



Moving beyond the boilerplate: Reflections on equity-centered reviewing for granting organizations

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Abstract

This essay centers on the voices of leading scholars in science and STEM education on how equity can and should be centered in reviewing proposals for granting organizations. As the decisions made as a result of the reviewing process significantly impact the future directions of the field, we recognize the urgency in considering how equity is considered in this process. Through their experiences, four researchers offer the science and STEM community a *call to action*. The scholars interviewed highlighted that equitable reviewing and funding research and professional development will require changes within the science education and STEM funding ecosystem. Three overarching themes include (1) changing the ideologies and culture of science and STEM education research funding will require centering the needs of the communities being served; (2) institutions and granting organizations should adopt equity-focused and holistic rubrics and models; and 3) we each have an individual responsibility to employ equity during the review process. Thus, this essay has the potential to both inspire and provide explicit examples of how we can all center equity as we strive to transform the future of science and STEM education.

KEY WORDS

grants, peer-review, science education, STEM education



Opening Reflection

It was my first time preparing to serve on a review panel and as I reviewed one proposal, I found myself disturbed. I questioned, "Do the researchers know the school community they are proposing to work with? Where is the evidence of care? How do I know they would work with and not on this community?" I sat around a table with many of whom didn't look like me and wondered, what do I say to this group so that they hear me? As I reviewed other proposals, I wondered, would the community truly value this proposed project? I know that my experience as a new reviewer is not isolated.

1 | INTRODUCTION

This essay aims to expand our understanding of how equity can be centered in the review panel process by granting organizations. Discussions about equity in science and STEM education often focus on mitigating disparities in academic achievement and access. Yet, few studies qualitatively examine the existing practices of expert reviewers who prioritize equity in science and STEM education. As equity is not central to many reviewing practices and standards for many funding organizations, we are curious about how science and STEM experts engage in equity-centered reviewing of science and STEM education proposals. This essay specifically focuses on research and professional development grants, recognizing that there are additional types of grants that fall outside of our focus.

Although there are many organizations that fund science and STEM education research, with an annual budget of \$8.5 billion (FY 2021), the National Science Foundation (NSF) plays a pivotal role in funding ideas that may change the future of science and STEM. According to Blanpied and Borg (1979), "[r]eliance on peer review rests on the Foundation's strong conviction that the scientific community itself should make a major contribution to decisions about grant proposals that are to be supported" (p. 417). NSF is governed by the National Science Foundation Act of 1950 (National Science Foundation, 2022). According to NSF, the organization "is vital because we support basic research and people to create knowledge that transforms the future." This means equitable funding reviews have a substantial impact on the kinds of research that is conducted, and subsequently submitted and published in Science Education. There is a precedence for writing about proposal reviews (Blanpied & Borg, 1979); however, equity has not been specifically centered as a criteria of the reviewing process. Therefore, we as a science education field need to consider how equity is central to futuristic ideals of what equity in science education can be, including via funding reviews.

Before participating on a review panel, there are institutional and organizational structures that frame both the experience of reviewing and limit who is able to be a part of the reviewing process. Specifically, integral to reviewing are the policies and practices of higher education and research organizations that either incentivize or employ barriers that impact one's capacity to review or to even submit a proposal. Program officers play a crucial role in the process as well. This essay speaks to both challenges and opportunities toward a more equitable reviewing process and presents institutional and organizational considerations.

As early-career researchers, we considered the enormous amount of funding allocated within science and STEM. Yet, ill-defined criteria about weighting equity and social justice continue to usher in projects into marginalized communities that will potentially exacerbate harm done by researchers. We, therefore, questioned the presence of equity and how it is engaged with, formally and informally, during the review process for granting organizations. The opening reflection to this essay highlights an example of such an experience by the first author.

For this essay, we decided to turn to science education and STEM education experts to understand how they have centered equity as they served on review panels for granting organizations. We also requested that our experts remark on perceived changes that need to be made to the reviewing process that would promote equity. We entered these conversations starting with the granting organizations' processes. We soon began to learn how scholars and academics strategically center equity through conversations, actions, and in partnership with other



equity-minded individuals they serve with on the panels. Notably, the researchers we spoke with expressed a passionate vision for the potential of reviewing—and the barriers to equity that are frequently in place. This essay explicitly explores the question of how equity could become more centered in reviewing proposals submitted to grant-awarding organizations? We also solicited expert recommendations needed to better center equity within the grant proposal reviewing process. The outcomes of this project will inform the science education and STEM community broadly on best practices in equity-centered reviewing. We offer specific recommendations from our equity-minded experts that should be considered in the field—specifically by grant-awarding organizations. In this essay, we also draw on how the words of our equity-oriented experts have already influenced us. Before introducing you to our experts and ourselves, we provide a literature review about proposal reviews for granting organizations.

