

”The Engineer Does Not Bow:” Refusing Pedagogies of Compliance

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In 1950, as Europe reckoned with the aftermath of the Holocaust, the German professional engineering society Verein Deutscher Ingenieure (VDI) published an Engineers’ Creed (*Bekanntnis des Ingenieurs*) including the tenet: “The Engineer does not bow to those who disregard human rights...,” presumably in response to the fact that many engineers had done exactly that in facilitating Third Reich atrocities.

This paper asks what it would take to live out VDI’s tenet in the present-day United States, amid authoritarian assaults on many institutions, including higher education, science, and public health, and amid legislative and judicial actions that undermine democratic ideals including academic freedom, freedom of expression, and equal opportunity, all of which are essential for advancing STEM.

Because demographic change threat is a key driver of the present situation, this paper seeks to reckon with white supremacy as a root cause and a force to which engineers ought not bow. Using national data on educational access by race and ethnicity, Slaton’s historical analysis of the color line in 20th century engineering education, social scientific analyses of ideologies of merit, rigor, and depoliticization in STEM education, and commentary on the rise of the alt-right and the anti-DEI movement, this paper seeks to urgently identify new strategies to educate and empower more engineering students, educators, and practitioners to face this reality head-on and work for change.

The paper then considers how critical pedagogies can transform engineering education from a practice of compliance to a practice of freedom, drawing on case studies from other countries where engineering education and practice have suffered under authoritarian regimes. We consider how curricula must change to prepare engineers for the present moment, broadly educating engineers in the social and political contexts of their work, and radically strengthening ethics education, professional principles, and practical strategies for engineers to individually and collectively refuse to bow.

At the same time, engineering educators must also refuse to bow. Possible strategies include defending academic freedom and liberal education principles, deploying moral imagination, organizing a variety of creative challenges to anti-DEI efforts, and doing what educators do best: facilitating learning, fostering critical thinking, building community, and constructing persuasive arguments. Examples drawn from a defunded Center for Engineering Equity will further illustrate adaptive change strategies in the shifting engineering education landscape.

Introduction

German engineers recently celebrated the 75th anniversary of their Engineers' Creed (*Bekennntnis des Ingenieurs*), written during the aftermath of the Holocaust by members of the German professional engineering society Verein Deutscher Ingenieure (VDI). One of the tenets stands out: "The Engineer does not bow to those who disregard human rights..." It implies a duty to resist with a clarity far beyond the language of the more common paramountcy clauses regarding the health, safety, and welfare of the public. This clarity is attributable to the historical context, as in fact many engineers had bowed to those who disregarded human rights and facilitated Third Reich atrocities [1-3].

This paper asks what it would take to live out VDI's tenet in the present-day United States, amid authoritarian assaults on many institutions, including higher education, science, and public health, and amid legislative and judicial actions that undermine democratic ideals including academic freedom, freedom of expression, and equal opportunity, all of which are essential for advancing STEM [4].

While this paper traverses expansive territory, it does so because the issues are not isolated; they are entangled. Necessarily, we touch on many aspects in brief, relying on referencing, both because others have previously cut these paths and to offer avenues to the reader who wants to know more. And despite this expansiveness, we do not attempt to be exhaustive, given the many assaults, onslaughts, and disinformation campaigns, targeting, for instance, vaccines, climate change, pro-Palestine activism on campuses, and public health. We write from our particular positionalities and situate our work with background on white supremacy and xenophobia. From there, we consider how this shapes who can be an engineer, and how domestic racism and demographic change threat serve as root causes. Together, these are reflected as pedagogies of compliance in higher education. We illustrate ways that efforts towards learner-centered pedagogies are held back by these underlying challenges and structural/disciplinary power, and why we believe that a focus on learners having consequential agency is key in not bowing. We conclude by surveying noncompliance beyond the classroom.

Positionality

[Donna] I am the daughter of an immigrant who experienced trauma under fascism and later communism in Germany, ultimately fleeing to the United States. My scholarship on DEI — and perhaps also my identity as a queer woman academic leader in engineering — have been an alt-right target since 2017. I am currently an engineering dean leading a Center for Engineering Equity at my institution, despite losing NSF funding last year (views here are my own and do not represent those of any employer, past or present, nor of the National Science Foundation). I am a white person with class privilege, persistent in my continuing commitments to actively participate in unpacking, resisting, and dismantling racism and classism, especially in my local academic and community settings. As an aging person, my once able-bodied positionality is shifting in real time. I am unsure whether I continue to possess academic freedom, and so I write.

[Vanessa] I am descended from European immigrants — including early English and French colonizers/settlers as well as those fleeing oppression in Germany and Bohemia. I am a white person who currently has class privilege. I was raised in a hyperdiverse community (80 languages and dialects in my elementary school) before moving to a predominantly white community for three years, an experience that left me uneasy, yet naive. After a productive start to my career, I became disabled and chronically ill. Prior to having three NSF grants unlawfully terminated in Spring 2025, I contributed to a community of transformation that engaged STEM faculty in arts-based activities to support their DEIJ change efforts. I practice radical hope and rest so that I can keep showing up, ready to act, listen, learn, and help create a more just future.

White Supremacy in US Engineering

Engineering co-evolves with the nation-state [5]. Examples from contexts outside the United States include Tiago Saraiva's analysis of genetic engineering in fascist regimes in Italy, Portugal, and Germany, where both crop production and animal husbandry came to conform with fascist ideologies and undergird atrocities such as colonial forced labor. [6]. Loren Graham's profile of Soviet humanistic engineer Peter Palchinsky showed how Stalin's vision for Soviet industrialization left no room for human values, sacrificing individuals to the power of the state in gigantic-scale engineering projects that ultimately failed to achieve their goals, contributing ultimately to the collapse of the USSR [7].

In the United States, The 1619 project and Indigenous histories [8-10] reveal how racism was baked into the development of the United States. Noble [11] has described how mass production shaped 20th century industrial capitalism. Downey [12] expands on his analysis to show how engineering education co-evolved with mass production and the growth of land-grant universities. The Land Grab U project [13] documents over 10 million acres of indigenous land that was appropriated for 52 US land grant universities, amounting to over half a trillion dollars in endowments. Rev. Dr. Martin Luther King, Jr., in several of his speeches toward the end of his life, detailed how whites benefitted from the Homestead Act and Morrill Acts, which provided them with land, farm education, and engineering know-how to mechanize farming, building generational wealth [14]. As Henry Ford led the transition of the US economy to mass production, he also shaped US models for racially segregated cities and colonial "civilizing missions" abroad [15]. Engineering artifacts that reflect this co-production of engineering in/and/for a racist society abound, from the caravel and cotton gin to Robert Moses's Long Island bridges, to skin lighteners and algorithms of oppression, to Flint's lead in water crisis [16-21]. But the more important question is whether engineers can come to understand how racism functions in US society, and how their designs reinforce or resist racism, eschewing an ideology of depoliticization [22].

Changes to international student visa processes reflect isolationist and xenophobic policies [23] that have had direct negative impacts on international students' lives [24]. These policies threaten US higher education and promise to harm US innovation and national security [24-27].

Who Can Be an Engineer?

Engineering education is itself an engineered system, and Amy Slaton [28] traces how the color line became established in engineering education. In particular, she highlights how standards of rigor and selectivity in engineering education have simultaneously defined engineering as white, even as they are made to appear objective and value neutral. She shows how rhetoric about “high standards” foiled even our most well-intentioned efforts at racial equity in engineering education, linking expanded opportunity to a fear of “diminished rigor.” Even as arguments around technological and economic need drove a quest to recruit minorities to engineering, these same leaders refused to acknowledge the ways in which standards of education or employment reflected and perpetuated social hierarchies. Meritocracy — a fallacious belief in a level playing field that governs advancement and reward based on hard work — sorts and disciplines students; *what* is taught in engineering classrooms has everything to do with *who* has counted as a well-qualified student or engineer [29], just as it shapes in the broader sense our notions of social equality, or who and what higher education is for [30].

