Conclusion: Lessons from the Front Lines

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This book has focused heavily on the theme of increasing feelings of belonging in STEM, particularly for individuals from historically marginalized populations in these disciplines, but not exclusively. The approaches discussed throughout the text are to the benefit of all STEM students, not just those who have historically encountered additional challenges to access. For us, belonging is about more than just being welcomed into a space. It's about having a secure attachment to the community. It is about feeling as though you can speak, push back, and offer new approaches without suffering consequences. We help facilitate a sense of belonging for students by constructing spaces that illustrate the variety of viewpoints and backgrounds individuals within the community hold. We make visible in our assignments and curriculum the diversity that exists so that we don't create an impression that only one group of individuals participates in the procedural and knowledge-making tasks of our field. We clear a path to belonging when we create spaces that allow all of our students to thrive, regardless of how they arrived; we meet students where they are, not where we think they should be, and we help them to grow. Belonging happens when we listen to the many voices that have contributed to our discipline's ways of knowing over time and share those voices with our students, when we create space for multiple epistemologies. We foster belonging when we are accountable—accountable to our students, to our colleagues, and to our disciplines. This includes holding *others* accountable for harm that is done. And that is challenging but necessary work. By engaging with this text, you have already shown a commitment to (and have begun) doing that work, so we are working from the assumption that you see its value. This concluding chapter offers some reflection and resources for continuing that journey.

The organization in this chapter was heavily inspired by Rebecca Walton, Kristen R. Moore, and Natasha N. Jones' (2020) *Technical Communication After the Social Justice Turn* – a book we highly recommend educators from all disciplines read, despite the title's disciplinary reference. We begin with some reflection: Amplifying lessons each of us has learned or been inspired by while working on the

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collection. These are followed by a series of questions that we commonly encounter with individuals starting this work of building awareness, as well as our answers, taking into account our position as members of different disciplines. These answers are followed by short lists of resources that readers can use to further explore the specific topic areas. Not all resources listed explicitly address writing instruction from an equity perspective, but we do believe they illustrate practices that will lead toward that goal. We recognize that these resources are not exhaustive; rather, our goal is to provide entry points.

Reflections from a Chemistry Perspective – LaKeisha McClary

When I was first asked to be a co-editor for this collection, I was hesitant. Yes, I have taught for over ten years a writing in the disciplines (WID) course, but I was not sure what I could contribute. I had no formal training in writing pedagogy, and I learned mostly by teaching a lab-based writing course, CHEM 2123W, semester after semester. I also was not aware of much scholarship and research that existed at the intersection of equity and disciplinary writing. In fact, thanks to the Writing Program at GW providing me with a paid membership to the Association for Writing Across the Curriculum in 2020, I had only recently learned that there were entire areas of research on writing. Of course there are! But I never knew it.

Like most STEM Ph.D.s, I received undergraduate and graduate training in science departments that focused their curricula on lab-based scientific research. It was not until I transferred Ph.D. programs to pursue chemistry education research (which I also was unaware of until I attended an American Chemical Society Conference while pursuing a Ph.D. in organic chemistry) that I learned about the rich legacy of social justice efforts in K-12 spaces through my graduate education courses at The University of Arizona. But my day-to-day in a chemistry department never explicitly considered how social justice frameworks could improve student outcomes in STEM. Even though I was interested in doing research at this intersection of social justice and chemistry, I made a choice to follow a road that would be more likely to lead to a position within a chemistry department. It was already a risk at that time to pursue an academic career in chemistry education research. [What then did it look like for a Black woman with an afro puff to be talking about promoting social justice in chemistry education? Confident though I may be, I self-censored to be employable.]

Now, however, the stakes are even higher in U.S. higher education following the COVID-19 pandemic and forecasts for lower college enrollments taking place among the conversations surrounding college affordability. I choose to no longer be

complicit but to become part of the solution to the challenges we face in producing a diverse pool of STEM professionals and STEM educators. I am convinced that many of the challenges we face in STEM can be addressed through effective writing pedagogies that are inclusive and incorporated consistently in higher education so that students are repeatedly provided opportunities to practice different genres of science writing within their interdisciplinary programs of study. Even as co-editor of this collection, I still have barely scratched the surface. I am grateful for each of the authors of this collection for their commitment to shifting the paradigm of what and how we can educate STEM students for a more socially just future. Their work is an accessible entry point to STEM faculty like me, who are deeply committed to equity in STEM but with limited knowledge of how to do it in our disciplinary spaces. I hope that, like me, you have added to your vocabulary and have a framework within which to reflect critically on teaching and assessment practices in your writing and non-writing courses. And most importantly, I hope that, like me, you will continue the conversation with colleagues on your campus and within your disciplines.

I end with a personal call to action for different stakeholders employed in colleges and universities:

> **Writing program directors:** Visibility is crucial. My daily life is in my department, and I forget that we have writing professionals and workshops available to assist me in sharing resources about writing pedagogy and writing studies broadly and within STEM/science. Consider pooling resources to make your workshops available to faculty at other institutions. We talk about inclusive STEM at the classroom or program level, but let's also extend this to a cross-institution level.
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> **College deans and university provosts:** Increase funding to support the efforts that Writing Centers are engaging in. Provide fellowships for faculty to have course releases to spend time developing or refining a curriculum that supports writing-to-learn (WTL), writing across the curriculum (WAC), and WID within STEM disciplines. Hire faculty with expertise in STEM writing studies. Furthermore, fund graduate level courses targeting Ph.D. STEM students; we need courses that teach professional writing skills and writing studies research. Those graduates who will remain in academia need this valuable and relevant educational experience to better prepare undergraduates whom they will teach and graduate student researchers whom they will mentor. Every Ph.D. graduating with a STEM degree who pursues an academic career should be equipped to effectively teach writing courses with equity built in from the beginning.

> And truthfully, regardless of their career path, every STEM student should be required to take at least one science writing or writing-intensive science course every semester as part of their program of study. In a time when university budgets are strained, preparing faculty and students who can meet these challenges is a wise investment.
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> **Faculty:** I have yet to attend a faculty meeting on my campus where STEM research faculty spend as much time arguing for resources to support writing in their courses as they do for resources to support their research. What good are discoveries in science if we cannot prepare students to create and consume science communication that can reach a wide range of audiences? Empirical research is clear: Writing is an effective way to help students learn conceptually within their traditional STEM courses and to learn professional writing skills in research-based and WID courses. Students are underprepared to engage in science writing in my third-year WID course (CHEM 2123W) because they do not consistently engage in science writing in their pre-requisite STEM courses, including ones offered by my own department. Fortunately, I do see much improvement when some of these same students enroll in the writing course (CHEM 4195W) that accompanies our undergraduate research course, in part because students are able to practice honing their skills in writing-intensive laboratory courses for which 2123W is a pre-requisite.

