Although the intention in this manner of selection is to select the "best" students, it likely excludes students whose class behavior may be strongly influenced by classroom dynamics, family upbringing, stereotype threat, or the need to protect themselves in an unwelcoming classroom climate. It's not at all clear why students with top grades are necessarily best prepared for success in the laboratory, especially in programs where the skills required to get top grades are different from those to be successful in research. Merit-based selection strategies may perhaps always be fraught with exclusivist outcomes, especially if the concept of merit has not been considered carefully and clearly defined.

Hi Dr. Bauerle, thank you very much for sharing with us today. Can you speak to what is going on specifically at JMU with respect to moving toward equity-based practices in biology classrooms and curricula?

The JMU Biology department has developed several initiatives that are meant to address equity. The introductory course for majors includes a year-long CURE, which provides opportunities for every student in the department to gain scientific and technical skills in the context of discovery research. This can effectively level the playing field, allowing for more equitable access to faculty research opportunities. In response to a growing number of transfer students in the biology program, the department created an "on-ramp" CURE since these students typically transfer into the curriculum at an intermediate level and thus would otherwise miss the introductory CURE.

With support from HHMI's Inclusive Excellence grant, the department has created in-house faculty development programs to support faculty efforts to learn and implement inclusive teaching practices. They have also built the BioCommons, a physical space to support student community and student-faculty collaboration, and including a dedicated space for the Biology Student of Color organization. The department has been active in acknowledging the experience of students of color on JMU's predominantly white campus (https://www.jmu.edu/biology/) and intentional in presenting the department as a community that is actively engaged in anti-racism and anti-oppression work on campus.

What are the largest obstacles to expanding this mindset to our colleagues? And how do we overcome those?

I think a good place to start is by paying attention to the data about student success at your institution. Who enters your STEM programs? Who persists and who switches or leaves? Having a good understanding of patterns of student experience and success on your own campus and in your own programs is important so that the strategies you design to address them are evidence-informed. I've been in conversation with colleagues at my institution (in areas outside of STEM) who argue that it's important to understand how the history of our institution is connected, sometimes in very active ways, with current structures and practices. Just as social scientists, several who I mentioned in my talk, have contributed to our better understanding the challenges for marginalized students, perhaps we may need to call on historians and other scholars to help us understand the implications of the white supremacist history of HE in America.

Have you considered the impact of holding departments accountable for the success of PEER students, so as to drive the difficult task of revising course content and insuring its relevance?

Absolutely, I think as a part of standard practice, all departments should be engaged in monitoring student success in their programs (e.g. retention/persistence, academic progress, access to research and other high impact opportunities, time to degree). It can be challenging to establish data collection practices and systems even though this information is collected by all

institutions, but it's critical data for informing equity-minded approaches. There are several national initiatives focused on this including the gateway project at Gardner Institute, AACU TRHT and TIDES initiatives, HHMI's Inclusive Excellence project, among others.

I LOVE the framework of building a more equity-minded system. Do you have any ideas of how to measure equity-mindedness in students/educators/researchers/academic leaders? It seems like this will be important in order to monitor our progress and determine what interventions are most helpful at getting us there.

Great question! I'm not aware of resources for measuring equity-mindedness in individuals. The Center for Urban Education has developed some tools for evaluating curricular programs and syllabi for racial and ethnic equity – this may be a great place to start!

Could you give an example of some types of micro affirmations that might be used in the classroom?

I encourage you to look at Mica Estrada's recent work on the impact of microaffirmations on student experience. Dewsbury and Brame's recent article in LSE on inclusive teaching describes empathy and positive classroom climate as essential elements. Microaffirmations might include the support you voice for LGBTQIA+ students in one on one conversations, or acknowledging the efforts of students who are PEERS to contribute their ideas and perspectives in group interactions.

Your point about the centrality of campus mission at HBCUs was compelling. Would you agree that HWIs often seem less focused on a common mission, or would you say that their mission is clear, and it's problematic?

I'm not sure how much time historically white institutions spend examining the connection between their historical and contemporary missions. What we know is that forty years of effort to ameliorate educational disparities in HE have unfortunately not resulted in significant systemic change.

