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Am I The Villain?: How Critical Reflection Gaps in Individual University Decision-Makers Affect Access Programs

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Abstract

Two graduate students, holding underrepresented identities, in academia, developed and ran a summer educational access program supporting local first generation and/or low-income (FGLI) high school students hosted at a well resourced university with an espoused commitment to community engagement, equity and inclusion. Originating from conversations with faculty on their struggles with recruiting high school research interns in an equitable manner that did not erase the presence of underrepresented students, the two students demonstrated, to relevant faculty for their work, the potential to leverage the university's resources and community partnerships to support local FGLI high school students in gaining access to these research opportunities. Despite their extensive efforts over the course of two years and their measurable successes in demonstrating the efficacy of their program model in its first iteration, the program was not given the institutional support needed for a second iteration and left rendered obsolete by its host department. This paper presents a critical self-reflective auto-ethnography of the two graduate students in concert with a third party sociology scholar studying how university mechanisms interact with its individual decision makers influencing the design, implementation and resulting efficacy and sustainability of university programs designed to address academic inequity and injustice. In it, we begin at an assessment of the university's loose organizational structure and garbage can decision making process that leaves opportunities, within the university's administrative framework, for implementing solutions that challenge the status quo in the hands of individual university decision makers and their commitment to the solution. We highlight how university norms prime an aversion to these kinds of solutions. In particular, we point out how these norms also offer individual university decision makers sanctuary to circumvent critically assessing their complicity with not challenging harmful and/or ineffective normative solutions despite the decision maker's agency and social capital to do so under the guise of "institutional culture". Building on social identity theory, feminist social theory, and critical theory, we further leverage the auto-ethnography to present how these norms dichotomize individual decision makers into privileged decision makers with no personal consequence associated with the university issue at hand and afflicted decision makers who will be affected regardless of the chosen solution. We connect these theories to the experiences of the two graduate students and discuss the consequences of the dichotomy on the efficacy and sustainability of educational equity programs to challenge individual university decision makers of every rank to accept the responsibility of dismantling and interrogating harmful norms in their academic institutions.

Introduction

Operating within a resource-rich university that explicitly touts “community engagement, equity, and inclusion” as institutional priorities, two graduate students—both navigating marginalized identities in academia—pioneered a summer educational access program for local first-generation and/or low-income (FGLI) high school students. The initiative emerged as a direct counterstrategy to faculty-reported challenges in recruiting diverse high school research interns without perpetuating exclusion. By leveraging existing institutional resources and forging new community partnerships, the students designed a cohort-based model that combined targeted outreach, mentorship, and skill-building workshops to recruit and compensate 10 FGLI youth for contributing to competitive research opportunities. Participant survey data from the pilot iteration revealed several positive outcomes: increased participant confidence in pursuing research opportunities and STEM pathways, improved research literacy (see Figure 1), and quantifiable research contributions such as research equipment servicing, data collection, and publication authorship. These outcomes align with the university’s public equity agenda. Nevertheless, after two years of demonstrable impact, faculty leadership declined to renew the program, citing nebulous “institutional constraints”. If equity-centered programs like this one demonstrably advance institutional equity goals, why do universities still fail to sustain them?

Drawing from organizational theory, social identity theory, feminist social theory and critical theory, we present a critical self-reflective autoethnography of the creation of the program to interrogate the systemic contradictions that enable institutions to publicly valorize inclusion while materially undermining the initiatives designed to achieve it. Recent literature underscores the imperative of addressing justice, equity, diversity, and inclusion (JEDI) within academia. In the U.S., efforts to create pathways for underserved students to access higher education are increasing[1], [2], [3], [4], [5], [6]. However, these initiatives face obstacles. Scholars are examining factors such as the academic environment, sense of belonging, and university governance to evaluate the effectiveness of these interventions [7], [8], [9], [10]. A key focus is studying how these programs are designed and implemented, especially in institutions characterized as “organized anarchies” with loosely connected departments, known as "loosely coupled systems" [11]. In such systems, decision-making is often chaotic and described as "garbage can" models [12]. These models show how decisions come out of problems, solutions, and decision-makers being randomly and unpredictably available at the same time in a “garbage can” representative of choice opportunities(See Figure 2).

We analyze individual agents within university decision-making through this lens, revealing a dichotomy between privileged and afflicted decision makers in times when an available and effective solution to a problem stands to oppose institutional norms. At this juncture, we observe a breakdown in the transition from theory to praxis as the decision maker is confronted with the reality of their choices. Privileged decision makers, whose most salient identities are not at risk, may avoid critical engagement with this solution, leveraging the abstract nature of the garbage

can model to hide behind the illusion of policy. This enables them to defer action and opt for a more normative and potentially harmful solution despite being the decision makers thus hindering effective equity interventions. This allowance for platitude hinders the efficacy of inequity intervention which requires its actors to be willing agents of change[13], [14], [15], [16], [17], [18]. Within that ability to circumvent action without personal consequence lies the privilege, hence the name. Conversely, afflicted decision makers, whose most salient identities are at risk, have limited options. They can avoid conflict by choosing the normative solution and suffer the harmful consequences, leave the institution with damage already done to them [19], or leverage the abstract nature of the garbage can model to string together solutions not prioritized by the institutions. This often means navigating significant roadblocks and enduring emotional and physical labor to drive change [20], [21], [22], [23], [24]. Utilizing the "What?So What? Now What?" critical reflection framework [25], we synthesize interactions and experiences as samples in a case study to illustrate examples of the presented theory. We offer our findings as work to challenge university decision-makers to consider how institutional norms influence their actions, especially when designing and implementing educational access programs. We hope to inspire internal dialogue on these norms and their effects. Additionally, we urge individuals in academia to reflect on their privilege and position when making decisions. Assessing their ability to ignore, delay, or downplay crucial opportunities is essential for achieving positive outcomes in educational access interventions.

PROGRAM PARTICIPANT SURVEY QUESTIONS	RESPONSE AVERAGE	
	Pre (n = 9)	Post (n = 6)
On a scale of 1 to 7, how confident are you now that you could do research as an undergraduate or graduate student? (1 = not at all confident, 7 = very confident)	3.2	6
On a scale of 1 to 7, how comfortable do you feel doing research in a university setting? (1 = not comfortable at all, 7 = very comfortable)	4.5	6.2
On a scale of 1 to 7, how confident are you in your college readiness skills? (1 = not at all confident, 7 = very confident)	4.6	6
On a scale of 1 to 7, how confident do you feel with your knowledge of STEM topics? (1 = not at all confident, 7 = very confident)	4.1	6
On a scale of 1 to 7, how familiar does the idea of attending college feel to you? (1 = not very familiar, 7 = very familiar)	5.3	6.4
On a scale of 1 to 7, how confident are you in applying to college/university after this program? (1 = not at all confident, 7 = very confident)	5.2	6.6

Figure 1. Participants Survey Questions Administered Pre and Post Educational Access Program