Because race, gender, and class shape access to pre-college STEM courses, the education system profoundly shapes engineering demographics. Using national data from NSF, the Department of Education, and the College Board, Figure 1 compares the race and gender representation in our high school population (left): Non-Hispanic Whites are about half the population, Asian students 5%, Hispanic/Latinx almost 25%, Black/African-American students 16%, and Indigenous students at the top totaling 1 percent. There are roughly equal proportions of males and females in each racial-ethnic group. The next column to the right shows high school Calculus enrollment, where Whites and Asians are overrepresented and Hispanics and Blacks are at about half the expected representation. This reflects the fact that schools in predominantly Black, Indigenous, and Hispanic communities are less likely to offer Calculus [31]. Urban and rural schools are less likely to offer Calculus than suburban ones. This is not about merit or ability, but about unequal opportunity.

The third column shows College Board data from the Physics C AP exam, showing the demographics of students scoring a 5. While a score of 5 sounds like an achievement based on merit, one must first have access to Calculus in high school, and access to AP Physics C, which skews even more suburban, wealthy, and white, as well as male. Consider also that a student must have funds to register for and complete the exam. Taken together, merit is hardly reflected in the data; rather AP Physics C filters by both race and gender. Yet elite institutions use it to determine admission, eligibility for receiving Physics course credit, as well as access to honors or other elite learning opportunities in engineering. The far right column shows completion of the bachelor’s in engineering. It also skews strongly by gender and race. Engineering Education amplifies privilege. Smatterings of outreach projects will not alter the pattern. Change requires systematic investments at federal and state levels. Engineers need to muster the outrage that is due at this systemic inequality, show up, and get involved.

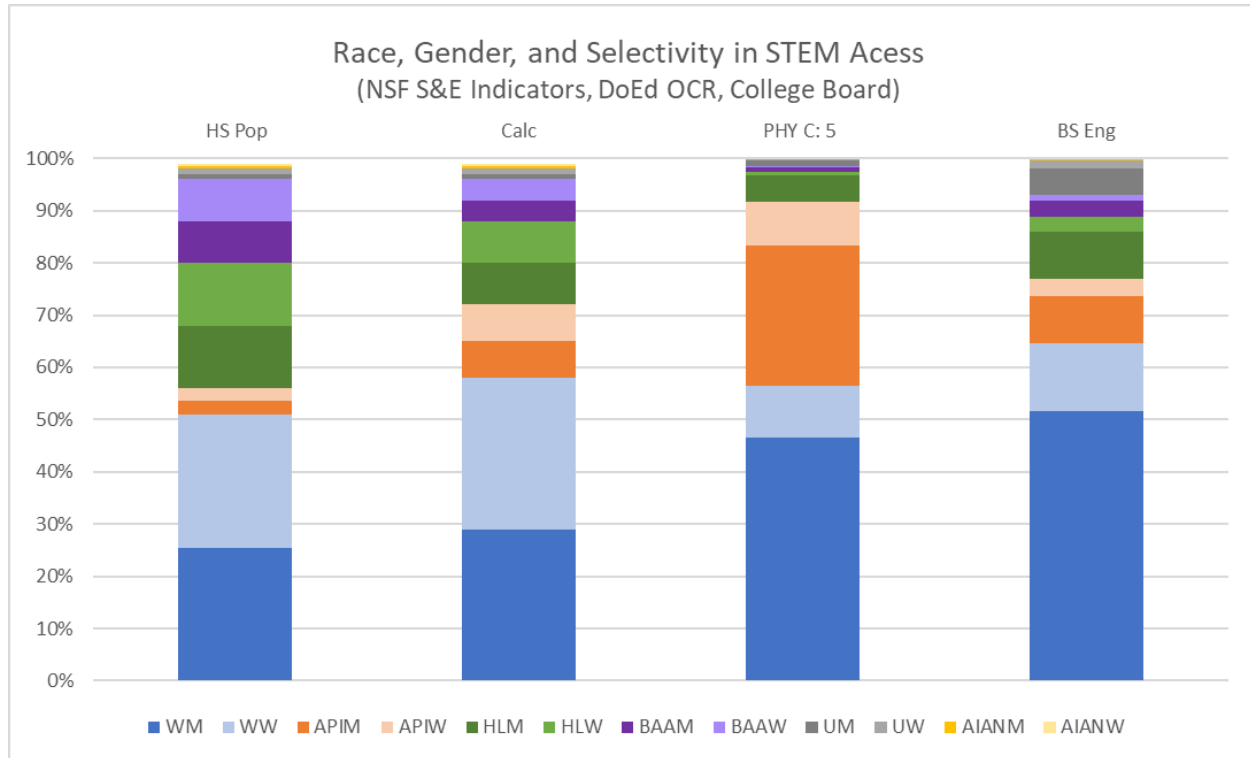


Figure 1: National data from NSF, the Department of Education, and the College Board

In the 1990s, Carnegie Mellon (CMU) made a bold stride to disrupt these patterns in an admissions experiment [32]. Recognizing that women at the time lacked pre-college coding experience, CMU demonstrated how removing the admissions criterion for prior programming experience in Computer Science — and changing the early curriculum to no longer assume that experience — drastically increased the percentage of women enrolled from 7 % in 1995 to 42% in 2002, and changed the demographics of who went on to be successful in CS. Too often, a change like this is seen as “lowering the bar” rather than critically assessing a standard for who it favors, and who is left out. This deficit mindset creates a new pattern in which well-meaning faculty lower their own standards and pass on students who are ill-prepared, reinforcing the deficit narrative that some students are less deserving, or that diversity comes at a cost to excellence, rather than facilitating it [33]. A more effective approach would meet students where they are, building on the funds of knowledge they bring to the classroom, and set new standards of excellence [34].

Demographic Change Threat

...basically there's been no country where the ethnic majority has become a minority in a peaceful and democratic fashion... and that's happening in the US by 2045.

– Dr. Lilliana Mason, Johns Hopkins
Pod Save America, Sep. 21, 2025

US higher education is in the midst of numerous strategies to “ban” DEI [35-38]. The impact is already being felt in hiring practices, loss of support offices at many institutions, and even in our own shifting language use. At the time of this writing, *The Chronicle of Higher Education* reports that nineteen states have passed one or more legislative bans on various aspects of Diversity, Equity, and Inclusion (DEI). However, universities in nearly every state without a legislative ban have restricted or rolled back DEI initiatives on their own, effectively complying in advance [39]. The practices of capitulation, appeasement, and compliance in advance are the hidden curriculum of many of our academic institutions, while a rare few model resistance [40].

While many treat DEI as a flattened singular concept, and anti-DEI advocates seek to paint it as illegal racial preferencing, it is crucial to consider the real meaning and consequences of a ban:

- To ban Diversity would be to institute a monoculture of wealthy white Christian able-bodied cis-gender straight men at our institutions, and to allow only their thought traditions in our curricula.
- To ban Equity would be to accept inequitable outcomes of our education system, to refuse to confront systemic inequities in our p-12 education system and remove pathways providing access to broader range of students [41, 42].
- To ban Inclusion would be to erase decades and centuries of an ever-widening sense of community in public life, and in who can be an engineer, and in who can be served by engineering (and other professions).

Additionally, the attempt to ban so-called divisive concepts is an attempt to erase scholarly tools for reckoning with our nation’s history of racism and settler colonialism and for advancing diversity, equity, and inclusion [43].

Ironically, had anti-DEI advocates left well enough alone, “DEI” as a flattened concept was already far down the path of being assimilated, diluted, and converted into meaningless platitudes by a variety of institutions whose commitment to preserving the status quo is evident [44-46].