Acknowledging that HBCUs do have a different mission from HWIs, is it appropriate that HWIs have broader missions, which will inevitably have a less consistent effect on campus operations?

The mission analogy I used brings up interesting questions. At one level, HBCUs and HWIs have exactly the same mission with respect to STEM: to develop the nation's talent and ensure a vital STEM enterprise for the good of society. What seems most appropriate is for all institutions, and perhaps especially HWIs which continue to serve the majority of college-going students, to examine and clearly enunciate the way in which contemporary mission evolves from, is shaped by institutional history. Everything from how students enter the academy (application practices), select majors (advising and entrance requirements), learn (pedagogy, curriculum) and ultimately enter the workforce as graduates (degree requirements, access to professional

opportunities) is impacted by institutional practice, policies and norms. Interrogating these may reveal opportunities to institute equitable practices that support students who continue to be underserved by programs that were not built for them. Take a look at Lindsey Malcom-Piqueux's article for an interesting analysis of the historical expansion of the US educational mission.

On the faculty/department side: it seems to me that a lot of positive work toward building inclusive STEM communities can be undone by the actions of a few (especially senior faculty/administrators)...any thoughts on how to remedy this given present-day academic systems/hierarchy?

Recalcitrant attitudes are nothing new in HE reform, but it is frustrating to feel that one or a small number of individuals can derail intentional efforts to advance equity. A couple of comments in response to your question. First, one of the most powerful ways to compel awareness is to make room for student voices in the conversation. I can recall a student panel delivered to an audience of university adminstrators and board members that changed the path of a conversation about race, ethnicity and student success, because the students were provided a forum to speak and they took the opportunity to share their experiences candidly and courageously. Second, why is it that we allow dynamics in the academy that enable individuals or small groups to stymy collective effort? What is it about department (or institutional) culture and governance? Finally, I think one of the hardest things about change leadership is maintaining the expectation that departments, faculty, administrators stay involved in the difficult and long conversations. This requires continual attention to individuals and dynamics and steadfast resolve to keep calling people back to the conversation. It's the job of administrators to intentionally support transformation efforts of their faculty and units – supports can be in the form of recognition, funding, space making.

In your estimation, how important is visibility for queer-identified faculty in STEM for building a sense of belonging for our students? Can you speak to this?

I will speak from my own experience here since as a white, queer-identified individual, the determination of how "out" to be has been a constant element in my academic career. Gender has at least as many external constructions as internal in my experience, and (binary or cis-) gendered expectations are a core element of science culture. I have continued to decide, not always as bravely as I would hope, to be open about my gender and sexual orientation. This is a personal decision that has implications for success and safety even in the face of virtuous ideals of the academy, and I respect the right for each queer/LGBTQIA+ scientist to make it in the manner that works best for them.

It occurs to me that if I decide to ignore or hide my queer identity in the classroom, I am at the very least precluding opportunities for a queer student to witness a positive role model or establish a connection that expands their safety – or worse, that I am inadvertently teaching that being in science means hiding a part of yourself, the very opposite of equity.

Finally, it warrants saying that for queer/LGBTQIA+ people, either decision (to be "out" or not) requires significant effort – this is the opportunity tax – and if I've got to expend it, I'd rather spend it being open about who I am and hope that this contributes in some small way to moving the academy toward integrity, inclusion and equity.

I'm interested in your idea around the transformation of self/policies/structures and this happening in tandem with the sustainment of work/research. Do you have examples/thoughts around how we can do this hard work of equity and transformation alongside our current responsibilities? (I'm thinking in relation to leaders/faculty who might say they don't have enough time/energy for this work given other responsibilities).

This is such an important question, as burnout is an ever present danger among equity-minded leaders in the academy. One of the long term transformations that we must continue to work for is shifting the incentive and reward systems in our institutions to reflect the hard work of building equity on our campuses. The stress and exhaustion that faculty who are PEERS and other marginalized faculty experience is real, and drains the academy of their vitality and creative contributions. The work of allyship and advocacy that many white faculty choose to do places demands on their time and creative work. A survival strategy must include having a support network of committed colleagues, at your own institution or through contacts in your professional community. This is one of the things that we emphasize in the curriculum for PKAL's STEM Leadership Institute – advancing equity is not solo work.