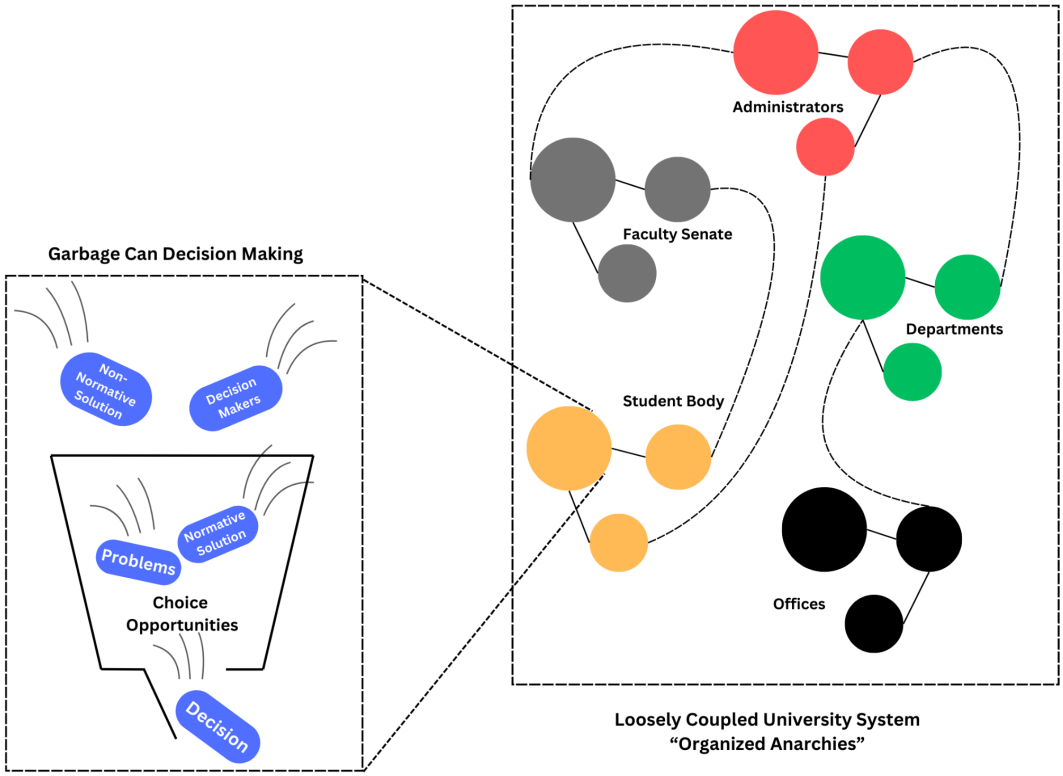

Figure 2. Universities as Organized Anarchies. Garbage Can Decision Making Nested in Loosely Coupled Organizations

Theoretical Backing For Assessing the Individual Decision Maker

Weick[11] was a pioneer in describing academic institutions as loosely coupled systems, suggesting that parts of organizations don't always follow linear or rational decision-making processes. This framework helps us analyze how different elements, like administration, faculty, and students, are interconnected yet operate independently. In our analysis, we note that within a decentralized institution, the awareness of each area's practices is often limited. Weick[11] argues that loosely coupled systems give individuals more autonomy, allowing personal agency in decision-making. This is supported by Cohen, March, and Olsen's[12] Garbage Can model, which highlights the chaotic decision-making common in universities, further emphasizing individual influence on institutional choices. However, as noted by other scholars[26], [27], even in these "organized anarchies," institutional norms can shape decision-making by limiting available options. Normative pressures often arise from professional standards, which help establish the legitimacy of decision-makers. Consequently, individuals may feel compelled to align their choices with institutional norms to maintain their credibility. Recognizing that decision-makers are influenced by these institutional pressures allows for a deeper exploration of how their social identities shape their responses to these forces. This underscores the idea that, as

feminist sociology argues, “the personal is political”[28]—individual values and institutional ideals can become intertwined.

Roots of the Decision Maker Dichotomy

What happens when faced with choices that conflict with institutional norms? According to the Garbage Can and Loosely Coupled models, such options are viable. If a non-normative solution leads to favorable outcomes, literature simply argues that this change would be slow to migrate between elements due to loose couplings and the non-involvement of the organization as a whole [11], [12], [29]. For example, some medical schools have recently begun implementing pass/fail grading systems and see improved student well-being with no adverse effect on academic performance yet the practice still struggles with acceptance from residency program directors [30]. However, when the critical lens is focused on the individual agent, it offers a deeper perspective.

Firstly, who is primed to make such decisions?
Building on the teachings of feminist sociology, we recognize that this bias to make normative decisions and consequent identification with institutional norms reaches a point where confrontation of the “institution” becomes confrontation of one’s self. As agents gain legitimacy through research and accolades, an “in-group” forms among those aligned with the institution, contrasted by an “out-group.” This dynamic complicates confrontations, reinforcing the distinction between privileged (“in-group”) and afflicted (“out-group”) decision-makers.

Absence of critical reflection leads privileged decision-makers to operate within a bounded rationality framework, prioritizing the institution's status quo and their own stability. This dynamic fosters an environment resistant to institutional change. In the context of educational inequity, although literature presents compelling arguments for necessary interventions, these are often perceived as mere theory rather than integrated into university governance[20]. Institutions may use access programs as superficial add-ons or public relations tools rather than true necessities[31], [32], [33], [34]. Consequently, these programs symbolize institutional “performance” rather than genuine efforts to enhance legitimacy. For privileged decision-makers, this creates little incentive to implement educational equity scholarship, as the institution does not legitimize these efforts and none of their salient identities are in jeopardy. This situation allows them to deflect responsibility for inaction onto the institution, even though the success of outcomes, in a garbage can model, is ultimately determined by the individual decision maker. We refer to this tendency as finding “safety in theory,” where privileged decision-makers feel secure in adhering to established norms that enable them to shelve critical teachings at the point of theory.

When conceptualizing the afflicted decision-maker, we must first define them as members of the institution’s “out-group.” In academia, minoritized and underserved identities exist within

environments often designed and legitimized without consideration for their needs [19], [35], [36], [37], [38], [39], [40], [41]. Drawing from feminist sociology, we invoke Standpoint theory, which asserts that an individual's knowledge is shaped by their social and political experiences. This leads to Patricia Hill Collins' concept of the "Outsider Within," highlighting that marginalized voices uniquely identify patterns of behavior that members of the "in-group" may overlook, due to differing experiences of institutional power. Collins aptly notes that "Outsider within status is bound to generate tension, for people who become outsiders within are forever changed by their new status"[42]. Afflicted decision-makers are therefore closely linked to choice opportunities that challenge institutional norms. The complexity of intersectional identities means that labeling someone as an afflicted decision-maker varies based on their most salient identities in relation to the choices they face. Within the Black feminist thought framework, Collins also points out that afflicted decision-makers encounter a few options when faced with their new status. They may leave the institution, but this departure does not just relieve tension; it also means losing energy spent in a hostile environment and foregoing opportunities. Alternatively, they might suppress their differences to assimilate, sacrificing aspects of their identity, well-being, and personal growth within the institution. Both options illustrate the limitations afflicted decision-makers face in effecting institutional change.