But anti-DEI efforts are well-organized [47, 48] with the backing of think tanks, grass roots organizations, and politicians, informed by white supremacist ideologies including notions that European-Americans are being “replaced” or “colonized” by non-white immigrants in a “white genocide” [49]. A phenomenon known as population change threat is providing fuel to these ideas in the United States, where response to demographic changes has spurred a kind of “moral panic” regarding a majority-minority future in the US and a presumed loss of white privilege [50]. Demographic change threat exists across national contexts and is known to create preferences for authoritarian rule and violent conflict [51].

As a root cause, it is racism and xenophobia that make demographic change threatening. US engineering educators must reckon with racism and xenophobia amid demographic change because the engineering profession demands a diverse, well-educated workforce in order to produce the best possible outcomes for society. Engineering education must also reckon with demographic change threat and national tendencies toward authoritarianism and

political violence now and over the coming decades, helping our students understand and navigate engineering in these emergent contexts. The next section addresses how.

Pedagogies of Compliance

Gramsci [52] shows how schooling produces control, enacting the power of the state through intellectual and cultural hegemony, revealing the stakes for public education from the Scopes monkey trial to present day struggles over whose histories and literatures are included. Recently, Texas A&M banned Plato from a Philosophy syllabus due to the readings' purported race and gender ideology, a direct result of anti-DEI legislation [53]. The philosophy professor was told to either remove the readings in that course, or be reassigned to teach a course on engineering ethics, apparently presumed to be pre-compliant, perhaps given engineering's emphasis on a single right answer, and the hierarchy of disciplines [54] in academia that privileges STEM knowledge over other forms of knowing.

What Texas A&M — notably one of the largest engineering schools in the country — is teaching through its actions is compliance at any cost: sacrificing critical thinking, academic freedom, and the very idea of a university as a place of open inquiry where learners strive to know [55, 56]. Many other universities have behaved similarly.

Engineering educators' prevailing norms for teaching comply with engineering disciplinary norms, reinforcing the notion of one right answer in believing there is one right way to teach. Some advocate the “sage on the stage” method because instructors, after all, hold the knowledge, and in Freire's banking model, make deposits in students' minds, which are regurgitated through testing [57].

To illustrate pedagogies of compliance, we weave vignettes through this discussion, drawing attention to ways agency can be distributed in engineering classrooms. The vignettes are fictionalized versions, drawn from the peer reviewed literature as well as our recent and in progress publications, including those documenting how faculty shifted from a pedagogy of compliance to a pedagogy of freedom from our university's change efforts in Chemical & Biological Engineering and in our first-year engineering program.

Vignette: (Re)Active Learning, Instructor Control

Dr. Lo pauses his thermochemistry lecture and projects a multiple-choice question on the screens around the room. Familiar with this routine, students pull out clickers and enter their answers. Dr. Lo projects a graph of their answers, disappointed to see that only 43% chose correctly. Without sharing the correct answer, he asks students to discuss at their tables and consult their notes before answering again. As they begin discussing, Dr. Lo's teaching assistants know the drill; they fan out to tables, prompting students to discuss why one of the answers might be incorrect. After students update their answers, 78% have the correct answer. Dr. Lo asks students to explain why the wrong answers are wrong and the correct answer is correct.

In engineering classrooms, active learning often emphasizes reducing passive student behavior, such as by interleaving lectures with clicker questions or students working out

example problems in groups [58]. This shift from chalk-and-talk is valued for keeping students on task and attending to important concepts, while providing information to faculty about which students are making progress [59]. Some faculty appreciate clickers because using them for attendance and pacing enhances their control over the students [60]. There is abundant support for active learning, with much of the research demonstrating improvements in student performance on exams [58]. Such approaches center the curriculum, instructor, and assessment, thereby limiting learner agency and anchoring student worth to correctness of recall.

There has already been critique of the term *active learning* for its ambiguity [61], but we argue that *active* learning ought to enhance learning agency, not reduce it. As such, we henceforth refer to it as *reactive* learning — a term we coin to draw attention to agency. Others have detailed active learning spectra, such as a Chi's depiction of active (engaging learner attention), constructive (learners produce outputs), and interactive (learning through social interactions with peers or experts) learning [62]. By foregrounding learner agency — central to not complying — we offer a potential way to distinguish amongst the various forms of otherwise undifferentiated active learning strategies. We define reactive learning as learning that responds to a stimulus set by the instructor or curriculum, generally with a single correct answer rather than creative and generative possibilities. Consider this simple example of two variants of the “same” information:

(a) $2 + 2 = ?$ versus (b) How many ways can you express n : $2 + n = 4$?

By making this simple math generative, we trade the convenience of clickers for the practice of possibilities, a foundation for not bowing. Ultimately, reactive learning privileges the curriculum and its assumptions about what can be known, how it can be known, and who can know it. Reactive learning follows what is happening to ideas, not humans, throughout the core curriculum, cumulatively communicating that ideas matter more than people.

Engineering ethics scholars have critiqued a “hired gun” approach to engineering ethics in which uncritical and unquestioning loyalty to an employer is the supreme value [63]. While most codes of engineering ethics instruct engineers to hold paramount the health, safety, and welfare of the public (i.e., hold it above loyalty to an employer), it remains the case that in practice, engineers are often under pressure to do otherwise. The Challenger Case Study famously describes a senior Morton Thiokol executive pressuring Vice President of engineering Robert Lund to take off his engineer's hat and put on his management hat and ultimately support the launch decision [64]. In this way, engineers are disciplined to obey, disciplined to take the side of industry, or the military. While teaching case studies where loyalty is pitted against honesty, or the health of the public, is one way to make these tendencies clear to engineering students, liberatory pedagogies may ultimately hold more power to make these dynamics clear, especially in a packed curriculum. Visceral experiences in which students live out a pedagogy of freedom enable freedom to be felt and inscribed in the body, in the community, and on the land.

When engineering faculty move away from lecturing or reactive learning, they commonly encounter uncomfortable, unfamiliar territory. Is a noisy room good or bad? It can be difficult for faculty to know when they are teaching in ways that they have themselves not

experienced as learners. As such, missteps are likely on the route to teaching in ways that support learner agency. Our system creates numerous barriers to embarking on this journey.

Vignette: Shifting to Design, Uncomfortable/Unfamiliar Territory

After hearing Dr. Casakin describe her insights about students' passion for chemical & biological engineering, Dr. Carrillo decided to add a design project to an upcoming course. Dr. Casakin had specifically shared that when she stayed at the front of the room, there was both physical and interpersonal distance between her and the students. When she began teaching with design projects — just during recitations — in a learning studio, she realized that both the physical and interpersonal distance shrank. She was startled to discover how many students had been drawn to their major for altruistic rather than financial aims.

One month later, the room is noisy as 3rd year students, seated at round tables, summarize their research to one another before using their shared work to evaluate existing approaches to detecting atypical cells, a topic selected because of students' interest in biomedical engineering approaches to cancer detection and treatment. Dr. Carrillo circulates around the room, pausing at each table to ask, "Do you have any questions?" Consistently, they do not, yet Dr. Carrillo overhears snippets of conversation suggesting students may be struggling with some of the technical language in the resources they identified. Later, these concerns are validated in reading students' reports. After relating this to Dr. Casakin, she gently yet firmly suggests that when they were asked if they had questions, students actually heard, "Are you stupid?" She suggested, "Maybe next time, you could say, 'Can you update me on your conversation?'"

Supporting faculty on this journey means making space for missteps and coaching through, rather than coaching not to. And this process contributes to not bowing, because reflection and persisting through the tough stuff are essential attributes of resistance [65, 66]. Students' expectations of their coursework, cultivated from prior experiences of a mile-wide, inch-deep curriculum promote shallow engagement in a banking model of education. Paired with pressures to please students on end-of-course evaluations that promote customer service over student learning [67, 68], we should anticipate such issues.