Reflection from a Writing Perspective – Heather M. Falconer

In 2021, I had the opportunity to conduct a workshop on incorporating social justice into STEM courses through the Boston Rhetoric and Writers Network (BRAWN). One of the first things we did in that workshop was reflect on what it means to belong; to really think about what that looks like. But to get there, we had to reflect on times we *did not* feel that sense of belonging—mostly because those experiences are often easier to conjure in our minds. Some of the responses in the anonymous Google Jamboard included:

> "Subtle social cues - the unspoken - made me feel out of place. My jokes don't land, and I don't get *their* jokes. We don't care about the same things."

> "People were talking at/through/around me. People were not interested in what I had to contribute. I didn't feel comfortable sharing my opinions, thoughts, or feelings."
>
> "There was little interaction or acknowledgement of my presence. It was clear that I had to adapt to the people there; there was a palpable sense of exclusion."
>
> "I did not 'get' what others were talking about, in terms of language, sometimes – but just as often in terms of topics, or activities that they apparently had shared."

As I have been working on this collection, reading the stories and activities that our chapter authors have contributed, my mind has often wandered back to that workshop and the experiences people identified as making them feel unwelcome or not belonging in a space. I can imagine that any one of us reading those comments can immediately recollect a time when we felt something similar. It's easy enough to say, "I don't ever want to make someone else feel that way!"; it is less easy to say, "This is how I make sure students in my class *don't* feel that way." That last part is what this collection has done such a nice job of addressing. The authors have offered us specific, actionable things we can do in the classroom to recognize a diversity of viewpoints, to make sure our students are reflected in the space, and to help our students feel their perspectives and experiences are valid and that they are not out of their depth.

As I have read, though, I have found myself both challenged and inspired. I've wondered about which assignments currently in rotation could realistically be swapped out and still meet my learning objectives. I've found myself stopping to ask whether my pedagogical choices in the last few years have swung too far into the traditional realm after experiencing some pushback in student evaluations of teaching about being *too* social justice-focused. (Blomstedt's chapter, in particular, has caused me to bring back discussions of linguistic bias to my STEM writing classrooms.) I've thought back on my challenges and outright failures of "ungrading" in the classroom and wondered whether I had just done it wrong. I've wondered, as someone who *does* this stuff all the time, whether I have the time and energy to try something new.

Why have I lifted the curtain to show what's happening behind the scenes in *my* mind? Because it's important to acknowledge that this work never gets "easy." Not in the way we might hope, anyway. These collection authors have offered us a way in—a way *through.* We can't go over or under and still land in the same place; we have to reckon with the brambles and mud and mosquitos first.

I have been inspired by the work these authors are doing at their respective institutions, and it gives me such hope for the future. Like stones in a cairn, each one contributing to the spire, we can work collectively to shift the way STEM educators and practitioners (both emerging and seasoned) think about who can do this work and what kind of work they can do. Though each chapter is presented within the

confines of highly specific courses, the practices transcend such spaces and are applicable broadly. For example, Barlow and Quave discuss explicitly teaching ontology and epistemology and how that impacts the methodologies we use. Weaving in these different perspectives helps students see that there are multiple ways of creating knowledge—a theme also taken up by Bitler and Oraby and extended to considering multiple accounts of history and considerations of interdisciplinarity. These reflective, contemplative approaches are not relegated to a STEM classroom; they can easily be replicated in any disciplinary space, including rhetoric and composition.

Similarly, thinking administratively, many of the contributions have given me an opportunity to consider ways of practically integrating these ideas, concepts, and activities into our existing structures. Burry et al. remind us how it is possible to build in considerations of equity and inclusion *programmatically* by incorporating explicit questions about power dynamics, erasure, and the reification of inequity within organizations and systems. Callow and Shelton beautifully illustrate the balance between addressing the *content* students need to learn with presenting capacious ways to critically examine that content. At the same time, they remind us that, in addition to designing great courses, it is just as important to work with institutional partners to ensure the overall success and adoption of such courses (an issue addressed in many chapters in the collection, including Bitler and Oraby, Barlow and Quave, Riedner et al., and Mallette).

Having partners and an open dialogue are important, as well, for finding a common language across disciplines. In reading Seraphin's chapter on non-disposable assignments, I couldn't help but think about how similar these are to the meaningful writing activities discussed by Eodice, Geller, and Lerner (2016). While not exactly the same, the fact that both emerged in very different disciplinary spaces, with different names, but never overlapped in scholarship has made me wonder what other kinds of activities might be showing up under different guises throughout our institutions. At a recent discussion about undergraduate research experiences, I was struck by how many different names are used throughout my institution to, essentially, label activities that get students involved in the process of learning (such as the course-based undergraduate research experience that Newell-Caito discusses). Why are we so siloed in this work, and how can we break down those silos so that we all can benefit from shared knowledge? In short, working with these authors has taught me much while raising even more questions. I have learned something from each of them that I am empowered to bring forward into my own teaching and research.

How do I begin to understand inequity in STEM disciplines?

Heather: If we are being honest, inequity in STEM spaces is directly connected to inequity in education broadly. This isn't *just* a STEM issue. What helped me

early on in this journey was learning about the educational infrastructures in the US—how they have been shaped historically, the ways in which assessment measures have been implemented and institutionalized, access to education based on gender and race, etc. Understanding, even only superficially, the ways biases have influenced the way we teach, what we teach, and so on helps peel back the curtain and shift responsibility. If students are not performing at a level we expect as educators, then it's on us to figure out why rather than assume a deficit in the student. Blomstedt's chapter in this collection does a wonderful job of highlighting the ways in which language, for example, can impact not only how faculty perceive students but also how students perceive themselves as both writers and scientists.