Afflicted Decision Makers Making Up The Difference

Collins introduces a third alternative where the tension experienced by outsider-within individuals is harnessed to promote institutionalization. In this context, an afflicted decision-maker is empowered to "make up the difference." March and Cohen highlight that organizations often exhibit "high inertia," requiring powerful disruptive forces for institutional change[43].

This inertia indicates that institutions find a steady state, with privileged decision-makers favorably positioned to maintain the status quo. Researchers suggest that norm upholders may exploit the ambiguity of the garbage can model—either knowingly or unknowingly—to limit the impact of disruptive agents[26]. For example, widening garbage cans (choice opportunities) that include problems and non-normative solutions to accommodate more normative solutions. This channels the energy of the "trouble-makers" into "attractive arenas that are devoid of any consequence" [11]. As a high level example, we point to the pilot educational access programs designed to "help everyone" but still demonstrate no improvements for the most vulnerable populations due to a lack of intentionality and focus on engaging the underserved population. This example of normative momentum build-up serves to illustrate the sheer magnitude of energy the afflicted decision maker is tasked with opposing and dismantling when "making up the difference".

Addressing JEDI issues requires afflicted decision-makers to navigate complex university governance, involving difficult conversations with institutional representatives across various

levels, often with limited social capital. Alarmingly, even if these efforts generate positive momentum, they must overcome the weak information base typical of organized anarchies to ensure sustainability. As a cursory example, we point to the JEDI programs that are sustained by under-resourced staff and/or underserved students that struggle to stay alive upon their departure from the institution.

“Making up the difference” entails sacrifice, as afflicted decision-makers endure ongoing institutional tension. This concept of conserved energy neglects the minority tax they often face in academia[34], [44]. Importantly, literature indicates that privileged decision-makers can help bear this burden[45]. With their social capital and favorable positions, they are well-placed to advocate for and dismantle harmful norms impeding sustainable and effective programming. Achieving meaningful change requires all stakeholders to work toward common goals, with privileged decision-makers critically engaging with choices to promote equity.

Methodological Framework

This study explores how the positionality of individual university decision-makers influences their choices regarding educational access programming. We examined the interactions and communications between decision-makers involved in creating the educational access program. The program originated from a discussion between graduate students and a faculty member about the need for equitable access to research opportunities for high school interns. Two graduate students (holding underrepresented identities in academia) volunteered to research methods, within the university, to make these opportunities more accessible, and the faculty member volunteered to work towards ensuring these efforts were sustainable and institutionalized within a university department with relevant faculty. The analysis and results are based on a critical self-reflective autoethnography by the two students, with input from a third-party sociology scholar.

In analyzing meeting notes, conversations, and events, we use the “What? So what? Now what?” reflection model[25] to critically examine our experiences during the program's creation, administration, and post-implementation phases within broader social, cultural, and institutional contexts. This model involves three baseline questions for extracting learning from critical incidents:

The “What?” describes the incident, defining the facts and feelings, and uncovering recurring themes, values, and assumptions connected to larger societal constructs.
The “So What?” examines the implications of the incident, placing personal experiences within broader cultural, historical, and structural frameworks to understand their significance.
The “Now What?” focuses on action plans and suggestions for engaging with the learnings.

For brevity, we group events by recurring themes, narrate the incidents, link them to proposed theories, and discuss their outcomes. Our aim is to identify valuable learning opportunities for both privileged and affected decision-makers.

Positionality Statements

Author 1: I am a Black male, first-generation low-income PhD candidate. I grew up both in an economically segregated country in West Africa and in the metropolitan area of a racially and culturally diverse city in the southern United States. During my middle and high school years at public schools known for their high poverty rates, I became intimately familiar with the challenges of being a low-income student. My identity as a first-generation college student and now graduate student has also shaped my experiences in academia, including constant struggles to access physical and socioeconomic resources and an unawareness of hidden curricula that impact my journey. For both my undergraduate and graduate academic career, I attended elite predominantly white institutions where I was trained and educated to be an engineer in environments that at times felt hostile and unsafe. Dating back to my early teenage years, I have been involved in numerous community efforts focused on bolstering early engagement with higher education for underrepresented students at high schools that do not typically get this attention. I am passionate about doing work to equip students that are underserved within our global community with tools to find success in what they want to do with their lives.

Author 2: I am a Black and non-binary Ph.D. Graduate who worked with Author 1 on the summer program discussed in this work. As someone who identified and was perceived as a Black woman for most of my life, I always struggled to feel like I belonged in engineering as there are so few people like me in the field. Fortunately, I had access to lots of academic resources throughout my childhood, but the ones that had the greatest impact were those run by Black women and queer engineering students. For that reason, I have been involved in running outreach programs focused on bolstering education and retention for minoritized middle and high school students interested in STEM since I was an undergraduate student. I am passionate about providing these kinds of opportunities for underrepresented students because those same kinds of programs are what made me feel confident I belonged and could succeed in an engineering program.

Author 3: I am a Black woman sociologist (B.A) from the California Bay Area and have been working in private higher education at the director and programmatic level for the last 5 years. I am interested in liberatory practices and programs created in higher education spaces both in and out of institutions, especially for those of marginalized identities and how their identity shapes as their environment refuses to shift to accommodate them. I have found myself specifically involved in cohort programs that cater to students who identify as Black, first generation, low income, or all three. In these spaces I have been most interested in dissecting how these programs come to be needed and how universities keep them on the fringes.

Autoethnographic Narratives Illustrating the Theory

First, the overview of the actions of relevant parties (specified below) during the creation and implementation of the 2023 educational access program is summarized below. We offer this as a tool for orienting detailed dissections and discussions about more specific events further in this section. We have also provided a timeline (See Figure 3). For the purposes of maintaining anonymity, the anecdotes presented below have been de-identified.

Involved parties: the volunteering faculty member from the meeting, the two graduate students from the meeting, faculty from the host department, various other university representatives, program participants, community members.