2 | REVIEW OF LITERATURE

Currently, scant peer-reviewed literature examines the review process by granting organizations (Mayo et al., 2006). The authors are not aware of any research studies that examine how equity is addressed in this same process. Peer-reviewing is relied upon by federal agencies and private foundations to determine promotion and tenure, departmental changes, and funding for research and programming (Eisenhart, 2002). The purpose of review panels has been described as “to ensure that scarce funds are spent only on high-quality research” (Horrobin, 1996, p. 1293). The decisions made by review panels are directly connected to economic gain, as being awarded funding impacts one's wages, funding for research, issuing contracts, and so forth (Larochelle & Désautels, 2002). The academy's reliance on the peer-review process means that those who conduct reviews are central to shaping, gatekeeping, and maintaining the current conditions within the academy (Harcum & Rosen, 1993).

Horrobin (1996) described the projects funded by review panels in biomedical research in the UK to be “pedestrian” (p. 1293) rather than cutting edge innovation that would be revolutionary; essentially, the research granted by funding organizations has been to relatively “safe” projects (Greenberg, 1999; Horrobin, 1996). Even the National Institutes of Health (NIH), the worlds' largest source of funding for biomedical research, has been said to “[suffer] from scientific conservatism, risk aversion, and nit-picking in grant applications” (Greenberg, 1999, p. 577). Thus, there is a need to support innovative ideas that demonstrate potential impact (Greenberg, 1999). Generally, a panel is assigned based on the multidisciplinary expertise of the researchers needed to review proposals. Reviewers are assigned proposals to review, rate proposals based on a rubric or specific criteria, and write a report of the proposals they are assigned to do so for (Mayo et al., 2006). Overall, experts tend to constrain the progress of research through funding opportunities with limited rationale (Horrobin, 1996).

Despite decades of conversations on equity, those who serve in senior positions of the academy have authority in the various review processes, including grant applications (Scantlebury, 2002). Eisenhart (2002) notes that those in senior positions who review those relatively newer to the field are primarily White men. Given their positionality as marginalized persons and women, those who may be innovators and counter the status quo may intentionally be blocked from contributing knowledge to the academy (Larochelle & Désautels, 2002). The peer-review process also implies one is being evaluated by a “peer,” without conscious consideration as to what Scantlebury (2002) states, “where the difference lies” (p. 161). According to the Merriam-Webster Dictionary (n.d.), a peer is defined as “one that is of equal standing with another: equal.” Therefore, the process of reviewing is designed, so one is evaluated by someone who is “equal,” but this is often not the case.

According to Cornell Law School (2020),

A person's peer is someone who is equal to that person, generally of a similar age, social status, or the like. Peer can also refer to someone in the same profession as another person. For example,



many experiments, studies, or articles in certain fields are required to be peer-reviewed to be deemed credible. Rather, the work must be reviewed by other experts in a given field to ensure that its purported results are accurate. In a legal context, peer most often refers to anyone who is an adult citizen, such as in “a jury of one's peers.” Generally, a jury of one's peers is a random selection of other citizens from a similar geographic location. These individuals do not necessarily share traits similar to a defendant's. As such, there is no guarantee that those who hear a defendant's case will be of a similar age, race, socio-economic background, or gender as the defendant, though these traits alone cannot disqualify someone from serving as a juror.

Therefore, in both a legal context and peer-reviewing, a peer's definition has been accepted as someone local or in the same field. Our experts consider this idea as well. The current state of the peer-review process assumes there is an equitable system for the reviewing process, given we entrust the process to our peers. The reviewing process directly impacts a scholar's trajectory as proposed projects are considered for funding, awards for scholarship, and promotion and tenure.

It is important to recognize that institutions, organizations, and individuals are interconnected within an ecological system (Bronfenbrenner, 1976). An individual's environment is a “nested set of concentric circles” (Parsons, 2008, p. 1131). The micro-level is the context in which the individual engages in a specific activity, such as reviewing. The meso-level accounts for the relationship among the micros (Parsons, 2008). This could be the relationship between peer-reviewers and the program officer. The exo-level considers the formal and informal social structures that influence an organization. This may include the processes by which program officers determine awardees of grants. The macro-level includes culture and subculture impacting the ecosystem. This may be a white-normed culture, systemic racism, the continued erasure of Indigenous knowledge and people, and so forth (Bronfenbrenner, 1976; Parsons, 2008).