Reading books like Stephen J. Gould's *The Mismeasure of Man* and Rebecca Skloot's *The Immortal Life of Henrietta Lacks* was eye-opening for me because they unpack, historically, the way race has played a prominent role in scientific knowledge-making (whether that is about who was allowed to do scientific work or the physical exploitation of historically minoritized groups in the name of scientific knowledge-making). The key thing to remember, though, is that these historical accounts are illustrating how ideas become part of the institution and that just because they're historical accounts does not mean that the perpetuation of biases are history. The bias has been built in from the start, so our job as educators is to try to understand which parts need an overhaul and to question our own assumptions as we go. Scholars like Chanda Prescod-Weinstein's Decolonizing Science Reading List (https://tinyurl.com/yjyfwc9u) and Priya Shukla's Diversity, Equity, and Inclusion in Science: A Reading List (https://tinyurl.com/2sprd5rw)are living curations that provide a way into this knowledge. Approaching inequity in STEM from this angle means that we can step away from casting blame on 'a few bad actors' in the past and take an active role and responsibility in remediating that harm ourselves. From a writing studies perspective, that means that I need to actively think about linguistic bias in disciplinary writing spaces and how that is enforced in STEM journals and granting agencies (publishing and funding are currency, after all).

LaKeisha: Understanding the roots and manifestations of inequities in STEM disciplines is one way to begin to chart a path forward. The same approaches that we use when entering a new research area are helpful here: scholarship and good old-fashioned open-minded conversations with knowledgeable people. Heather highlights some great scholarly resources to begin a journey. Sharing the journey with students and colleagues can be equally impactful in moving toward a more inclusive science education. Are you able to start a faculty learning community or a journal/book club around a theme of learning about inequities in STEM disciplines? What opportunities exist on your campus or nearby campuses to learn more from students, colleagues, and outside experts about inequities, their root causes, their manifestations and harm in STEM, and the ways that others are addressing those harms? Are there organizations that you can join that offer such

opportunities? Until solutions are as pervasive as the harms, those of us who want to understand inequity in STEM will have to be proactive and seek resources or even create them ourselves within our spaces.

In my own spaces on my campus, I strive to listen to as many voices as possible, particularly student voices, so that I can make informed pedagogical decisions. Being able to hear from students enrolled in courses featured in our collection is something I appreciate and am very grateful for because it really helped me to consider how students in my WID laboratory course might respond to the assignment or assessment practice. As instructors, we are the experts, but students are the experts of their lived experiences. How do we make science education work for more of them? How do we understand how inequities in their prior education—including in other courses taken on our campuses!—influence their experiences in our courses? What can we learn from students about their other courses to make ours more inclusive and just? Such reflexive questions and an inquiry-driven approach are great guides for the journey toward understanding and empathy. Lastly, I will add that seeking to understand does not necessarily mean that you have to solve a great societal problem that has centuries-old roots. But I would argue we can start chipping away with each course we teach. I recommend *Humble Inquiry: The Gentle Art of Asking Instead of Telling* by Ed Schein for a framework to approach creating a dialogue with students, colleagues, and administrators around how to make STEM disciplines more inclusive.

Resources for Continuing the Journey

Bian, L., Leslie, S., & Cimpian, A. (2017). Gender stereotypes about intellectual ability emerge early and influence children's interests. *Science (American Association for the Advancement of Science), 355*(6323), 389–391. https://doi.org/10.1126/SCIENCE.AAH6524

Falconer, H.M. (2022). *Masking inequality with good intentions: Systemic bias, counterspaces, and discourse acquisition in STEM education.* The WAC Clearinghouse; University Press of Colorado. https://doi.org/10.37514/PRA-B.2022.1602

Gould, S. J. (1981). *The mismeasure of man*. Norton.

McGee, E. O., Robinson, W. H., Baber, L. D., Chapman, R., Cox, M. F., Madden, K., Pereira, P., Rezvi, S., Trinder, V. F., & Martin, D. B. (2019). *Diversifying STEM: Multidisciplinary perspectives on race and gender.* Rutgers University Press. https://doi.org/10.36019/9781978805712

McGee, E. O., & Martin, D. B. (2011). "You would not believe what I have to go through to prove my intellectual value!" Stereotype management among academically successful black mathematics and engineering students. *American Educational Research Journal, 48*(6), 1347–1389. https://doi.org/10.3102/0002831211423972

Schein, E. H. (2013). *Humble inquiry: The gentle art of asking instead of telling.* Berrett-Koehler Publishers.

Skloot, R. (2010). *The immortal life of Henrietta Lacks.* Crown.
Torres, L.E. (2012). Lost in the numbers: Gender equity discourses and women of color in science, technology, engineering and mathematics (STEM). *The International Journal of Science in Society, 3*(4), 33–45. https://doi.org/10.18848/1836-6236%2FCGP%2FV03I04%2F51352

How do I find contributions to my field from historically minoritized scholars? Isn't doing this an example of bias?

Heather: These are such important questions for many reasons, most notably because they highlight citation bias, but also because they raise ethical questions about whether we should include someone just because they are from a historically minoritized background in our discipline. Citation bias is a well-documented phenomenon (see resources below, as well as Barlow and Quave, this volume) that involves the conscious or unconscious citation of scholars whose worldview supports our own. This might include the outcomes of a study, but also include citing scholars we know and have faith in their authority, journals we publish in (or wish to publish in), and even citing ourselves. The challenge with citation bias is that it tends to create an insular bubble where the same people are repeatedly cited on certain topics, even when others have successfully published scholarship that agrees with, challenges, or complicates those findings. It isn't a phenomenon exclusive to STEM by any means, but it certainly contributes to the silencing of particular voices in those spaces.

The latter question has some unarticulated assumptions associated with it, though, that we have to confront individually. Do we believe that the systems of publication and recognition in our field are fair and equal? Do we believe that an individual's identity and lived experience create unique lenses that might impact how they view the world and, as a result, the contributions to scholarship they might make? I firmly believe that, no, we should not include an individual scholar's work based solely on their identity markers. They should be included based on the value of the contribution. For me, though, the value of the contribution sometimes lies *specifically* in the different-from-me viewpoint and interpretation that is being offered.