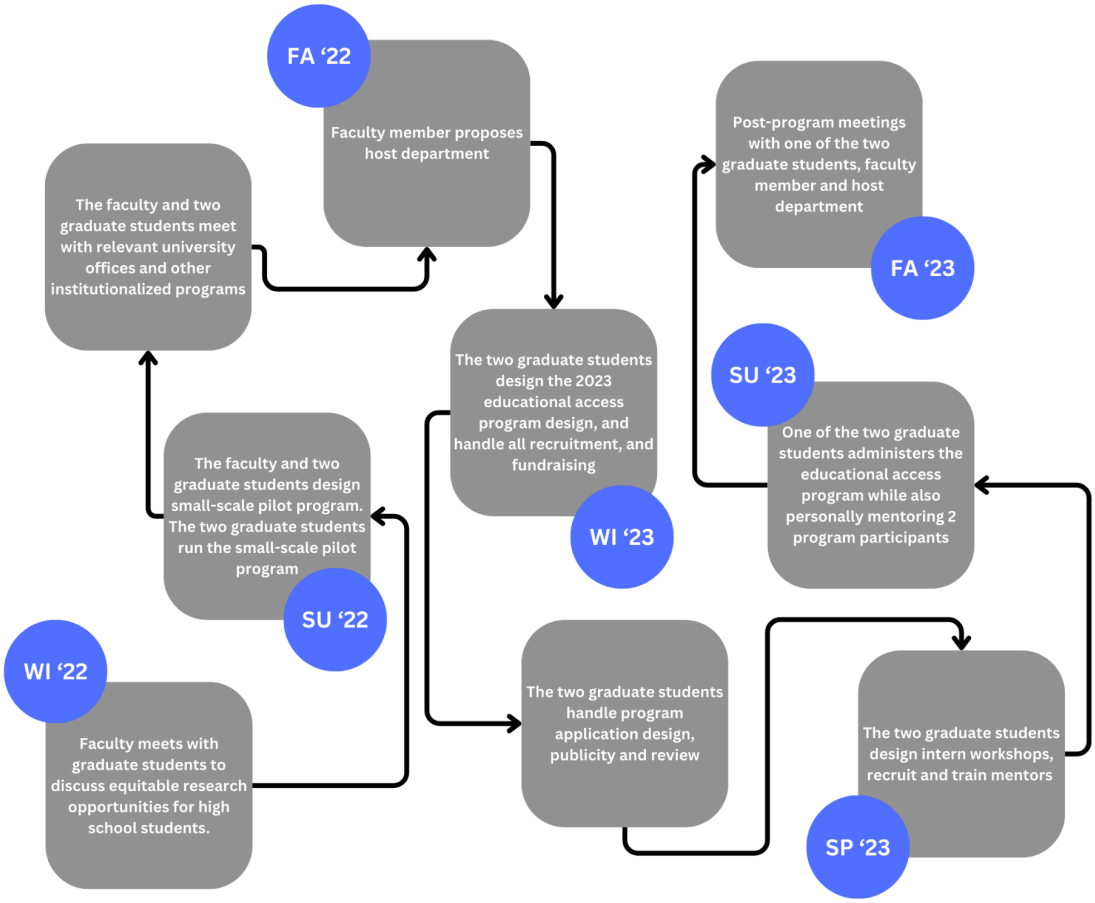

Figure 3. Program Development Timeline

Program Development Overview

- The volunteering faculty and two graduate students designed a small-scale pilot program in summer 2022 to maximize student learning outcomes and gather feedback.
- The two graduate students administered the pilot and gathered insights for the 2023 program.

- The volunteering faculty proposed housing the 2023 program in a new department within which they held an executive role.
- The volunteering faculty and two graduate students coordinated discussions with university offices and representatives relevant to the process of institutionalizing the 2023 program.
- One of the involved graduate students joined a university program designed to offer training and resources (including financial) for community engaged programming.
- In effectuating the 2023 educational access program, the two graduate students
    - Recruited students via partnerships with local high schools and non-profit organizations.
    - Raised funds for program costs including but not limited to feeding the students and compensating students and their mentor for their labor.
    - Held meetings with education experts, teachers, leaders of other institutionalized programs to solicit their guidance with designing the program structure, content and administration.
    - Administered and oversaw the program.

Anecdotes

The following anecdotes describe the experiences of the two graduate students who established the educational access program—a paid high school research internship for first-generation and low-income students, with added consideration for racially minoritized students. Gender balance was also considered although the program wasn't specifically targeted at gender minorities. These anecdotes reveal how institutional norms persist within garbage can decision-making and loosely coupled systems when faced with non-normative solutions. We also highlight instances where choice opportunities are altered to fit more conventional solutions and discuss the toll this takes on those making up the difference.

> Leveraging the insights of one of us as a FGLI student, we understood the pressure on low-income youth to earn money, sometimes significantly contributing to their households. We also saw that lost income from unpaid internships limited low-income students' participation in research programs. Believing students should be paid for their lab work, we insisted that our educational access program be a paid internship.
>
> To figure out how high school students could be employed and compensated at our institution, we contacted other high school research internship programs. Of the seven programs we found, only one offered financial compensation, and this was only for those with demonstrated need. The rest were unpaid or required interns to pay fees, recruiting mainly from schools with few low-income students. These programs acknowledged the challenge of attracting low-income students, though this was not their intention.

> While most programs expressed confusion at the idea of compensating students, the representative of the one program that did offer stipends emphasized, unprompted, their importance for attracting low-income students. As a former FGLI student themselves, they understood the necessity of financial support for low-income students. They explained their stipend mechanisms were specific to their department and advised us to seek similar solutions in our own department, while also sharing potential funding sources.

Here, we observe how atypical it is within this institution to monetarily compensate high school interns. The confusion expressed by some programs further illustrates that this practice is not the norm. Research indicates that low-income students, who face greater pressure to work long hours, struggle to find jobs that enhance their academic and career prospects [46]. Expecting them to engage in unpaid work over the summer, when they could earn essential income, deters them from applying. The correlation between these programs' lack of stipends and their low recruitment of low-income students is noteworthy. Other high school internship programs across the U.S. have successfully utilized stipends to attract low-income participants [47], [48], [49], [50], [51], [52]. Despite this precedent, these programs adhere to institutional norms, leading to a demonstrated recruitment gap. Framing all work within a university as an educational opportunity, even when it isn't formal instruction, is reductive and overlooks the significant contributions of interns. For instance, students in our program performed tasks such as 3D printer maintenance, characterizing novel sensing mechanisms, and contributing to published research. Here, we also start to recognize the relevance of a decision maker's identity in engaging with non-normative solutions. The representative of the one program that did offer compensation to their students shares how their experience as a low-income student made them feel that it was critical to offer these stipends. We, the authors, also share similar experiences that sparked our insistence on offering stipends. While we did have the option to settle as the other programs did, this shared identity uniquely primed us to have to engage with this problem space nonetheless illustrating the realities of afflicted decision makers.

Another brief note here is how loose coupling within the institution starts to show up. In inquiring about disbursement mechanisms, we learn that disbursement mechanisms can be specific to individual departments, not standardized across the institution, exemplifying loose coupling.

> From these conversations with other institutional programs for high school students, we were advised to contact the office responsible for youth program policy. The faculty member emphasized involving the host department's HR representatives as key stakeholders. This led us to schedule a meeting with both offices to understand the university's policies and requirements. While the meeting had positive outcomes, many

questions remained unanswered. It became clear that the offices had redundant and contradictory action items, which neither was aware of, attributing this to the decentralized governance of the university.