We draw inspiration from Lenhoff et al. (2022) who consider the role of “thinking ecologically” (p. 1) about education and apply their framing to the process of granting and grant organizations. “Thinking about [grant funding] as a part of an [granting ecosystem] draws attention to [reviewer] characteristics and experiences, [institutional] circumstances, [reviewing process], and [systemic] conditions that shape both [granting organizations] and [who is awarded grants].”

3 | COMMON ELEMENTS OF SCIENCE EDUCATION GRANT PROPOSALS

As it stands, there are some common elements of grant reviewing in the science education community (see Table 1), but no known standards across funding agencies for centering equity. Table 1 is not an exhaustive list.

3.1 | Perspectives on equity-centered reviewing

Looking to deeply explore the reviewing experiences and perspectives on equity-centered reviewing, we facilitated conversations with leading science education and STEM equity scholars. We did not come to these people by chance: We interviewed them due to their reputation in science/STEM education. They are respected thought leaders who we believed would push our thinking as a community as we envision and consider equitable models for review panels of grant-awarding organizations. They agreed to share their experiences and be named in this document. We specifically sought to: (a) understand their approach toward centering equity when reviewing for panels; (b) their experience in participating on a review panel while centering equity; (c) the support offered from the lending organization aligning with equity-centered reviewing; and (d) inviting them to envision the future

**TABLE 1** Common elements of grant review proposal processes

Common elements of proposals	Description
Statement of purpose & relevance/project narrative	Project narrative is dependent upon the RFP but can include the following: Significance, Research Plan, Personnel, and Resources.
Author biographies/research & related senior/key person profile	Brief descriptions of the backgrounds and experiences of the PI, co-PI, and collaborators.
Letters of support (agreement)	Letters affirming participation in the proposed research from education partners.
Logic model	The planned action and its expected results.
Theoretical/conceptual framework	Theoretical and conceptual framing to support the theory of change grounding the study.
Evaluation plan (evaluator and/or advisory board)	Provide information on the evaluator(s) and advisory board members and their specific role on the project.
Partnerships (where relevant)/project site location(s)	Primary site where project work will be performed.
Management plan	Project structure (team roles, organization chart, etc.), subcontractor roles and how they are integrated into the team, who supervised whom, and what tasks they lead.
Timeline	Projected ranges of time when specific parts of the study will be conducted.
Budget and justification	A detailed project budget (and justification) for each year of support requested including personnel, equipment, travel, direct costs, indirect costs, etc.
References	The citations for the literature, studies, reports examined to ground the study.

Abbreviation: RFP, request for proposals.

potential of equity-centered reviewing. We developed a protocol (Appendix A) to gain insights into the processes, understand reviewers' experiences, and consider new information in light of related literature.

3.2 | Participant biographies and reviewing experience

3.2.1 | Malcolm Butler

Dr. Malcolm Butler was a Professor and School Director at the University of Central Florida (he is now at the Cato College of Education at UNC Charlotte). His career is dedicated to “growing” more scientists. With K-12 experience in math and science education, he has been at the forefront of science teacher education. Dr. Butler is also one of the authors of the K-5 science curriculum, National Geographic Science, “a research-based program that brings science learning to life through the lens of National Geographic.” Dr. Butler stated,

I've done primarily federal grants and some smaller private grants. I've also done some international work in South Africa and a couple of other countries where I've been asked to review proposals for different agencies here in the US. I've always found it to be an invigorating and a phenomenal



experience, to be able to see what people were investigating and the kinds of ideas people have, and it definitely informs my work, so that's kind of my experience for the last few years.

3.2.2 | Kinnis Gosha

Dr. Kinnis Gosha is a Hortenius I. Chenault Endowed Associate Professor and Division Chair for Experiential Learning and Interdisciplinary Studies at Morehouse College, a Historically Black College & University (HBCU). He also serves as the Academic Program Director for Software Engineering and the Director of the Culturally Relevant Computing Lab. Dr. Gosha's research interests center on expanding computer science education, broadening participation in computing, green computing, and culturally relevant computing. Dr. Gosha said,

Reviewing is very helpful for faculty who want to get federal grants. Most of my reviewing experience has been with the National Science Foundation. It's very time-intensive, which is hard for HBCU faculty that have a high teaching load to then be on panels just to help you to get a grant. So, I understand why a lot of people can't do it, but at the same time, for those that really want to get grants, I think it's a good, valuable experience.