So, how do we find those scholars? Due diligence. There is no simple way to go about this because of the history of citation bias. It takes time and conscious effort, as well as use of your favorite search engine and library database. Begin with the subject area or lesson at hand. Are you teaching about DNA or cell organelles? Consider including Rosalind Franklin or Barbara McClintock in the discussion (with mention of how they are often left out of such discussions). I personally love to start with resources like The Visionlearning Project (https://www.visionlearning.com/en/), which provides open-access educational materials, including learning modules on scientific communication, profiles of underrepresented individuals in STEM, and the process of science. There is also the science

podcast This World of Humans (TWOH) (https://www.visionlearning.com/en/twoh), which is dedicated to recent advances in biology and social science and emphasizes scholarship from scientists from communities minoritized in STEM. (TWOH is a collaboration with Visionlearning and includes teaching resources to aid science instructors in using this podcast and its featured science in their classrooms.) Teaching the history of a thing is a lot like doing a review of the literature. How do we know what we know? Only, here we are also highlighting *who* contributed to that knowledge and as many empirically valid perspectives as possible. (Such validity includes qualitative methodologies, like ethnography, as well as Indigenous ways of knowing).

When building your lesson plans and curriculum, include current scholars (including those from your own institution) and look them up. These days, it isn't too hard to find biographical information about scholars from institutional and professional networking websites. If you use social media, consider exploring hashtags like #CiteBlackWomen (which also has a podcast), #BlackInStem, #WomenInStem, or #DisbilityInStem. Consider also looking at national organizations like the National Society of Black Engineers, Society for Advancement of Chicanos/Hispanics and Native Americans in Science, Society of Asian Scientists and Engineers, National Association of Mathematicians, and National Action Council for Minorities in Engineering to see which members are being highlighted in the publications and doing work in your field. Within the field of writing studies, Cana Uluak Itchuaqiyaq maintains the Multiply Marginalized and Underrepresented (MMU) Scholars List (https://www.itchuaqiyaq.com/mmu-scholar-list), as well as the MMU Bibliography (https://tinyurl.com/3z8eh5ek), which provides names and scholarship of self-identified MMU scholars in technical communication and related fields. (As a side note: When you *do* find and include these scholars in your teaching and research, make sure you cite them in relevant publications!)

LaKeisha: Heather unpacks these questions beautifully. I would add that using professional gatherings to seek out and to engage historically minoritized scholars about their work is particularly important. Gatherings can include conferences, symposia, local meetings of professional organizations; build a network of diverse scholars, researchers, and practitioners. Is there an opportunity to collaborate on research projects? Might students or other colleagues at your institution benefit from their scholarship in their learning, teaching, and research? When inviting speakers for departmental seminars or colloquia, consider scholars from minority-serving institutions, Tribal Colleges, and primarily undergraduate institutions. Also, consider scholars and teacher-scholars who are actively working to create inclusive spaces; many will showcase these on their faculty websites. Graduate students from historically minoritized communities are often acutely aware of faculty researchers with whom they share identities, so invite them to share or contribute to a list of speakers that they would like to see at department seminars.

Resources for Continuing the Journey

Cite Black Women Collective. https://www.citeblackwomencollective.org/

Leng, G., & Leng, R. I. (2020). *Unintended consequences: The perils of publication and citation bias*. The MIT Press Reader. https://tinyurl.com/mwmvy7yc

Krupnik, I., & Jolly, D. (Eds.). (2002). *The earth is faster now: Indigenous observations of arctic environmental change. frontiers in polar social science*. Arctic Research Consortium of the United States.

Reid, G., Jones, C. E., & Poe, M. (June 7, 2022). Citational racism: How leading medical journals reproduce segregation in American medical knowledge. *Bill of Health: Examining the Intersection of Health, Law, Biotechnology, and Bioethics.* Harvard Law. https://tinyurl.com/4env3k4a

Itchuaqiyaq, C. U., Jones, N. N., & Franchini, J. (2023, August 12). *Multiply marginalized and underrepresented scholars list*. https://www.itchuaqiyaq.com/mmu-scholar-list.

Itchuaqiyaq, C. U., Jones, N. N., & Franchini, J. (2023, August 12). Multiply marginalized and underrepresented scholars bibliography. https://tinyurl.com/3z8eh5ek

The Visionlearning Project. https://www.visionlearning.com

This World of Humans. https://www.visionlearning.com/en/twoh

Urlings, M. J. E., Duyx, B., Swaen, G. M. H., Bouter, L. M., & Zeegers, M. P. (2021). Citation bias and other determinants of citation in biomedical research: Findings from six citation networks. *Journal of Clinical Epidemiology, 132*, 71–78.

How do I talk about inequality without "politicizing" my class? Do I need to explicitly talk about these things in my courses? I'm not an expert and feel out of my depth.

LaKeisha: Truthfully, until I began working with Heather on this collection, such a question never entered my mind. I did not give a second look to the workshops on campus for faculty to learn how to have "difficult" conversations in courses. The vast majority of STEM disciplinary courses in the US are still lecture-based, and those that are more collaborative in nature focus on the content rather than inequalities. But the very fact that most STEM courses are lecture-based masks inequalities and can make our students feel invisible. Giving students opportunities to explore and develop their science identities through non-technical science writing exposes this myth that science is objective (see Barlow and Quave, as well as Callow and Shelton, in this collection).

Since we started gathering and editing chapters in 2021, I have since re-designed one WID undergraduate research course that I oversee to include a lesson that highlights inequalities in STEM Writing. The lesson incorporates inclusive citation practices using the ACS Inclusivity Style Guide from the American Chemical Society (ACS) as a starting point. We currently use the Inclusivity Style Guide

to discuss creating visuals of experimental results that are accessible and, while not addressed directly in the style guide, choosing citations that represent a broader range of ideas than what we typically see. For example, I ask students to search for articles published by authors from institutions outside the US that support their research findings or ones that are relevant to their research but published outside of typical chemistry research journals. Students do not have to include these articles as citations in the required research paper, but most will do so because they recognize that science needs to include more diverse voices, and they appreciate being able to contribute to their field in such a way. Giving students a choice lessens the chance that they might view a particular pedagogical practice as "politicizing" the course. Regardless, as instructors, we should be prepared to justify our practices as a way to be transparent with students.

For courses that are lecture-based, it may not be necessary to have conversations about inequality and inequities in STEM. Including examples or even creating problems on assessments that are culturally relevant can be a way to address inequities (see Callis' chapter, for example). When we used an atoms-first textbook in general chemistry, the chapter that included acid-base chemistry was just before the Thanksgiving holiday. I would share a story about being a little girl and watching my grandmother use a fork tine dipped in baking soda to neutralize some of the oxalic acid in her collard greens. Of course, neither of us knew at the time what "chemistry" was involved. All my grandmother knew was it made her greens less bitter and more tender, and I enjoyed watching the fizzing. My choice to tell this particular story was deliberate. It reinforced my belief that science is something that everyone does, whether or not they know it or understand it, and it was a way for me to invite all of my students to see themselves as capable of "doing science" if only by virtue of making a meal for themselves or their family.