Vignette: External Pressures and Customer Service

Dr. Dasgupta reviews student evaluations of teaching after a first attempt at integrating a design challenge into a core, required course on thermodynamics. She had assigned students to different parts of the project — two complementary refrigeration approaches that don't depend on electricity and sizing to meet the cooling load — but students complained, wishing they'd gotten to learn all parts and concerned that they missed out on important learning, even though they'd done well on the final exam. Concerned about her upcoming promotion application, Dr. Dasgupta redesigned the project so every student would work on every part.

Two weeks after the project start, students share the research they'd done on refrigeration approaches within their team. At his table, Jorge shared "My search turned up absorption, evaporative cooling, and passive radiative cooling. What about you all?" Each student

shared their initial search results in turn, then coalesced quickly on a single idea that turned up most commonly, because, as Amber shared “If we all found it, it’s probably the right answer.” Observing that most teams did this, Dr. Dasgupta improvised. Although she’d wanted them to develop criteria to evaluate the approaches, she felt pressed for time and wanted to please her students. She tallied the top choices and informed the class they would spend two weeks each on the top two choices. Later in the semester, her concerns were confirmed: the shallow engagement she’d observed in class was also clear in the thinly written reports students submitted.

Structural and disciplinary power shape how faculty interpret and respond to student evaluations of teaching [69]. In this way, these evaluations and a culture of coverage are tools of compliance.

Even when redesigning these systems is beyond an individual faculty member’s sphere of influence, they can take up resistance strategies, including explaining to students why they are doing what they are doing, and how it supports learning. There will always be students who don’t want to “eat their broccoli” but our responsibility as faculty is not to please them with pies and pastry. One key aspect is helping students understand the relevance of learning more than the technical concepts. Centering engineering work as sociotechnical and entangled with ethical decision-making through concrete examples from research and industry can help them recognize its salience [47].

Agency as Noncompliance

To cultivate a pedagogy of noncompliance, we consider agency and its distribution within the learning environment, and the degree to which learners’ experiences are connected to what and how they are asked to learn. In contrast to classrooms in which the instructor and curriculum control the what and how of learning, projects that engage learners as designers offer them framing agency, meaning they can make decisions that are consequential to how they frame and learn about the design problem [70, 71]. This kind of instruction can be challenging for faculty in part because students might take projects in unexpected directions; they might not bow to the instructor’s authority.

Vignette: Querencia & Funds-of-Knowledge Informed Design

“Shh, let’s just keep working” Paloma whispers conspiratorially to her team, while around them, other teams shift to the next step projected on the screens around them. While Paloma has been arguing to focus their project on a highly novel — but expensive — approach to remediation, Jonas and Carla want to use approaches that are affordable. Darren agrees, explaining, “Since we agreed to focus on my [Navajo] community, I think we need to prioritize cost and whether people can run it themselves.” They ignore the instructor’s light prompt to move on and continue to discuss, sharing journal articles back and forth. Three weeks later, after testing bench scale designs in the lab, they enter their results into a GoogleForm then access a dataset, not just of their data, but data from 3 years of the class!

At their final presentations, Carla shares a graph they created. Dr. Norooz briefly notices it is missing error bars, but he doesn’t focus on that. Instead he is impressed that they have

managed to select data from that unwieldy, messy dataset to demonstrate the potential value of a mixed solution, especially given that he resisted giving a lecture walking them through the process step-by-step. As a result, students' graphs and solutions differ quite a bit, yet they generally make sense given the different ways that they framed the problem. Suddenly, in a choreographed move, Carla and Jonas step to the side, and Darren steps forward, presenting ways they can help his community understand and select their idea for remediation.

In this final vignette, the students have agency, not just over what they learned, but also over how they committed their time. They made decisions consequential to the framing of the problem and why it mattered to them, which in turn shaped how and what they learned. We label this kind of agency — making decisions that consequentially impact the problem frame and therefore, its solution — framing agency [70, 71]. This kind of agency is challenging to foster, both because faculty and students have had few chances to engage in this way, and there are many structures that prevent us from persevering in the journey to do so. Recognizing that students have relevant knowledge from their cultural and everyday experiences [72-74] — their funds of knowledge are a key ingredient, but inadequate on their own. We have found benefit from taking a particular place-based approach called *querencia* [75], a word that lacks an adequate translation into English. With roots referring to safety and love of place, *querencia* references relationships with and responsibilities to the places we are from, along with love for and kinship with those places, despite the complex histories they hold [76-78]. One of the consequences of taking up *querencia* and liberatory pedagogy is that engineering itself gets challenged. Through this process, we and our students recognize an imperative: engineering must serve — and belong to — a broader group. The “why” for students to be non-compliant is generated in place, with community, not just from the teacher explaining why it matters.

Everyone is on a journey, toward or away from compliance. Cultivating moral imagination, the capacity to generate ideas and evaluate their potential to benefit others [79], depends upon having opportunities to practice using one's agency consequentially, and in generative situations. As the last vignette shows, emancipatory, liberatory, and place-based pedagogies can help engineers develop a consciousness of power in professional practice that enables them to leverage their funds of knowledge and navigate ill structured, values-laden problems. By thinking critically and acting reflectively, they can find creative ways forward that uphold local values, rather than ceding power to others or rushing to implement solutions that may not hold the community's best interest.

Students and faculty alike can move from a “given: find” mentality to one in which they claim responsibility for problem definition [80]. This development of framing agency is critical for learning not to bow. When engineers are in environments (classrooms as well as workplaces) where they are expected to comply, they now have a broader moral imagination in which they can generate choices beyond following orders on one hand and blowing the whistle on the other, attending to a complex set of interpersonal relationships, duties, and values. This capacity can sustain them whether they are navigating inequitable hiring

practices in an organization or being compelled to design weapons for unjust deployments overseas or at home.

The vignettes also reveal how communities of practice (of any size) are crucial to support faculty development in deploying pedagogies properly and developing a deepening understanding of *querencia* and other place-based approaches. Our process meets faculty where they are and brings them along relationally, so that both faculty and students develop critical framing agency over time. Having humility and space to be wrong, make missteps, correct errors, and persist in community is the key to transformation. In this way, faculty in a first-year engineering course can move from a presumption that students must be told explicitly how to do everything before they try (leading to overlecturing and low expectations placed on students), to new presumptions where students are supported in becoming power-competent, and in developing tools to make change as they explore and navigate their desired career paths. If students are encouraged to think explicitly and in a place-based way about what making change means, and listen to community members in a position to know, they learn how influence unfolds in real organizations and communities, and connect with people who they can work alongside for change.

Beyond the Classroom: Transformative Enactments

We used to say that what happened inside the classroom — with the protections of academic freedom — is profoundly radical by enacting different power realities with our students. While those acts still matter, we know these protections are threatened and eroding. Just as Freire empowered people who were oppressed and disenfranchised, we must likewise take this moment and act.

While students learning to develop framing agency and navigate power in organizations is essential for a democratic future, we also urgently need to level up the capacity of engineering educators and professional engineers to do the same in their work environments. This section presents some possible strategies, though by no means an exhaustive set, for engineers, engineering educators, and engineering students to resist an authoritarian, anti-DEI regime.

We urgently need to build on the scholarship referenced in the introduction on engineering under authoritarianism and ask: What kinds of engineering are co-produced under demographic change threat and how could it be otherwise? What ethical responsibilities does each group hold now? What can, what should each group risk now? How can members of each group support one another as the work continues? Possible strategies draw from social movement organizing, from education broadly, and from the profession itself.

There is no one-size-fits-all in this work and it is a form of compliance to imagine otherwise. Our ideas here are also far from exhaustive, and we encourage readers to seek out writings in both the academic and popular press that delve more deeply into these issues [81].

As we share ideas, we invite readers to keep the contextual as well as intersectional nature of these strategies in mind as they adapt, rather than adopt, as well as approach with an expansive, yes-and stance [82, 83] that goes beyond typical academic work [84].

Organizing Strategies

First, we value and engage in citizen activism (Figure 2). Being part of a wider movement buoys our sense of strength, responsibility, inspiration, so that we can show up in our respective roles on campus and in engineering and educational societies.