Specific queries about identifying appropriate personnel for different aspects of hosting outreach programs were met with hypothetical answers and mentions of needing to persuade certain individuals. Neither office had clear guidance on compensating students. Policies on onboarding requirements, such as documentation and training for high school interns, were either misaligned between the offices or dependent on individual buy-in. Additionally, frequent personnel turnover led to a loss of expertise in handling similar situations, with some attendees revealing they were transitioning out of their roles.

We and the volunteering faculty member provided feedback, suggesting that both offices gain more knowledge about each other to streamline the program development process.

The meeting highlighted many aspects of the institution's governance, showcasing hallmarks of loosely coupled systems and garbage can decision-making. Loosely coupled systems were evident in the lack of coordination and consensus between offices handling the same situation, resulting in incomplete and conflicting information [11]. Simply put, each office had its own rules, despite being part of the same institution, which hindered the implementation of global initiatives. Garbage can decision-making was observed in the discretion allowed to individual decision-makers regarding their level of engagement and the determination of efficacy. Attendees mentioned relying on individual discretion rather than a general policy. There was also a lack of clarity about who could serve in the university-defined roles required for outreach programs. High personnel turnover further exemplified the weak information base characteristic of garbage can models, leading to the loss of institutional knowledge and poor knowledge transfer. This aligns with the theory that limited information leads to haphazard decision-making, connecting problems to solutions simply because they coexist, causing conflicting priorities and confusion[12].

However, the meeting also illustrated how individual decision-makers can effectively navigate garbage can decision-making to build momentum towards their solutions. By organizing a meeting with all stakeholders present, we facilitated coordination, reduced ambiguity, and brainstormed solutions that worked for everyone involved. This effort helped tighten the coupling between offices and clarify available resources and mechanisms within the organization.

In the original meeting where faculty expressed concerns about the equity of high school research opportunities, we volunteered to figure out the university mechanisms to address the gap. Towards gaining insights of the process and content of running such a research

internship, we started with a small-scale pilot program hosting four high school students who had already reached out to faculty. None of the students were from underrepresented backgrounds in STEM; some had family ties to the institution, and all had previous R1 university experience. Although the intern pool did not include our target population, we saw the program as a learning opportunity for both us and the students. We were transparent about this and actively sought their feedback on the program content and mentorship needs.

After the pilot, we convinced the faculty member of the need to compensate high school interns for equity reasons, but we faced the challenge of securing funds. The faculty member suggested housing the program within an institutional center that might provide funding. We agreed to help with logistics but emphasized that, as graduate students with full-time research responsibilities, we should not run the program. The faculty member then proposed placing the program in a new department where they held an executive role and offered to pitch the program to the rest of the executive team. They assured us that administrative staff would be hired to manage it. We agreed to run the first official year of the internship, applying our learnings from the pilot and expert advice, with the plan to transfer responsibilities to the department's administrative staff once hired.

After meeting with the executive team, the faculty member excitedly informed us that the team loved the idea and agreed to host the program, though they couldn't provide funds that year. When we asked if they specified the target student population, they said it wasn't necessary. We raised concerns that this might affect the program's long-term identity. The faculty member reassured us that the department would hire more staff to take over the program's responsibilities.

Trusting this, we organized and ran the program through the 2022/2023 academic year and the 2023 summer, despite it adding 20 hours per week to our graduate research workload. However, each time we revisited the topic, there was no progress on hiring a staff member to take over the program. At the end of the program, we stated that we would not run it again, having fulfilled our commitment to demonstrate its viability. We also realized the harmful health effects of the extra workload, which added stress and felt like an additional job, all while needing to make significant research progress.

We communicated our willingness to share all resources once the department was ready to continue the program. After making this clear, the faculty member tried to convince one of us to adjust our academic and professional responsibilities to keep running the program. This person explained the toll it would take on their academic progress and reiterated that graduate students were never meant to run the program indefinitely. The faculty member then stated they didn't believe the program justified hiring full-time or

> part-time staff, suggesting the work was only for the summer. This person countered by explaining the program required year-round effort, citing examples from our experience, other roles within our university and even other institutions. The faculty member accepted that we would not be running the program again and promised to facilitate a meeting to transfer knowledge to newly hired staff. However, in that meeting, the department showed no commitment to the program and made questionable remarks about the trustworthiness of our target student population. As a result, the program only ran during the summer of 2023 and no longer exists, with no visible effort from the department to revive it.

It's important to note that the volunteering faculty member in this anecdote has not experienced being a first-generation or low-income student and has achieved significant success within the institution. This positions them as a privileged decision-maker on issues of institutional inequality and injustice for these identities. Without a personal connection, they are likely to adopt institutional norms, making it harder to implement non-traditional solutions. Their previous success within the institution reinforces this tendency. However, they still have the ability to reflect on their position and use their influence to support non-normative solutions. This manifests in various ways in the development of the program. Initially, the faculty member acknowledges the institutional gap and shows a willingness to address it. They leverage their position to find a host department for the program. Their presence and advocacy in meetings, as we, the afflicted decision-makers, laid the groundwork, helped us overcome potential roadblocks. Although they lack first-hand experience with the challenges faced by FGLI students, the faculty member recognizes the issue and takes action to address it.

Fioretti [26]warns that incorporating normative solutions alongside non-normative ones can undermine efforts for institutional change and act as a diversionary tactic. The faculty member unintentionally does this at several points, contributing to the program not surviving. One key example is when they failed to mention FGLI students as the target population to the executive committee. This omission left the program’s objectives unclear, creating a disparity among stakeholders and resulting in a lack of shared vision and alignment. Without clearly articulating the program's focus, the executive committee struggled to prioritize it as a necessity, as these issues are not ingrained in the institution's priorities. This caused problems when the committee showed no commitment to continue the program or prepare new staff to take it over. The faculty member did not properly inform them about the program's goals, resulting in ambiguity and jeopardizing the program’s future.

We also see the faculty member's reluctance towards non-normative solutions in their discomfort with hiring staff for the educational access program, while being comfortable having us, the afflicted decision-makers, do the labor for free even to our own detriment. Pressuring one of us to do this uncompensated work adds to the minority tax already placed on us. This aligns with

academia's history of asking marginalized individuals to address institutional gaps they did not create and are negatively affected by [21], [34], [53]. In adhering to the norm of unpaid labor from marginalized groups, the faculty member struggles with the solution of transferring the program to hired staff, despite initially agreeing. By not reflecting on how their position influences their view of this solution, the faculty member fails to assess its viability thoroughly, despite examples of this framework from other institutions. They fall back on institutional norms, leading to the program's demise while they remain free from blame.