Heather: This is a real tightrope that we have to walk—one that can blow up in our faces if we push too hard, too quickly. At least, that's been my experience. We *can* talk about how historical bias has impacted current inequities without casting blame. As Barlow and Quave noted, it "is not that science is fundamentally, irredeemably flawed, but rather that the sciences are brought to life by humans working within social and individual contexts" (this collection). So often, these things become political when individuals feel that they, personally, are being accused of wrongdoing (e.g., blaming white men for all the ills). This work isn't about specific individuals but the collective working within specific contexts. The Hidden Brain podcast on implicit bias (see Revealing Your Unconscious in the resources below) does a fantastic job of showing how implicit bias works and how inequity isn't about individual people doing bad things but the ways in which beliefs held by the majority of individuals in a space are institutionalized, and as a result cause harm. It's a law of averages; we are trying to shift where the average lies. That podcast is one place to start if you're struggling with understanding inequity on a structural level.

After much trial and error, my approach is to weave in discussions of the worldviews that have historically been held by those in positions of power and how those assumptions have impacted the policies that are made. Fink's chapter is an excellent example of how to do this, as is Callow and Shelton's focus on question-asking. Sometimes, the simplest thing to do is to include a few readings that complement or extend the discussions in the classroom. When I teach science writing, for example, I often include a module on the impact language has on the communication of scientific knowledge. We look at the role of linguistic markers (hedges, boosters, etc.) on knowledge reception through the lens of Andrew Wakefield et al.'s now-retracted *Lancet* article that anti-vaccine groups continue to use as evidence that the MMR vaccine causes autism. We also read Ann Morning's article alongside Cherice Escobar Jones and Genesis Barco Medina's (both listed below) to discuss the ways in which the use of language can lead to conflation of genetic information with race, even when such a connection doesn't exist. In classes focused on writing and engineering, I include articles on indigenous ethics (see Itchuaqiyaq below) and use the Tarot Cards of Tech (https://tarotcardsoftech.artefactgroup.com/) to ask students to challenge assumptions in their group projects. Weave these considerations in as an expected part of the curriculum instead of as an add-on. Normalize the inclusion of diverse viewpoints.

My advice to anyone interested in taking a social justice approach in their classes is simply to start where you are. Yes, we need to lean into our discomfort and challenge ourselves, but *you* need to be comfortable enough with the content in the classroom in order to be an effective guide for your students. Consider small edits to start. If your students are writing memos of project proposals, for example, ask them to incorporate a consideration of ethics (see Burry et al. in this collection). If they are doing user testing, ask them explicitly to consider the perspective of individuals with disabilities in the use of that tool or product. To me, this is about opening perspectives, not forcing students to take on my personal ideology.

Resources for Continuing the Journey

ACS inclusivity style guide. (2021). https://tinyurl.com/4kkeuvyr

Artifact Group. *The tarot cards of tech*. https://tarotcardsoftech.artefactgroup.com/

Brandt, C. B. (2008). Discursive geographies in science: Space, identity, and scientific discourse among indigenous women in higher education. *Cultural Studies of Science Education, 3*, 703–730. https://doi.org/10.1007/s11422-007-9075-8

Brandt, A. M. (1978). Racism and research: The case of the Tuskegee Syphilis study. *The Hastings Center Report, 8*(6), 21–29.

Gawthorp, E. (2023. October 19). *COVID-19 deaths analyzed by race and ethnicity*. https://www.apmresearchlab.org/covid/deaths-by-race

Cudd, A. E. (2001). Objectivity and ethno-feminist critiques of science. In K. M. Ashman (Ed.), *After the science wars: Science and the study of science.* Routledge. https://doi.org/10.4324/9780203977743

Gebru, T. (2020, October). *Hot topics in computing: Who is harmed and who benefits?* MIT CSAIL. https://tinyurl.com/yupn24sf

Hidden Brain Podcast. Revealing your unconscious, Parts 1 and 2. https://hiddenbrain.org/

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I have too much disciplinary content to cover already. How do I make room for this?

LaKeisha: Researchers at the University of Virginia published an article in *Nature* showing that people overwhelmingly will add components to an object, idea, or situation rather than subtract components, even if the subtractive change leads to a better-desired outcome. Gabrielle S. Adams, Benjamin A. Converse, Andrew H. Hales, and Leidy E. Klotz (2021) wrote, "If people default to adequate additive transformations—without considering comparable (and sometimes superior) subtractive alternatives—they may be missing opportunities to make their lives more fulfilling, their institutions more effective, and their planet more livable." (p. 261). I consider Adams et al. and our collection an invitation to reimagine our courses and consider what is not really needed. Chances are there is something.

It is important to recognize what constraints may be placed on your course and the source(s) of the constraints. Professional societies are taking the lead on creating and disseminating discipline-specific tools and strategies to incorporate inclusive teaching and assessment practices as well as providing a space for conference symposia and proceedings. Even if every topic we teach must remain in the curriculum, we can teach those topics differently. Anjali Joshi (2023) recently published an Edutopia article online entitled "5 ways to make your science classroom more culturally responsive." I cannot emphasize enough using existing resources on your campus and through professional networks and organizations to tap into the expertise of folx whose research, teaching, and job roles center on inclusive teaching practices. This is a journey best traveled together!

Heather: Time is a major commodity. We have 6 or 9 or 16 weeks in a quarter, trimester, or semester, and within that time, we have to make sure we tick all of the

boxes required by our program and accrediting bodies. It's a lot. Recently, when I was talking with a colleague about the inaccessibility of their presentation materials, they remarked: "I don't have time to go back and do all of that!" The two of us were just talking about slides, but even still, that felt like a huge ask. The thing about inclusion, though, is it isn't a *product.* We don't get to the end of a syllabus or presentation and say, "Fine! Done! Now I'm good." Inclusion is a process. There is always going to be something to alter, and with every move we make to create space for one group, we inevitably may be cutting others out. The goal, then, is to make changes in ways that don't mess the whole thing up. Thinking back to my colleague's slide materials: If they had chosen a slide design that had high text to background contrast, minimal color, and no unnecessary frilly designs *before* they put any content into the file, it never would have been an issue. So, our first thought with this work is: "How can I build it in from the start so that it doesn't feel like a retrofit?"