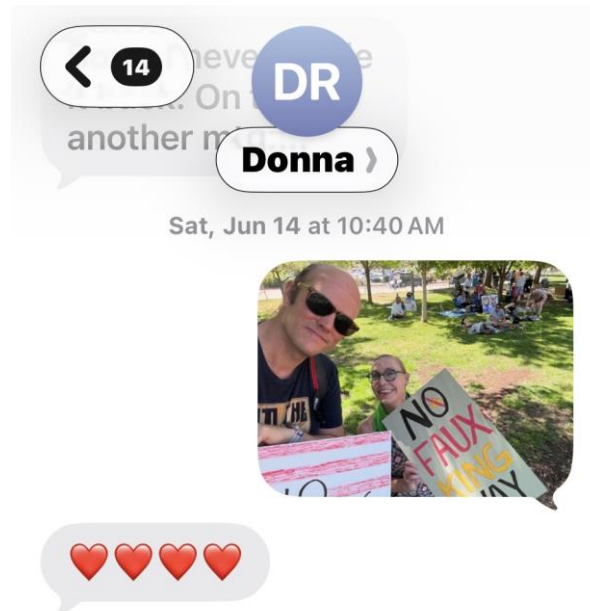


Figure 2: A text message from Vanessa to Donna (as private citizens) sharing participation in a local No Kings event

This can include showing up at community events as well as campus events. Protesters have continued to show up at Texas A&M following widespread censorship and erosion of academic freedom [85, 86], and we personally draw inspiration knowing protest is happening, even in College Station, Texas.

In addition to all of the other things that we have not named that you can do as an engaged citizen, the process of relational meetings [87, 88], honed through decades of movement organizing, is a core building block that can help start conversations that build common ground and identify people and places who can work together for change. These strategies have already been successfully deployed in engineering and engineering education research [89-91].

There is no substitute for authenticity in this approach; real relationships cannot be forced or faked. Intentionally facilitating and developing community is essential work for education and social movements alike [92]. Centering empathy — particularly for our students feeling the impact of dismantled support systems in our institutions and hateful national discourse at

a crucial time in their development as people — can help guide our praxis. Care must be a foundation; its absence invites terrible things to take root [93].

Ultimately, these efforts need to fit into broader strategies for building power and organizing for change, most likely by showing up within and for broader movements [94, 95]. For those universities that are unionized, prioritize codifying academic freedom, if you have not already done so. Interdisciplinary coalition building can create sinews that hold universities together [96].

Where resistance is in order, effective civil disobedience strategies abound, from rule departures and conscientious objection to legal protest, non-violent resistance, and beyond [97, 98]. Recognizing the long-haul nature of the work can help us work in sustainable ways [99].

Not bowing sometimes means inaction. Keep asking, strategically, ‘What is actually actionable about this latest EO?’ In many of the 2024 EOs regarding DEI, we identified nothing actionable, and thus, we did nothing.

Educational Strategies

In order to reclaim DEI from those who have weaponized it as an anti-black slur, equated with incompetence [100], or maligned it as “racist” in Orwellian fashion, educators must create authentic community in which DEI myths can be dispelled [101]. Ideals that have until recently enjoyed broad support from the majority (in principle if not in practice) can be affirmed, strengthened, and placed in engineering context through meaningful engagements rooted in local community.

Remembering what universities are *for*, we can recognize that campuses are targets for anti-DEI movements *because* they are havens for open-mindedness and free inquiry. It is essential that we defend these core principles that facilitate learning and discovery, especially academic freedom. This includes in our scholarship, telling truths and professing what we believe. This paper as example, but there are others [81, 84, 102, 103].

Now more than ever, engineering educators need to fully commit, aligning our reward structures to support defense of these core principles, and prioritizing that which is essential. STEM folks seem particularly afraid of being accused of being political, but this is already political, and our silence in the face of colleagues being attacked is deeply political. It sets up and perpetuates cycles of invisibility and hypervisibility for those being targeted. When we practice ignorance of these dynamics, we facilitate violence, whether that is physical, ontological, or epistemic. Nancy Tuana [104] has helpfully mapped out the varying registers of ignorance, for example when we **are not interested** to know, or when we **do not even know what we do not know,** or when we **do not care to know.** STEM as an institution needs to banish this ignorance and show up with our colleagues in the humanities and social sciences aligned in work against misogyny, xenophobia, and white supremacy. It is ok if we do not do it perfectly, if we show humility and a willingness to learn.

In all this work, creativity is a force — for subversion, for laughter, for sustaining, and for shining the light on a situation the way only art can. One of our unlawfully terminated

grants formed a community of transformation of change agents engaged in DEI-aimed change work in higher education. We designed arts-based activities to support processing, critically reflecting, and visioning in service of justice [105-108]. We used remixing and collage. to practice critiquing oppressive structures and norms; made protest art to share in solidarity and kindle radical hope.

Art can be a space to build practice that is persistent and sustained [109] and offer inspiration for others to build upon [110]. Indeed, we have continued to find solace and joy in the arts (Figure 3) — creative rest actions that sustain us in this work [111]. We funneled some of our anger over unlawful grant terminations into tiny quilts, shared with colleagues who likewise “earned” these badges [112].



Figure 3. Collages from Vanessa’s daily practice; Left: “Erupt” from the “Go Feral” series calls upon us “housecats” to get out and do something; Right: “White fragility” reminds us this is a marathon, not a sprint.

And this historical moment is fecund terrain for our creativity. DEI bans are fodder for brainstorming new acronyms — satirical, joyous, defiant. Subversively co-opting AI (Access & Inclusion!) or MERIT (Measurable Equity, Respect, Inclusion, Transformation!) could be fun; the possibilities are endless. This exercise is left to the reader.

Analysis is a tool we can apply broadly, to the language of DEI (the meaning of “student success” is evolving in real time!), to how attempts to weaponize Critical Race Theory actually constituted an excellent illustration of Critical Race Theory, to how attempts to end

single-sex girls' STEM education initiatives resulted in greater inclusion of trans and non-binary students, to deconstructing attempts to weaponize college affordability in the service of eliminating critical disciplines of study from academe. Analysis of DEI as self-limiting may point the way toward what's next. Historical context can help us situate the present moment in a long history of resistance, inform decisions, and provide a sense of solidarity [113].

Professional Strategies

Can the institution of engineering resist state capture in the present context, especially after early capitulation and collusion from Silicon Valley? The VDI showed us one possibility in 1950: drawing a bright line to protect human rights. Could US professional societies consider adopting VDI's language, or something stronger, into their ethics codes? Could they take a stand against participating in the construction of detention centers, or designing gear and weapons for paramilitary groups?

Can the engineering education community learn not to bow? At a time when both immigrant labor and non-white domestic labor are being excluded and worse, what are we proclaiming about our workforce needs, and what are we willing to risk in demanding that engineering opportunities be extended to all groups? With ABET hastily retreating from its recently approved DEI requirements, will engineering ethics committees be the next to bow by removing DEI and anti-discrimination language from the codes? How could an organized group of interested members create accountability to prevent such capitulation?

For now, at least, US engineering professional societies function as democratic organizations. Organizing activities like those described above, operationalized within professional societies, can move consensus to reflect positions appropriate to this moment. ASEE previously took an important stand in the face of targeted harassment of its members, defending academic freedom rooted in scholarly expertise [114]. What else is needed to not bow to those who would violate human rights and the other values we hold dear?