> Our fundraising campaign involved reaching out to both internal and external entities within the institution. First, we asked the research groups hosting the students if they could provide stipends while we sought funding for the remaining program costs. Our reasoning was based on faculty PIs' acknowledgment that they sought opportunities to host underrepresented high school students. These labs had included such promises in large research grant applications to entities like the National Science Foundation, as part of their broader impact. However, they struggled to reach and onboard these students. Our program aimed to simplify this process. We proposed that the labs use a small portion of their grant funds—where they promise research outreach to underrepresented students—to cover the stipends for the interns they hosted. This proposal faced significant pushback. Some faculty were confused by the idea of compensating interns, while others cited lab expenses as a barrier. When it became clear that faculty PIs were not interested in this model, we continued searching for other resources. Ultimately, we pieced together over $25,000 in funding from university community outreach offices, a company connected to us by the volunteering faculty member, and community nonprofits invested in our initiative.

This anecdote highlights how privileged decision-makers struggle to accept non-normative solutions, hindering institutional change. The faculty PIs, who largely lack marginalized identities, benefit from the unpaid labor of both us and the high school interns. Despite promising in their grants to dedicate funds to educational access programs for underrepresented students, they instinctively prefer the normative solution of unpaid labor. In 2022, the average National Science Foundation research grant was $778,647 [54], while the stipend we offered participants was just $2000. Graduate students at the institution cost around $110,000 including stipend and tuition, but many have prestigious fellowships to offset these costs. Some PIs even require fellowships for lab positions. Yet, they couldn't justify paying $2000 for one student. As a result, we had to handle fundraising ourselves, relying on already underfunded outreach offices and community nonprofits [55], [56].

> During the development and eventual end of the program, we undertook many additional tasks to run its first year. Beyond meetings with over 15 education experts and program leaders, we reached out to 11 local high schools and nonprofits serving underrepresented

students to recruit applicants. We recruited and trained mentors, developed and delivered workshops, found industry and academic speakers, and handled administrative tasks like catering, room bookings, background checks, and managing diverse funding sources with separate disbursement mechanisms.

We were also still searching for an institutional mechanism to compensate the interns and fundraising as the host department and its PIs had said they would not be able to support monetarily. During this work, we discovered a program similar to ours that had been suspended at the pandemic's onset. With many pandemic-impacted programs resuming, we inquired about its return and were told to contact the university outreach representative. In a meeting, the representative confirmed the original department had decided not to revive the program. They expressed excitement about our efforts and agreed on the importance of compensating interns to reach low-income students, offering valuable information and some financial support for administration and stipends. They also didn't know the exact process for paying high school interns but promised to help. The representative soon found the mechanism, which required coordination among three university offices and was not well-known. They assured us that any pushback could be directed to them. When we encountered confusion from other offices, the representative intervened to clarify and collaborate.

Across each anecdotal piece, we have exemplified the tolls of making up the difference as afflicted decision makers. We invested extensive hours to make the program happen and encountered conflicts when proposing non-normative solutions. In the last anecdote, we detailed the extra work required to address loose coupling, acting as the connection between internal institutional offices and the broader community. We sought out individuals like the representative who acknowledged the loose coupling and helped bridge multiple offices. We advocated for paying the students despite other programs not doing so. We consulted education experts to ensure the program engaged first-generation and low-income students effectively and recruited and trained mentors to be inclusive and conscious of biases. All this while being expected to maintain full-time productivity as graduate students. Had privileged decision-makers, such as the faculty member, the host department executive committee, and faculty PIs, acknowledged their positions and supported these research-backed, non-normative solutions, our load would have been significantly lighter. Instead, we had to fill in the gaps, ultimately leaving the problem behind, burdened by the labor we undertook and the disappointment of unfulfilled potential.

Now What?

In this work, we have discussed how a lack of critical reflection on positionality among university decision-makers hinders the efficacy of institutional access. We presented a theoretical analysis linking this lack of reflection to institutional norms that shape garbage can decision-making in loosely coupled university structures. We also introduced the dichotomy of

privileged and afflicted decision-makers and illustrated the theory with our critical self-reflective autoethnography.

All decision-makers, regardless of their position, can leverage the ambiguity of the garbage can model to push for transformative change. As graduate students, we navigated the university's cracks, using institutional flexibility to advocate for and implement our program. We identified underused resources and found allies like the supportive representative to push for our non-normative solutions. This process showed that decision-makers could use institutional ambiguity to support, rather than obstruct, non-normative solutions.

We recognize that privileged decision-makers, like those in the anecdotes, are subject to institutional inertia and limitations despite their insider status. While being an insider does not grant unlimited power, such decision-makers often possess the social capital needed to drive lasting change and overcome these challenges. Simply going with the flow is insufficient to address harmful institutional gaps. Although institutional constraints do exist, privileged decision-makers should actively challenge these barriers. The choice by many in the anecdotes to maintain the status quo underscores missed opportunities for meaningful progress.

We hope this work serves as a call to action for individual university decision-makers to recognize their roles in supporting institutional access programs. We urge them to constantly reflect on the ideas they consider, question why they trust certain ideas over others, and assess their proximity to institutional norms and how these intersections shape their motivations. University governance models in the United States trend towards bureaucratic structures that stifle innovation and thoughtful reflection [29], [57]. We encourage decision-makers to challenge the status quo continuously. Understanding the unsavory pasts of our institutions, privileged decision-makers should remain vigilant to avoid perpetuating unjust norms. Listen to afflicted decision-makers within your institutions and offer support. As Patricia Hill Collins reminds us, they are uniquely positioned to identify gaps that privileged decision-makers might miss and are more inclined to generate non-normative solutions leading to positive change.

Finally, we reacknowledge that the privileged/afflicted binary allows room for a more nuanced understanding of interpersonal dynamics with intersectional identities. We encourage further discourse and research on this topic.

Citations

[1] B. Mitchneck, J. L. Smith, and M. Latimer, “A recipe for change: Creating a more inclusive academy,” *Science*, vol. 352, no. 6282, pp. 148–149, Apr. 2016, doi: 10.1126/science.aad8493.

[2] “Opening Doors: How Selective Colleges and Universities Are Expanding Access for High-Achieving, Low-Income Students - Jack Kent Cooke Foundation.” Accessed: Dec. 17, 2024. [Online]. Available: https://www.jkcf.org/research/opening-doors-how-selective-colleges-and-universities-are-expanding-access-for-high-achieving-low-income-students/

[3] D. Macari, A. Fratzl, K. Keplinger, and C. Keplinger, “Accelerating the pace of innovation in robotics by fostering diversity and inclusive leadership,” *Science Robotics*, vol. 9, no. 97, p. eadt1958, Dec. 2024, doi: 10.1126/scirobotics.adt1958.

[4] M. D. Bell, “Promoting diverse and inclusive spaces with intentionality,” *Science Robotics*, vol. 9, no. 97, p. eadu0906, Dec. 2024, doi: 10.1126/scirobotics.adu0906.

[5] M. R. Sto. Domingo *et al.*, “Replicating Meyerhoff for inclusive excellence in STEM,” *Science*, vol. 364, no. 6438, pp. 335–337, Apr. 2019, doi: 10.1126/science.aar5540.