That said, sometimes, the way to bring inclusion into our class is not in the content. We can't do everything, everywhere, all the time. Sometimes, the best thing to do is to consider *how* we are teaching, not *what* we are teaching. Riedner, Francis, and Paretti in this collection offer us one way to think about this through the lens of engineering judgment. By creating spaces for students to be recognized by their peers and faculty for their capacity to participate *as* engineers, we can create a space for the growth of disciplinary identity and self-efficacy. Similarly, Newell-Caito and Fink also offer ways of approaching the classroom epistemologically to be more inclusive—whether that is in our assessment practices or our pedagogical approaches. Considerations of Universal Design and teaching in multiple modalities is another way of making the classroom more inclusive (see both Callis and Mallette, this volume), particularly for students with learning disabilities or cultural views that prioritize communal work. You might also review the ten rules offered by Suchinta Arif et al. (2021), referenced below, that offer considerations of support for historically marginalized students in science. The faculty development centers of most institutions of higher learning will also be able to assist (e.g., Columbia University has a very useful inclusive teaching guide that is available on their website).

Start with where you are and do what you can manage.

When you can do more, do more.

Resources for Continuing the Journey

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If I modify how I teach and grade in my class, aren't I compromising the discipline? How will students learn what they need to be successful?

Heather: As a WAC specialist, these are the questions that I hear the most when talking with disciplinary faculty (even within English Literature). Usually, it's about writing instruction, but the same concern arises when it comes to questions of social justice. The thing I most *want* to say when these questions come up is: "Our disciplines are already compromised by bias! This is *part* of helping students be successful in the 21st century!" But that rarely gets a positive response. So, instead, I usually present it in a more accessible way, through questions. What does it mean to be successful in your field? Are students most successful when they can effectively memorize a list of facts to be selected on a multiple-choice exam? Or are they better off when they can think critically about their subject within different contexts and apply theories in interesting ways? What is it that you want students to be able to do when they leave your class, and how is your curriculum and assessment plan designed to privilege that learning?

When it comes to writing, many instructors wish to emphasize the grading of grammar and mechanics when they do include writing. Much as Blomstedt's work (this collection) shows, we are not compromising student success by leaving room for errors that can be caught in proofreading. If the work a student submits is so fraught with errors that it impedes meaning, that is an issue larger than what any one writing assignment or class is going to be able to address. That is when we include other supports and ask ourselves what role the writing is playing in the course (and how we are instructing the students within it). Including diverse viewpoints or a fuller picture of how we know what we know and how we communicate what we know isn't compromising; it's enhancing. We need students to see the messy parts, not just the cleaned-up, final versions. As instructors, we are always already making

choices about what to include and what to skip in our classes–let's make it a priority to be more conscious about those decisions.

LaKeisha: To me, there is irony in thinking that traditional grading does not compromise STEM disciplines. Grades in STEM courses serve as gatekeepers (Gasiewski et al., 2012) to careers in science, engineering, technology, math, and even health fields like public health, medicine, and pharmacy. The rise of the modern grading scheme in the US is rooted in bias (Feldman, 2019). Students struggle to use grades as feedback to adjust study habits (Chamberlin et al., 2023, p. 116). Yet, there are no real alternatives to grades and one-assessment-for-all in large-enrollment courses. So, what are we to do?

Heather's questions to reframe the "student success" concern are very effective in brainstorming ways to create classroom materials that can foster a classroom culture where all students see an opportunity and a pathway toward *mutually defined* success. All of our authors provide a window into productive ways to approach these questions. Mallette (this collection) mentions specifications grading (Nilson, 2014) as a mode of ungrading, and I am eager to incorporate ungrading principles into lectures and writing courses where I have a bit more autonomy to tinker and lower enrollments to co-create with students.

Specifications grading has been used successfully in biology (Katzman et al., 2021), biochemistry (Donato & Marsh, 2023), chemistry (McKnelly et al., 2023; Noell et al., 2023), and physics and engineering physics (Evensen, 2022). Notably, McKnelly et al. (2023) show how this form of alternative grading was implemented in an organic chemistry laboratory course with 1,000 students across several sections. To attract creative minds from diverse backgrounds, we have to adapt how we teach STEM courses, especially introductory courses. In addition to ungrading practices, incorporating writing activities will not only help students make sense of their learning but will provide rich data to help instructors and departments design more inclusive courses that increase engagement and foster meaningful learning for those students who buy in to these alternative forms and methods of assessment.

Resources for Continuing the Journey

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Chamberlin, K., Yasué, M., & Chiang, I. A. (2023). The impact of grades on student motivation. *Active Learning in Higher Education, 24*(2), 109–124. https://doi.org/10.1177/1469787418819728

Donato, J. J., & Marsh, T. C. (2023). Specifications grading is an effective approach to

teaching biochemistry. *Journal of Microbiology and Biology Education*, *24*(2), e00236-22 https://doi.org/10.1128/jmbe.00236-22

Evensen, H. (2022, August). Specifications grading in general physics and engineering physics courses. In *2022 ASEE Annual Conference & Exposition.* https://peer.asee.org/40676.pdf

Feldman, J. (2018). *Grading for equity: What it is, why it matters, and how it can transform schools and classrooms.* Corwin Press.

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Inoue, A. B. (2022). *Labor-based grading contracts: Building equity and inclusion in the compassionate writing classroom* (2nd ed.). The WAC Clearinghouse; University Press of Colorado. https://doi.org/10.37514/PER-B.2022.1824

Katzman, S. D., Hurst-Kennedy, J., Barrera, A., Talley, J., Javazon, E., Diaz, M., & Anzovino, M. E. (2021). The effect of specifications grading on students' learning and attitudes in an undergraduate-level cell biology course. *Journal of Microbiology & Biology Education*, *22*(3), e00200-21. https://doi.org/10.1128/jmbe.00200-21

McKnelly, K. J., Howitz, W. J., Thane, T. A., & Link, R. D. (2023). Specifications grading at scale: Improved letter grades and grading-related interactions in a course with over 1,000 students. *Journal of Chemical Education*, *100*, 3179–3193. https://doi.org/10.1021/acs.jchemed.2c00740

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Noell, S. L., Rios Buza, M. Roth, E. B., Young, J. L., & Drummond, M. J. (2023). A bridge to specifications grading in second semester general chemistry. *Journal of Chemical Education*, *100*, 2159–2165. https://doi.org/10.1021/acs.jchemed.2c00731

Poe, M., Inoue, A. B., & Elliot, N. (2018). *Writing assessment, social justice, and the advancement of opportunity*. The WAC Clearinghouse; University Press of Colorado. https://doi.org/10.37514/PER-B.2018.0155

Sathy, V., & Hogan, K. A. (2022). *Inclusive teaching: Strategies for promoting equity in the college classroom.* West Virginia University Press.