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References

- [1] "Bekenntnis des Ingenieurs." Verein Deutscher Ingenieure. <http://www.baendel.de/Der-Ingenieur> (accessed December 10, 2025).
- [2] S. Große-Wilde and S. Teupe, "75 Jahre "Bekenntnis des Ingenieurs"," Verein Deutscher Ingenieure, 2025. [Online]. Available: <https://www.vdi.de/news/detail/75-jahre-bekenntnis-des-ingenieurs>

- [3] E. Katz, "The Nazi engineers: Reflections on technological ethics in hell," *Science and engineering ethics*, vol. 17, no. 3, pp. 571-582, 2011, doi: 10.1007/s11948-010-9229-z.
- [4] J. M. Smith *et al.*, "We have been here before: Reflections on engineering and authoritarianism," *Engineering Studies*, vol. 17, no. 1, pp. 1-10, 2025, doi: 10.1080/19378629.2025.2466994
- [5] G. L. Downey and J. C. Lucena, "Knowledge and professional identity in engineering: code-switching and the metrics of progress," *History and Technology*, vol. 20, no. 4, pp. 393-420, 2004.
- [6] T. Saraiva, *Fascist pigs: Technoscientific organisms and the history of fascism*. MIT Press, 2018.
- [7] L. Graham, *The ghost of the executed engineer: Technology and the fall of the Soviet Union* (no. 87). Harvard University Press, 1993.
- [8] I. X. Kendi and J. Reynold, "Stamped from the Beginning," ed: New York: The New Press, 2019.
- [9] D. Treuer, *The heartbeat of Wounded Knee: Native America from 1890 to the present*. Penguin, 2019.
- [10] R. Dunbar-Ortiz, *An Indigenous peoples' history of the United States*. Beacon Press, 2023.
- [11] D. F. Noble, *America by design: Science, technology, and the rise of corporate capitalism* (no. 588). Oxford University Press, 1979.
- [12] G. L. Downey, "Low cost, mass use: American engineers and the metrics of progress," *History and Technology*, vol. 23, no. 3, pp. 289-308, 2007, doi: 10.1080/07341510701300387.
- [13] R. Lee *et al.*, "Land-grab universities: A high country news investigation," *High Country News*, , 2020. [Online]. Available: <https://www.landgrabu.org/>.
- [14] M. L. King Jr, "The Other America," ed: Speech delivered at Grosse Pointe High School 1968.
- [15] D. Riley, "An alternative tour of Ford Hall: Service toward education and transformation," in *Engineering and social justice: In the university and beyond*, A. Pawley, C. Baillie, and D. M. Riley Eds.: Purdue University Press, 2012, pp. 181-200.
- [16] A. Walton, "Technology versus African-Americans," *The Atlantic*, 1999. [Online]. Available: <https://www.theatlantic.com/magazine/archive/1999/01/technology-versus-african-americans/377392/>.

- [17] M. Abrams. "Eli Whitney." The American Society of Mechanical Engineers.
<https://www.asme.org/topics-resources/content/eli-whitney> (accessed.
- [18] C. Prahalad, *The fortune at the bottom of the pyramid: Eradicating poverty through profits* (no. 3). Upper Saddle River, N.J.: Wharton School Pub, 2006, pp. 52-74.
- [19] L. Winner, "Do artifacts have politics?," in *Computer ethics*, J. Weckert Ed.: Routledge, 2017, pp. 177-192.
- [20] S. U. Noble, *Algorithms of oppression: How search engines reinforce racism*. New York University Press, 2018.
- [21] B. J. Pauli, *Flint fights back: Environmental justice and democracy in the Flint water crisis*. MIT Press, 2019.
- [22] E. A. Cech and H. M. Sherick, "Depoliticization and the structure of engineering education," in *International Perspectives on Engineering Education: Engineering Education and Practice in Context*, vol. 20, S. Christensen, C. Didier, A. Jamison, M. Meganck, C. Mitcham, and B. Newberry Eds. Cham: Springer, 2015, pp. 203-216.
- [23] Z. S. Ritter and K. R. Roth, "International students need not apply: Impact of US immigration policy in the Trump era on international student enrollment and campus experiences," in *Whiteness, power, and resisting change in US higher education: A peculiar institution*: Springer, 2020, pp. 77-101.
- [24] Stop AAPI Hate, "Unsafe, unwelcome, and uncertain," 2025. [Online]. Available: <https://stopaapihate.org/2025/12/10/international-student-survey/>
- [25] NAFSA, "New research: U.S. economy could suffer a loss of \$7 billion and 60,000 jobs," 2025. [Online]. Available: <https://www.nafsa.org/fall-2025-international-student-enrollment-outlook-and-economic-impact>.
- [26] Association of American Universities, "International talent: Essential to America's innovation economy and national security," 2026. [Online]. Available: <https://www.aau.edu/key-issues/international-talent-essential-americas-innovation-economy-and-national-security>.
- [27] I. Ganguli and M. MacGarvie, "International students, immigration policies and implications for innovation," National Bureau of Economic Research, 2025.
- [28] A. E. Slaton, *Race, rigor, and selectivity in US engineering: The history of an occupational color line*. Harvard University Press, 2010.
- [29] A. E. Slaton, E. A. Cech, and D. M. Riley, "Yearning, learning, and earning: The gritty ontologies of american engineering education," in *STEM of Desire: Queer Theories and Science Education* W. Letts and S. Fifield Eds.: Brill, 2019, pp. 319-340.

- [30] E. A. Cech, "Rugged meritocrats: The role of overt bias and the meritocratic ideology in Trump supporters' opposition to social justice efforts," *Socius*, vol. 3, p. 2378023117712395, 2017, doi: 10.1177/23780231177123.
- [31] G. Orfield and R. Pfleger, *The unfinished battle for integration in a multiracial America—from Brown to now*. Los Angeles: The Civil Rights Project, 2024.
- [32] A. Fisher and J. Margolis, *Unlocking the clubhouse: Women in computing*. MIT Press, 2003.
- [33] S. B. Garcia and P. L. Guerra, "Deconstructing deficit thinking: Working with educators to create more equitable learning environments," *Education and Urban Society*, vol. 36, no. 2, pp. 150-168, 2004, doi: 10.1177/0013124503261322.
- [34] J. M. Smith and J. C. Lucena, "Making the funds of knowledge of low income, first generation (LIFG) students visible and relevant to engineering education," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, pp. 26.1127. 1-26.1127. 16, 2015, doi: 26.1127.1 - 26.1127.16.
- [35] Chronicle Staff, "DEI legislation tracker: Explore where college diversity, equity, and inclusion efforts are under attack," *The Chronicle of Higher Education*, 2023. [Online]. Available: <https://www.chronicle.com/article/here-are-the-states-where-lawmakers-are-seeking-to-ban-colleges-dei-efforts>.
- [36] G. Erin, H. Maggie, D. Christa, S. Jasper, C. Sonel, and A. Baiocchi, "Tracking higher ed's dismantling of DEI," *The Chronicle of Higher Education*, 2026. [Online]. Available: <https://www.chronicle.com/article/tracking-higher-eds-dismantling-of-dei>.
- [37] D. J. Trump, "Ending radical and wasteful government DEI programs and preferencing," *The White House*, 2025. [Online]. Available: <https://www.whitehouse.gov/presidential-actions/2025/01/ending-radical-and-wasteful-government-dei-programs-and-preferencing/>.
- [38] D. J. Trump, "Ending illegal discrimination and restoring merit-based opportunity," *The White House*, 2025. [Online]. Available: <https://www.whitehouse.gov/presidential-actions/2025/01/ending-illegal-discrimination-and-restoring-merit-based-opportunity/>.
- [39] S. Timothy, *On tyranny: Twenty lessons from the twentieth century*. New York: Tim Duggan Books, 2017.
- [40] C. L. Eisgruber, "The cost of the government's attack on Columbia," *The Atlantic*, 2025. [Online]. Available: <https://www.theatlantic.com/ideas/archive/2025/03/columbia-academic-freedom/682088/>.