[6] A. Mandelbaum, “Outreach to Students from Underserved Communities | Academic Leader,” Academic Briefing | Higher Ed Administrative Leadership. Accessed: Dec. 17, 2024. [Online]. Available: https://www.academicbriefing.com/marketing/recruitment/outreach-students-underserved-communities/

[7] A. C. Dowd and R. Liera, “Sustaining change towards racial equity through cycles of inquiry,” *EPAA*, vol. 26, p. 65, May 2018, doi: 10.14507/epaa.26.3274.

[8] A. C. Dowd, J. H. Pak, and E. M. Bensimon, “The Role of Institutional Agents in Promoting Transfer Access,” *EPAA*, vol. 21, p. 15, Feb. 2013, doi: 10.14507/epaa.v21n15.2013.

[9] M. M. Burke, S. E. Goldman, M. S. Hart, and R. M. Hodapp, “Evaluating the Efficacy of a Special Education Advocacy Training Program,” *Journal of Policy and Practice in Intellectual Disabilities*, vol. 13, no. 4, pp. 269–276, 2016, doi: 10.1111/jppi.12183.

[10] S. K. Klumpner and M. E. Woolley, “Expanding after School Program Access for Vulnerable Students: Examining the Efficacy of Federal Policy and Funding,” *Education and Urban Society*, vol. 53, no. 9, pp. 987–1000, Dec. 2021, doi: 10.1177/00131245211004550.

[11] K. E. Weick, “Educational Organizations as Loosely Coupled Systems,” *Administrative Science Quarterly*, vol. 21, no. 1, pp. 1–19, 1976, doi: 10.2307/2391875.

[12] M. D. Cohen, J. G. March, and J. P. Olsen, “A Garbage Can Model of Organizational Choice,” *Administrative Science Quarterly*, vol. 17, no. 1, pp. 1–25, 1972, doi: 10.2307/2392088.

[13] M. Ahmad, “On the Black Student Movement—1960–70,” *The Black Scholar*, vol. 9, no. 8–9, pp. 2–11, May 1978, doi: 10.1080/00064246.1978.11414012.

[14] R. R. Balsvik, “Student Protest—University and State in Africa 1960–1995,” *Forum for Development Studies*, vol. 25, no. 2, pp. 301–325, Jan. 1998, doi: 10.1080/08039410.1998.9666087.

[15] S. Odion-Akhaine, “The Student Movement in Nigeria: Antinomies and Transformation1,” *Review of African Political Economy*, vol. 36, no. 121, pp. 427–433, Sep. 2009, doi: 10.1080/03056240903211133.

[16] J. P. Pitts, “The Politicalization of Black Students: Northwestern University,” *Journal of Black Studies*, vol. 5, no. 3, pp. 277–319, 1975.

[17] K. Washington, “Keni Washington”, Accessed: Dec. 26, 2024. [Online]. Available: https://purl.stanford.edu/cc351hz7852
[18] F. J. Satterwhite, “Frank J. Omowale Satterwhite”, Accessed: Dec. 26, 2024. [Online]. Available: https://purl.stanford.edu/cd456xx9747
[19] N. J. Greenidge, “The cold truth about robotics research in the United Kingdom as a Caribbean woman,” *Science Robotics*, vol. 9, no. 97, p. eadu2844, Dec. 2024, doi: 10.1126/scirobotics.adu2844.
[20] K. P. Weeks, N. Taylor, A. V. Hall, M. P. Bell, A. Nottingham, and L. Evans, “‘They Say They Support Diversity Initiatives, But They Don’t Demonstrate It’: The Impact of DEI Paradigms on the Emotional Labor of HR&DEI Professionals,” *J Bus Psychol*, vol. 39, no. 2, pp. 411–433, Apr. 2024, doi: 10.1007/s10869-023-09886-8.
[21] M. F. Cox and K. Moore, “Defining Accountability among Black and White Women Accomplices,” presented at the 2023 ASEE Annual Conference & Exposition, Jun. 2023. Accessed: Dec. 27, 2024. [Online]. Available: https://peer.asee.org/defining-accountability-among-black-and-white-women-accomplices
[22] Joy Marie Doan and Rahni B. Kennedy, “Diversity Fatigue,” *Acknowledging and Moving Beyond Repetitious Emotional Labor*, 2022, [Online]. Available: https://doi.org/10.4324/9781003167174-12
[23] E. J. Abrica and R. Oliver Andrew, “The racial politics of diversity, equity, and inclusion (DEI) work.,” *Journal of Diversity in Higher Education*, p. No Pagination Specified-No Pagination Specified, 2024, doi: 10.1037/dhe0000566.
[24] N. Ueda, A. Kezar, E. Holcombe, D. Vigil, and J. Harper, “Emotional Labor: Institutional Responsibility and Strategies to Offer Emotional Support for Leaders Engaging in Diversity, Equity, and Inclusion Work,” *AERA Open*, vol. 10, p. 23328584241296092, Jan. 2024, doi: 10.1177/23328584241296092.
[25] “What? So what? Now what?,” The University of Edinburgh. Accessed: Jan. 04, 2025. [Online]. Available: https://reflection.ed.ac.uk/reflectors-toolkit/reflecting-on-experience/what-so-what-now-what
[26] G. Fioretti, “The Strategic Garbage Can,” May 01, 2022, *Rochester, NY*: 3775642. doi: 10.2139/ssrn.3775642.
[27] B. Levitt and C. Nass, “The Lid on the Garbage Can: Institutional Constraints on Decision Making in the Technical Core of College-Text Publishers,” *Administrative Science Quarterly*, vol. 34, no. 2, pp. 190–207, 1989, doi: 10.2307/2989895.
[28] “The Personal Is Political: the original feminist theory paper at the author’s web site.” Accessed: Dec. 19, 2024. [Online]. Available: https://www.carolhanisch.org/CHwritings/PIP.html
[29] I. Bleiklie and M. Kogan, “Organization and Governance of Universities,” *High Educ Policy*, vol. 20, no. 4, pp. 477–493, Dec. 2007, doi: 10.1057/palgrave.hep.8300167.
[30] L. Spring, D. Robillard, L. Gehlbach, and T. A. Moore Simas, “Impact of pass/fail grading on medical students’ well-being and academic outcomes: Impact of pass/fail grading on student outcomes,” *Medical Education*, vol. 45, no. 9, pp. 867–877, Sep. 2011, doi: 10.1111/j.1365-2923.2011.03989.x.
[31] S. Davis and J. Harris, “But We Didn’t Mean it Like That: A Critical Race Analysis of Campus Responses to Racial Incidents,” *Journal of Critical Scholarship on Higher Education and Student Affairs*, vol. 2, no. 1, Mar. 2016, [Online]. Available: https://ecommons.luc.edu/jcshesa/vol2/iss1/6