I am a lecturer/pre-tenure and don't have the authority to change up the curriculum. What can I do to be more inclusive?

LaKeisha: I am in a non-tenure track position at my campus. Early in my career, I was concerned that my contract would not be renewed because course evaluations not tailored to my course were the primary form of my quality of teaching (which is absurd yet common). In my limited experience at my institution, faculty teaching smaller courses—and for STEM courses, these will usually be major

courses—rarely have pushback from students when the curriculum changes to be more student-centered and inclusive. It is those of us who teach first-year courses with larger enrollments that often face the greatest resistance from students and parents and, therefore, administrators.

My strategy, learned from experience in chemistry education research, has been to have clear goals around any curricular changes *and* ways to measure the effects of the changes. The measures are, of course, for desired changes, but I would also include items and open-ended responses to capture unexpected and undesired changes to have a fuller picture. Not only would these data help me as the instructor, but I could report them to the students and to administrators. I have used both mid-semester evaluations and ones submitted at the end of the course (but before the university-wide ones were emailed to students). Because the questions align with my curricular goals, I included responses in my annual evaluations.

I enjoy crafting evaluations, so I do not mind spending the time doing them. I often reuse them with modifications to better capture students' experiences in my courses. But if creating an evaluation of your course is not what sparks joy, are there folx on your campus who are available to help faculty not only with instructional design but also ways to measure the impact of the curricular changes? On my campus, we even have an education developer who will come to our classes and facilitate a conversation with students (faculty are not present) around course goals. Depending on the scope of the change and the time you are able to devote, partnering or collaborating with education researchers or discipline-based education researchers who are interested in measuring impacts on students' experiences in STEM is a possibility.

Ultimately, I want to encourage you to be the change you want to see on your campus. Each campus culture is different, each STEM discipline culture is different, and each department culture is different. What works for others, even if it is published research or shared at a conference, may not work in your course or on your campus without modifications. And that's okay. When you go looking, you will find so many colleagues willing to help you create a more inclusive space through your courses.

Heather: This is a real issue and one to consider in light of your institution. The best scenarios are those where the institution has identified a commitment to DEIJ somewhere—in a strategic plan, in institutional priorities, in department curriculum changes, etc. If we can align what we are doing in the classroom with what the institution says it is prioritizing, then there is some leverage for change. But we live in a world where that is not always the case, and so my advice would be to tread cautiously. Use your course outcomes and goals as the lodestar. Sometimes, the simplest thing to do is to add on, rather than replace, content. As noted at the start of Section 2, maybe it's not about altering content but about pedagogy. Do you have room to modify the assessment of student work? Or to explicitly teach an

element of disciplinary writing? Or to offer additional resources to assist students in succeeding? Where is the wiggle room?

I agree wholeheartedly with LaKeisha's note above about seeking out like-minded people and strategizing together. I have been very mindful, lately, of just how lonely this work can be. You need to know *why* you are doing what you are doing, how that benefits the students in your class and the discipline, and who is going to have your back. Finding that network of support is important, even if it comes from outside your institution because it reminds you that you're not alone and can lead to some interesting innovation. It also helps to have someone to talk to when you encounter the occasional student pushback.

Resources for Continuing the Journey

Kadmos, H., & Taylor, J. (2023). No time to read? How precarity is shaping learning and teaching in the humanities. *Arts and Humanities in Higher Education*, *23*(1). https://doi.org/10.1177/14740222231190338

Opdycke, K. (n.d.). *A precarious professorate works against an antiracist curriculum*. Boston University, Center for Interdisciplinary Teaching & Learning. Retrieved November 10, 2023, from https://tinyurl.com/2s3f3udn

Schell, E. (2017). Foreword: The new faculty majority for writing programs: organizing for change. In S. Kahn, W. Lalicker, and A. Biniek-Lynch (Eds.), *Contingency, exploitation, solidarity: Labor and action in English composition* (pp. ix-xx), The WAC Clearinghouse; University of Colorado Press. https://doi.org/10.37514/PER-B.2017.0858.1.2

I'm not a writing instructor. How do I assess writing fairly if I don't know how to teach and assess writing in general?

Heather: After questions of compromising the discipline, this is the second-most frequent concern that I hear when working with faculty outside of writing studies. If we agree (as we usually do) that being able to write well is a key element of success in your disciplinary career, then we have to ask: Who is actually responsible for teaching students how to write well as members of their discipline? Sure, many institutions have writing-specific courses for STEM majors taught by specialists like me. We see examples of these in Burry et al. and Mallette (both in this collection). But not all institutions have the kind of funding or the commitment to writing that offering such courses requires. Additionally, just like a first-year composition course cannot prepare students for all the writing they will do in higher education, one writing in the disciplines course is not going to make them expert writers in their major. They need multiple points of contact from multiple experts throughout the

curricular experience. I may be able to teach engineering students about rhetorical situations and language expectations, some genre considerations, and give them practice at composing a variety of document types, but that doesn't mean that they won't *also* need feedback from their engineering professor when writing a project update or memo in another class. There will be subtle differences across subdisciplines and spaces that students need guidance on, and they need concepts and rhetorical moves reinforced from multiple directions.

Sometimes, I am challenged with: Who has the authority to teach disciplinary writing? Really, for me, we all do—faculty who teach disciplinary courses, as well as those who teach courses in the major. We are all experts in different ways. I am an expert because I study the rhetorical moves, language, and genres of different disciplines; STEM practitioners are experts because they actively employ these things in their everyday work. We come from different perspectives, but all have something to teach our students. *How* we do that, though, will be different. Consider using resources like those listed below and spend time thinking about what you want students to show you in the writing you assign. Don't assess grammar and mechanics if you aren't teaching these things (though you should definitely point out issues if such errors get in the way of meaning). If you teach the structure of a lab report, then it's appropriate to assess that structure in student work. If you use a haiku to assess students' understanding of structural relationships in biology, then assess how the knowledge is conveyed, not how good the haiku is. You don't have to be an expert on writing to know if a student is meeting the goals of your writing assignment, unless your goals are something you aren't teaching.