- [41] "Yazzie/Martinez v. State of New Mexico, No. D-101-CV-2014-02224 (N.M. Dist. Ct. July 20, 2018).", ed.
- [42] American Society for Engineering Education and N. S. F. National Academy of Engineering, "The engineering mindset report: A vision for change in undergraduate engineering and engineering technology education," Washington, DC, 2024. [Online]. Available: <https://mindset.asee.org/>
- [43] ASEE Board of Directors, "Statement by the ASEE Board of Directors," 2025. [Online]. Available: https://www.google.com/url?q=https://aseecmsprod.azureedge.net/aseecmsprod/asee/media/content/impact/pdfs/formal_asee_response_to_22_sept_eo_16_oct_2020.pdf&sa=D&source=docs&ust=1768859286908692&usg=AOvVaw1LpwEV-G60zeP6nXQjUA9V
- [44] A. Slayton, "No surprises: Engineering DEI and the history of 2025," *American Society for Engineering Education Annual Conference*, 2025. [Online]. Available: https://nemo.asee.org/public/conferences/365/registration/view_session?session_id=20842.
- [45] "Engineering Independence." <https://www.engineeringindependence.com/> (accessed.
- [46] S. Appelhans *et al.*, "From "leaky pipelines" to "diversity of thought": What does "diversity" mean in engineering education?," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, pp. 1-4, 2019, doi: 10.18260/1-2--32861.
- [47] D. M. Riley, "Refuse, refute, resist: Alt-right attacks on engineering and STEM education diversity scholarship," *Proceedings of CoNECD-The Collaborative Network for Engineering and Computing Diversity Conference*, pp. 1-19, 2018, doi: 10.18260/1-2--29572.
- [48] S. United States House of Representatives Committee on Science, and Technology,. "Defending the Hidden Figures: A rebuttal of erroneous attacks on merit-based, fair, and competitive STEM grants." <https://democrats-science.house.gov/staff-reports/defending-the-hidden-figures-a-rebuttal-of-erroneous-attacks-on-merit-based-fair-and-competitive-stem-grants> (accessed.
- [49] S. Bracke and L. M. H. Aguilar, *The politics of replacement: Demographic fears, conspiracy theories and race wars*. Routledge, 2024.
- [50] B. Farr, "A demographic moral panic: Fears of a majority-minority future and the depreciating value of whiteness," *University of Chicago Law Review Online*, 2021. [Online]. Available: <https://lawreview.uchicago.edu/online-archive/demographic-moral-panic-fears-majority-minority-future-and-depreciating-value>.

- [51] J. A. Piazza, "Demographic change threat, preference for nondemocratic governance, and support for political violence," *Social Science Quarterly*, vol. 105, no. 4, pp. 1123-1139, 2024, doi: 10.1111/ssqu.13402.
- [52] A. Gramsci, "Selections from the prison notebooks," in *The applied theatre reader*: Routledge, 2020, pp. 141-142.
- [53] A. Blinder, "Texas A&M, under new curriculum limits, warns professor not to teach plato," in *The New York Times*, ed. New York: New York Times Company, 2026.
- [54] C. Carrigan and M. Bardini, "Majorism: Neoliberalism in student culture," *Anthropology & Education Quarterly*, vol. 52, no. 1, pp. 42-62, 2021, doi: 10.1111/aeq.12361.
- [55] M. A. Nordenberg, "'There are few earthly things more beautiful than a university': Chancellor Mark A. Nordenberg's Report to Pitt's Board of Trustees, delivered Oct. 18, 2013," *PittChronicle*, October 28, 2013 2013. [Online]. Available: <https://www.chronicle.pitt.edu/story/there-are-few-earthly-things-more-beautiful-university>.
- [56] J. Masfield, *There are few earthly things more splendid than a university*. Providence: Brown University and Pembroke College Funds, 1969.
- [57] P. Freire, *Pedagogy of the oppressed*. New York, NY: Herder and Herder, 1970.
- [58] S. Freeman *et al.*, "Active learning increases student performance in science, engineering, and mathematics," *Proceedings of the National Academy of Sciences*, vol. 111, no. 23, pp. 8410-8415, 2014, doi: 10.1073/pnas.1319030111.
- [59] A. Khan, P. Schoenborn, and S. Sharma, "The use of clickers in instrumentation and control engineering education: A case study," *European Journal of Engineering Education*, vol. 44, no. 1-2, pp. 271-282, 2019, doi: 10.1080/03043797.2017.1405240.
- [60] C. M. Hartt, "Power dimensions of the use of clickers in the classroom and other interventions," *US-China Education Review*, vol. 4, no. 11, pp. 760-771, 2014.
- [61] P. Doolittle, K. Wojdak, and A. Walters, "Defining active learning: A restricted systematic review," *Teaching and Learning Inquiry*, vol. 11, 2023, doi: 10.20343/teachlearninqu.11.25.
- [62] M. Chi, "Active-constructive-interactive: A conceptual framework for differentiating learning activities," *Topics in Cognitive Science*, vol. 1, no. 1, pp. 73-105, 2009, doi: 10.1111/j.1756-8765.2008.01005.x.
- [63] C. Harris Jr, M. Pritchard, and M. Rabins, *Engineering ethics concepts and cases*. New York: Thomson–Wadsworth, 2005.

- [64] N. Elliot, E. Katz, and R. Lynch, "The Challenger tragedy: a case study in organizational communication and professional ethics," *Business & Professional Ethics Journal*, vol. 12, no. 2, pp. 91-108, 1993. [Online]. Available: <https://www.jstor.org/stable/27800911>.
- [65] S. H. Hall, "REBOOT: What happens if you screw up as an ally?," 2024. [Online]. Available: <https://www.antiracismnewsletter.com/p/allyship-screwup>.
- [66] P. S. Lin, L. N. Kennette, and L. R. Van Havermaet, "Encouraging white allyship in anti-racism by decentring whiteness," *Learning and Teaching*, vol. 16, no. 1, pp. 31-54, 2023, doi: 10.3167/latiss.2023.160103
- [67] T. Heffernan, "Sexism, racism, prejudice, and bias: A literature review and synthesis of research surrounding student evaluations of courses and teaching," *Assessment & Evaluation in Higher Education*, vol. 47, no. 1, pp. 144-154, 2022, doi: 10.1080/02602938.2021.1888075.
- [68] W. Stroebe, "Student evaluations of teaching encourages poor teaching and contributes to grade inflation: A theoretical and empirical analysis," *Basic and Applied Social Psychology*, vol. 42, no. 4, pp. 276-294, 2020, doi: 10.1080/01973533.2020.1756817.
- [69] P. H. Collins and S. Bilge, *Intersectionality*. Hoboken, NJ: John Wiley & Sons, 2020.
- [70] V. Svihla, T. B. Peele-Eady, and A. Gallup, "Exploring agency in capstone design problem framing," *Studies in Engineering Education*, vol. 2, no. 2, pp. 96-119, 2021, doi: 10.21061/see.69.
- [71] V. Svihla, J. R. Gomez, and M. Crudo, A., "Supporting agency over framing authentic design problems," *Interdiscipl J P-B Learn*, vol. 17, no. 1, pp. 1-26, 2023, doi: 10.14434/ijpbl.v17i1.33915.
- [72] L. C. Moll, C. Amanti, D. Neff, and N. Gonzalez, "Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms," *Theory into Practice*, vol. 31, no. 2, pp. 132-141, 1992, doi: 10.1080/00405849209543534.
- [73] Y. Chen *et al.*, "Leveraging students' funds of knowledge in chemical engineering design challenges supports persistence intentions," *Journal of Chemical Education*, vol. 99, no. 1, pp. 83-91, 2022, doi: 10.1021/acs.jchemed.1c00479.
- [74] V. Svihla, Y. Chen, and S. P. Kang, "A funds of knowledge approach to developing engineering students' design problem framing skills," *Journal of Engineering Education*, vol. 111, no. 2, pp. 308-337, 2022, doi: 10.1002/jee.20445.
- [75] R. D. Lopez-Parra, Y. Sawyer, M. Wilson-Fetrow, C. Salas, C. Willis, and V. Svihla, "An integrative, querencia-informed approach to first-year engineering,"

Proceedings of the American Society for Engineering Education Annual Conference & Exposition, pp. 1-13, 2025, doi: 10.18260/1-2--57619.