[32] D. Squire, Z. Nicolazzo, and R. J. Perez, “Institutional Response as Non-Performative: What University Communications (Don’t) Say About Movements Toward Justice,” *The Review of Higher Education*, vol. 42, no. 5, pp. 109–133, 2019.
[33] L. Knox, “‘Shouting Down an Empty Hallway,’” Inside Higher Ed. Accessed: Jan. 03, 2025. [Online]. Available: https://www.insidehighered.com/news/2023/02/03/frustrated-dei-staff-are-leaving-their-jobs
[34] J. E. Rodríguez, K. M. Campbell, and L. H. Pololi, “Addressing disparities in academic medicine: what of the minority tax?,” *BMC Med Educ*, vol. 15, no. 1, p. 6, Feb. 2015, doi: 10.1186/s12909-015-0290-9.
[35] J. E. Fox Tree and J. Vaid, “Why so Few, Still? Challenges to Attracting, Advancing, and Keeping Women Faculty of Color in Academia,” *Front. Sociol.*, vol. 6, Jan. 2022, doi: 10.3389/fsoc.2021.792198.
[36] Bensimon & Associates, “Whiteness rules: Racial exclusion in becoming an American college president.” Accessed: Dec. 27, 2024. [Online]. Available: https://collegefutures.org/wp-content/uploads/2022/10/whiteness-rules-presidential-search_findings-report_final.pdf
[37] E. Bonilla-Silva and C. E. Peoples, “Historically White Colleges and Universities: The Unbearable Whiteness of (Most) Colleges and Universities in America,” *American Behavioral Scientist*, vol. 66, no. 11, pp. 1490–1504, Oct. 2022, doi: 10.1177/00027642211066047.
[38] D. L. Brunsma, E. S. Brown, and P. Placier, “Teaching Race at Historically White Colleges and Universities: Identifying and Dismantling the Walls of Whiteness,” *Critical Sociology*, vol. 39, no. 5, pp. 717–738, Sep. 2013, doi: 10.1177/0896920512446759.
[39] D. L. Gusa, “White Institutional Presence: The Impact of Whiteness on Campus Climate,” *Harvard Educational Review*, vol. 80, no. 4, pp. 464–490, Jan. 2011, doi: 10.17763/haer.80.4.p5j483825u110002.
[40] J. G. Asare, “The Long Legacy Of Anti-Blackness In Academia,” Forbes. Accessed: Dec. 27, 2024. [Online]. Available: https://www.forbes.com/sites/janicegassam/2021/05/15/the-anti-black-legacy-of-academia/
[41] M. E. David, “Women and Gender Equality in Higher Education?,” *Education Sciences*, vol. 5, no. 1, Art. no. 1, Mar. 2015, doi: 10.3390/educsci5010010.
[42] P. H. Collins, “Learning from the Outsider Within: The Sociological Significance of Black Feminist Thought*,” *Social Problems*, vol. 33, no. 6, pp. s14–s32, Dec. 1986, doi: 10.2307/800672.
[43] M. D. Cohen, J. G. March, and C. C. on H. Education, *Leadership and Ambiguity: the American College President*. in Carnegie Commission on Higher Education. Sponsored research studies. McGraw-Hill, 1974. [Online]. Available: https://books.google.com/books?id=pYCdAAAAMAAJ
[44] K. M. Campbell, B. D. Hudson, and D. Tumin, “Releasing the Net to Promote Minority Faculty Success in Academic Medicine,” *J. Racial and Ethnic Health Disparities*, vol. 7, no. 2, pp. 202–206, Apr. 2020, doi: 10.1007/s40615-020-00703-z.
[45] E. A. Faucett, M. J. Brenner, D. M. Thompson, and V. A. Flanary, “Tackling the Minority Tax: A Roadmap to Redistributing Engagement in Diversity, Equity, and Inclusion Initiatives,” *Otolaryngol Head Neck Surg*, vol. 166, no. 6, pp. 1174–1181, Jun. 2022, doi: 10.1177/01945998221091696.
[46] R. I. Lerman, “Are teens in low-income and welfare families working too much?:

(723512011-001).” 2000. doi: 10.1037/e723512011-001.
[47] “High School Summer Internship | GTRI.” Accessed: Jan. 10, 2025. [Online]. Available: https://gtri.gatech.edu/stem/high-school-summer-internship
[48] “Kimberly Querrey Summer Research Program.” Accessed: Jan. 10, 2025. [Online]. Available: https://www.medicine.northwestern.edu/divisions/pulmonary-and-critical-care/education/summer-intern.html
[49] “NextGen High School Internship Program | Emory Department of Human Genetics | Emory School of Medicine.” Accessed: Jan. 10, 2025. [Online]. Available: https://med.emory.edu/departments/human-genetics/next-gen.html
[50] “Experiences in Research.” Accessed: Jan. 10, 2025. [Online]. Available: https://k12education.lbl.gov/programs/high-school/experiences-in-research
[51] “Summer Scholars Research Program | Winship Cancer Institute of Emory University.” Accessed: Jan. 10, 2025. [Online]. Available: https://winshipcancer.emory.edu/education-and-training/undergraduate-and-pre-college-programs/summer-scholars.php
[52] “Short-Term Research Experience Program to Unlock Potential (STEP-UP) - NIDDK,” National Institute of Diabetes and Digestive and Kidney Diseases. Accessed: Jan. 10, 2025. [Online]. Available: https://www.niddk.nih.gov/research-funding/research-programs/diversity-programs/research-training-opportunities-students/step-up
[53] S. S. F. N. R. I. Group, “The Burden of Invisible Work in Academia: Social Inequalities and Time Use in Five University Departments,” *Humboldt Journal of Social Relations*, vol. 39, pp. 228–245, 2017.
[54] “NSF by Numbers,” NSF by the numbers. Accessed: Jan. 11, 2025. [Online]. Available: https://tableau.external.nsf.gov/views/NSFbyNumbers/Trends?%3AisGuestRedirectFromVizportal=y&%3Aembed=y&%3Alinktarget=_blank&%3Atoolbar=top
[55] I. Staff, “An INSIGHT Investigation: Accounting for Just 0.5% of Higher Education’s Budgets, Even Minimal Diversity Funding Supports Their Bottom Line,” Insight Into Diversity. Accessed: Jan. 13, 2025. [Online]. Available: https://www.insightintodiversity.com/an-insight-investigation-accounting-for-just-0-5-of-higher-educations-budgets-even-minimal-diversity-funding-supports-their-bottom-line/
[56] J. G. GAYLES *et al.*, “TRUTHS ABOUT DEI ON COLLEGE CAMPUSES”.
[57] J. R. Dee and L. Leišytė, “Organizational Learning in Higher Education Institutions: Theories, Frameworks, and a Potential Research Agenda,” in *Higher Education: Handbook of Theory and Research*, M. B. Paulsen, Ed., Cham: Springer International Publishing, 2016, pp. 275–348. doi: 10.1007/978-3-319-26829-3_6.