LaKeisha: I am not a writing instructor. I have embarked on eleven years of intense on-the-job training. I am fortunate that we have amazing faculty in our University Writing Program. Even if my students never write a science manuscript for a peer-reviewed journal or a research paper as part of their undergraduate research experience, there are so many transferrable skills to learn from disciplinary writing. Perhaps the skill that I lean into the most with my students is that writing affords them a level of creativity they will not experience in a lecture or traditional laboratory course.

As Heather mentioned, it is not appropriate to assess grammar unless it is formally re/taught in the course. Since I am not an expert, I do not even attempt this as part of the formal curriculum. We use a science writing textbook (LeBrun, 2011) as a required textbook that includes chapters on grammar and writing mechanics, and each week during the experimental phase of the course, I only teach them about key points of a title, abstract, introduction, materials and methods, results and visuals, and discussion and conclusion. So, those aspects of students' science manuscripts comprise the bulk (25/40) of points on the rubric.

Because my course does not formally re/teach students writing mechanics, other aspects of a science manuscript are re/taught informally through their consultations with me during the writing phase that takes place in the second half of

the semester. How to best incorporate evidence from other studies, how to properly format references, and how to know when to include a citation are some topics that I touch upon during instructional time but really drill into during consultations. So, through these consultations—which are as labor intensive as they sound but oh so rewarding for students and me—I am then able to provide personalized instruction for the remaining points of the rubric.

Avoiding potential bias in assessing writing quality is desired and critical to inclusive teaching. So, providing feedback using an established rubric or set of criteria will help students see a path to being successful in the course. Even as we work to decolonize many disciplinary practices that cause harm and erase ways of knowing, having a framework for using these practices already embedded in the course curriculum and made transparent to students is essential.

Resources for Continuing the Journey

Berdanier, C., McCall, M., & Fillenwarth, G. (2021). Characterizing disciplinarity and conventions in engineering resume profiles. *IEEE Transactions on Professional Communication, 64*(4), 390–406. https://doi.org/10.1109/TPC.2021.3110397

Carter, M. (2016). Value arguments in science research articles: Making the case for the importance of research. *Written Communication, 33*(3), 302–327. https://doi.org/10.1177/0741088316653394

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Lebrun, J. L. (2011). *Scientific writing 2.0.* World Scientific Publishing Company.

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Purugganan, M., & Hewitt, J. (2004). *How to read a scientific article*. Cain Project for Engineering and Professional Communication. https://tinyurl.com/4afvdrxm

How much of an effect will this really have on students? Do these things stick, or do they fade away?

LaKeisha: Absolutely, yes! We wanted to include student vignettes in our collection to capture some of the lingering impacts that inclusively designed courses had on

students. Course evaluations given by departments or institutions often are not meant to capture these sentiments, and the end of the semester may be too soon to see what remains after time has passed. Riya and Madison each describe how pivotal enrollment in such courses influenced choices to persist in a STEM major and to incorporate writing as part of their educational journeys and career paths.

In my own WID laboratory course, students are able to see their transformation as science writers within the course itself. Peer feedback is required for all WID courses at GW, and I facilitate sessions during two lab periods. During the first session, I overhear the students commenting on how they see through peers' papers where they can improve their own writing. Then, during the second session, following an opportunity to revise and resubmit, students compliment their peers on improvements within their papers. I only provide general feedback to the class, so students really take ownership of this process. By the time I meet with them after these feedback sessions, I can then focus on the chemistry, syntax, and minor formatting. And even then, students will spontaneously comment on how they noticed their writing improved from their first consultation to their second. So, when I have chemistry majors from my laboratory WID course in the WID course linked to their undergraduate research experiences one to two years later, they have a solid foundation from which to write a 15-20 page research paper on their own semesters-long research projects. I should also note that these students will have taken one or two writing-intensive laboratory courses in the intervening years. Though the courses are not WID courses (there is no writing instruction, no opportunities for revisions, and no peer feedback), they do serve as opportunities for students to continue to practice their science writing.

Though limited, empirical research also supports these narratives from students featured in our collection and my own WID courses. Gere, Knutson, and McCarty (2018) use three case studies of three STEM students' progressions as writers to describe the ways in which they incorporated aspects of their varied writing courses to create their own concepts of disciplinary writing. More research is needed to support what and how much sticks from disciplinary writing, particularly the influence that inclusive practices have on retention of disciplinary content, disciplinary writing skills, and students themselves in STEM. A great reason to collaborate with others who are committed to inclusive writing practices in STEM courses!

Heather: Examining the ways in which disciplinary spaces have been constructed to welcome some people while keeping others out can be a daunting task, but it's one that is critical if we wish to make educational and workforce spaces more inclusive. So much of what we are doing is about sowing seeds and creating new perspectives to view the world. We don't know how that will show up in the long term, really. It's anecdotal. But that doesn't mean we shouldn't try. Johnson et al. (this collection) show how this work will impact the way new teachers enter the classroom, which is likely to stick and have an impact. Each positive interaction

has the potential to counteract the negative ones; our goal is to have more positive than negative in the end.

Relatedly, it did not go unnoticed when we were working on this collection that the vast majority of authors are coming from communities historically marginalized in STEM. In fact, there were at least four additional chapters that were originally planned for inclusion that chose to bow out explicitly *because* that extra labor was cutting into their time and ability to work on scholarship, and those authors did not want to hold up production of the overall book. Authors who identify as female, as disabled, as Black or Latinx, and first-generation college students, who are in contingent roles at their institutions or in non-tenure track positions. The reality, as we pointed out earlier in this chapter, is that this work—this caring, emotionally-laden labor—is typically carried by the individuals with the least amount of power. Maybe it is because of our life experiences on the margins that make us more likely to help the generations that are coming up, but it also takes away our time and attention for the practices that academia privileges (research and publication). It's a double-edged sword. So, yes, this stuff *does* stick, and it is why, more than ever, those who are in positions of power need to step up and carry their share of the load so that we can break these cycles and move toward a more equitable society.

Resources for Continuing the Journey

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Katz, J. (2016). Effects of the three-block model of UDL on inclusive teaching. *Journal of Research in Special Educational Needs, 16*(S1), 898–899. https://doi.org/10.1111/1471-3802.4_12347

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