Thoughts on decolonizing STEM as science is built on western non inclusive theoretical frameworks? as is infusing inclusivity into the very scientific process?

It seems really important for institutions to queue up mentoring programs for faculty who are trying to learnt to be antiracist and inclusive, and also to make it a requirement to be "trained" in mentoring (I am thinking of graduate students and undergrads who are working in labs, primarily, but could see this applying to the classroom as well). Are you aware of any places that are actually doing this?

The first program that comes to mind is HHMI's Gilliam Fellowship, which provides support for faculty-student mentoring relationships in graduate STEM programs. I believe mentoring is a central theme in the CIRTL network as well. Scientific societies like SACNAS and NoBCCHE also focus on sustaining students and faculty who are PEERS through mentoring and professional networks.

I like that term PEERs. Forcing the academic language to refer to students as peers that have historically been disenfranchised and definitely not treated as peers lol. my real question is what's the work that needs to be done by instructors to be able to actually uphold an educational system that is promoting equity? what's your experience with getting universities/departments to implement those trainings for their faculty and staff?

Erika, Sara – I think elements of other responses address this question, so I'm not going to answer it specifically, are you okay with that?

James Madison has a strong introduction to research program in freshman biology lab - is it making a difference?

Same thing here, already addressed above.

With your opening statement, political affiliation is becoming another way of marginalizing people (Faculty and Students). What is your POV on this observation?

It was not my intent to represent a political affiliation with my opening statement, but rather to acknowledge the moment we are in nationally (and globally) – while it's accurate to say that shared issues such as the pandemic, economic crisis and climate change have been politicized, these are inherently shared issues with basis in fact, and thus ones that all of us must grapple with. The problem isn't that differing political perspectives and affiliations exist, but rather that political discourse has become polarized to the extent that it precludes critical discourse, reasoned argument and dissent, all core elements of academic and intellectual endeavor. Perhaps solving polarization doesn't happen by ignoring it, but by acknowledging why it is antithetical to inquiry and providing opportunities for students (and our colleagues) to practice the skills of principled intellectual discourse.

How did you find the students interest and success in STEM when you worked in Darussalam University, during your sabbatical, related to minority student's success in STEM program in US?

All of the students at UDSM (the only 4-year public institution in the country at the time) got there by outperforming their peers on national exams, and all were fully financially supported. Many were also the first in their families and communities to have the opportunity to attend university, suffice to say there were heavy expectations for their success. At the time I was there the educational system was modeled after the British (colonial) system, and competition was fierce to be top of the class, which gave access to opportunities only a few students would enjoy. The group of UDSM students I taught that year were serious, they were motivated to learn and understood that their presence was directly connected to the country's need to build national capacity.

Generalizations are difficult to make across the thousands of students I've taught over 30 years on three campuses. I've typically found that student motivation is usually linked to the degree of engagement I succeed in implementing in my courses, no matter the student. Programs like John Matsui's Berkeley Scholars Program and the LA-STEM initiative at LSU demonstrate that students who are at risk of failing can succeed when provided with a context that supports their success. One of the bases of the argument in my talk is that addressing underrepresentation in STEM requires attention to fixing the system, not the students.

Are there any examples of cross-departmental work to expand curriculums to represent more multicultural backgrounds in the history of STEM development? Such as working with history departments so that the innovative developments of POC or other marginalized identities are highlighted in the curriculum, rather than solely or predominantly the historical perspectives of the white male.

Great question, which raises other questions for me about how history and other humanities disciplines could help to shape an equity-minded STEM education and how learning outcomes would shift in response. I'm sure there are examples of cross-disciplinary courses at many institutions, but it's interesting to think about how such a collaborative approach could inform core courses in the major. I have recently become involved with the Future Substance of STEM Education project, which seeks to re-envision and integrated STEM curriculum organized around a three part framework of foundational, meta, and humanistic knowledge and skills. Our design team consists of biologists, a humanities scholar and an engineer. Perhaps this project offers a model for the type of initiative you envision!