- [76] J. E. Arellano, "La querencia: La raza bioregionalism," *New Mexico Historical Review*, vol. 72, no. 1, p. 6, 1997. [Online]. Available: <https://digitalrepository.unm.edu/cgi/viewcontent.cgi?article=3255&context=nmhr>.
- [77] C. R. Ault Jr, "Achieving querencia: Integrating a sense of place with disciplined thinking," *Curriculum Inquiry*, vol. 38, no. 5, pp. 605-637, 2008, doi: 10.1111/j.1467-873X.2008.00438.x.
- [78] V. Fonseca-Chávez, L. Romero, and S. R. Herrera, *Querencia: Reflections on the New Mexico homeland*. University of New Mexico Press, 2020.
- [79] D. Narvaez and K. Mrkva, "The development of moral imagination," in *The ethics of creativity*: Springer, 2014, pp. 25-45.
- [80] G. Downey, "Are engineers losing control of technology?: From 'problem solving' to 'problem definition and solution' in engineering education," *Chemical Engineering Research and Design*, vol. 83, no. 6, pp. 583-595, 2005, doi: 10.1205/cherd.05095.
- [81] K. W. Whitehead, "How should feminist studies in the United States mobilize for action?," *Women's Studies Quarterly*, vol. 52, no. 1 & 2, pp. 85-92, 2024, doi: 10.1353/wsqr.2024.a924305.
- [82] G. Hatcher, W. Ion, R. Maclachlan, M. Marlow, B. Simpson, and A. Wodehouse, "Evolving improvised ideation from humour constructs: A new method for collaborative divergence," *Creativity and Innovation Management*, vol. 27, no. 1, pp. 91-101, 2018, doi: 10.1111/caim.12256.
- [83] K. Dohe and E. Pappas, "Lessons from the field: What improv teaches us about collaboration," *Library Leadership & Management (Online)*, vol. 32, no. 1, pp. 1-16, 2017. [Online]. Available: <https://pdfs.semanticscholar.org/036d/106386e2a11a9f9acbce0b9e7fa8c125167d.pdf>.
- [84] T. J. Boisseau and A. L. Ernstberger, "Introduction," *Women's Studies Quarterly*, vol. 52, no. 1 & 2, 2025. [Online]. Available: <https://www.proquest.com/scholarly-journals/introduction/docview/3033329790/se-2>.
- [85] AAUP, "AAUP, organizational partners call on Texas A&M to rescind censorship policies," 2026. [Online]. Available: <https://www.aaup.org/news/aaup-organizational-partners-call-texas-am-rescind-censorship-policies>.
- [86] AAUP, "Fighting for free speech at Texas A&M," *Academe Blog*, 2026. [Online]. Available: <https://academeblog.org/2026/02/02/fighting-for-free-speech-at-texas-am/>.

- [87] E. T. Chambers, *Roots for radicals: Organizing for power, action, and justice*. Bloomsbury Publishing, 2018.
- [88] G. Michael, *Going public: An organizer's guide to citizen action*. Anchor Books, 2002.
- [89] D. Riley, E. K. Foster, and J. Karlin, "Show up and disrupt," *Journal of Engineering Education*, vol. 109, no. 1, 2020, doi: 10.1002/jee.20305.
- [90] J. Valle, I. Ali, C. L. Bowen, and D. M. Riley, "Experiences of engineering students participating in an abolitionist labor strike," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, 2021.
- [91] J. Valle, C. L. Bowen, and D. M. Riley, "Liberatory potential of labor organizing in engineering education," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, 2021.
- [92] b. hooks, *Teaching community: A pedagogy of hope*. Routledge, 2004.
- [93] T. M. Cottom, "Disaster capitalism feeds where care abandons: A provocation on the case of US higher education after COVID," *Women's Studies Quarterly*, vol. 52, no. 1, pp. 371-376, 2024, doi: 10.1353/wsqr.2024.a924340.
- [94] M. Ganz, *People, power, change: Organizing for democratic renewal*. Oxford University Press, 2024.
- [95] J. McAleve, *No shortcuts: Organizing for power in the new gilded age*. Oxford University Press, 2016.
- [96] J. McVicker, "Contesting post-truth chaos through interdisciplinary heterotopias," *Women's Studies Quarterly*, vol. 52, no. 1, pp. 231-250, 2024, doi: 10.1353/wsqr.2024.a924319.
- [97] M. Engler and P. Engler, *This is an uprising: How nonviolent revolt is shaping the twenty-first century*. Bold Type Books, 2016.
- [98] D. Riley, *Engineering and social justice*. San Rafael, CA: Morgan & Claypool, 2008.
- [99] M. Horton, *The long haul: An autobiography*. New York: Teachers College Press, 1990.
- [100] A. Lawrence, "Racist dog whistle: the right wing has weaponized 'DEI'," ed, 2024.
- [101] S. Harper and Associates, *Truths about DEI on college campuses: Evidence-based expert responses to*

politicized misinformation. Los Angeles: University of Southern California Race and Equity Center., 2024.

- [102] J. Schneider, "On pandemonium's many pressures," *Women's Studies Quarterly*, vol. 52, no. 1, pp. 365-366, 2024, doi: 10.1353/wsqr.2024.a924338.
- [103] A. E. Slaton and D. Riley, "Rage-ography: Rigor, anti-wokeness, and technoviolence," *Women's Studies Quarterly*, vol. 52, no. 1, pp. 269-289, 2024, doi: 10.1353/wsqr.2024.a924321.
- [104] S. Sullivan and N. Tuana, *Race and epistemologies of ignorance*. Suny Press, 2007.
- [105] N. N. Kellam *et al.*, "Designing a community of transformation for justice: A design case capturing the beginnings," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, pp. 1-10, 2024, doi: 10.18260/1-2--46807.
- [106] S. C. Davis *et al.*, "Analyzing creative works within a community of transformation," *Proceedings of the International Society of the Learning Sciences*, pp. 1729-1733, 2025. [Online]. Available: <https://repository.isls.org/handle/1/11352>.
- [107] K. Ferris *et al.*, "Reimagining STEM change work: Exploring the role of arts-based practices and community in advancing inclusive education," presented at the OTESSA, Santa Fe, NM, 2025.
- [108] N. N. Kellam, S. C. Davis, K. Ferris, E. E. Lee, K. Getz, and V. Svihla, "Community of transformation to support inclusive and equitable change in engineering: An unlawfully-terminated NSF IUSE-Funded project," *Proceedings of the ASEE Annual Conference & Exposition*, pp. 1-5, 2025, doi: 10.18260/1-2--55590.
- [109] K. Louaillier, "Really? Really," *Women's Studies Quarterly*, vol. 52, no. 1 & 2, 2024, doi: 10.1353/wsqr.2024.a924300.
- [110] E. G. Nichols, "Crazy quilt activism," *WSQ: Women's Studies Quarterly*, vol. 52, no. 1, pp. 351-356, 2024, doi: 10.1353/wsqr.2024.a924334.
- [111] T. Hersey, *Rest is resistance: A manifesto*. Hachette UK, 2022.
- [112] T. Jones, E. Litzler, D. M. Riley, and V. Svihla, "Quilting not quitting: Moral fabric meets the fascist moment," *The ADVANCE Journal Blog*, 2025. [Online]. Available: <https://www.advancejournal.org/post/3188-quilting-not-quitting-moral-fabric-meets-the-fascist-moment>.
- [113] M. H. Carey, *The struggle for inclusive education*. Southern Poverty Law Center, 2024.

- [114] ASEE. "Letter supporting scholarly research in diversity and inclusion in STEM education." <https://www.asee.org/about-us/what-we-do/ASEE-Public-Policy-Statements/Letter-Supporting-Scholarly-Research-in-Diversity> (accessed.