3.2.3 | Sami Kahn

Dr. Sami Kahn is the Executive Director of the Council on Science and Technology at Princeton University, where she advances the mission of promoting scientific literacy for all through quality interdisciplinary course development, robust STEM education research, and creative programming. She coedited/authored a book entitled, *Towards Inclusion of All Learners Through Science Teacher Education* and sole-authored a book entitled, *It's Still Debatable! Using Socioscientific Issues to Develop Scientific Literacy, K-5*, which uses controversial societal issues related to science as the context for developing an informed, participatory, STEM-literate citizenry. Dr. Kahn shared,

I've reviewed on NSF panels... I have, of course, been on the receiving end of grants as well over the years. Then [there are] some smaller entities I review projects for, and it's not all about funding. Sometimes it's also just project reviews for research collaborations. You know, when people want to do things in equity, and sometimes that means a grant, and sometimes it means research collaboration, sometimes it means conversations, and so I try to facilitate all of those things.

3.2.4 | Bhaskar Upadhyay

Dr. Bhaskar Upadhyay is an Associate Professor of STEM Education at the University of Minnesota-Twin Cities. His research interests focus on how social justice and equity can be achieved through science education. He specifically examines the nature and purposes of science education for students from high-poverty, immigrant, and minoritized families. Dr. Upadhyay shared,

Most of my experience has been positive in reviewing panels. Obviously, sometimes it's because the panel group has quite a lot of diversity—mostly in thinking and less so in racial diversity. Sometimes, some of the challenges come in when talking about issues of equity and social justice and what kind



of work would benefit the community in which the study will be carried out. The other part of it is knowing about aspects of equity and social justice. Or what are other peer institutions or people who are interested in it looking at and how my own thinking about those things should look.

3.2.5 | The researchers

The authors of this essay are both early career scholars engaged in research and teaching across STEM policy and education. Both researchers are uniquely positioned to discuss this study as their commitment to equitable experiences for faculty and students intersects with their interests in equitable reviewing. This aspect of our positionality may affect phases of the research process, including preconceived notions about equity-centered reviewing. For example, one of the researchers served as a reviewer, while the other has not. Therefore, we tried to examine the experiences of this sample of postsecondary faculty and staff as both diverse and individually constructed given our positionalities. We also tried not to assume that this sample of postsecondary faculty and staff would participate in the interviews as our preconceived notions suggest.

4 | METHODS

To explore issues of equity-centered reviewing, four semi-structured interviews were conducted with postsecondary faculty and staff to explore (1) definitions of equity, (2) perceptions of peer-reviewing, (3) strategies for and challenges to centering equity, and (4) recommendations for granting organizations. The semi-structured interview and associated probing questions were based on prior research, our study's goals, and our own understanding of equity-centered reviewing. Each interview was recorded, lasted 45 min to 1 h, and transcribed both digitally and by a researcher. The interviewees were chosen for their experience across federal, international, or foundation grant reviewing experience. In particular, we sought to include the voices of scholars who also centered equity in their work and research. Interviewing these different participant categories enabled us to investigate differences in perspectives. As we analyzed the data, we recognized a need to capture the essence and complexity of the experiences shared by those interviewed that are entangled with their own cultural identities (Meyer, 2001). We therefore include some extended quotes from the participants that exemplify the themes established in the data so that meaning and complexity is conveyed. Our process was guided by descriptions of resulting interview data and interpretations of meanings and explanations that may yield application implications and inform the disciplinary thought.

As we reviewed the interview transcripts, we noticed that there were times when our experts responded to the specific question and others when they responded with what they may have wanted us to ask, or what the question reminded them of in regard to their own experiences as a reviewer. We, therefore, organized the questions based on the responses as they were asked and coded them for overarching themes that arose. From there, we analyzed the response to understand the essence of what was being said in light of their reflections, a phenomenological approach. Finally, the responses were synthesized to highlight quotes that exemplify the theme.

5 | FINDINGS

Those we interviewed discussed if they believe those who serve on review panels are their peers. First, they defined who they believe their peers to be, who is present, and who is not present. Our experts also shared strategies for centering equity when reviewing and challenges to centering equity in the reviewing process. We now expand on these themes through insights from our thought leaders.



5.1 | Definition of peer

Our participants' definitions of peer varied but overall centered around knowledge and ways of knowing. According to Bhaskar, peers are "people who have knowledge in a field that I am interested in and who could help me think," and "anybody who can help me get better at something and who knows the discipline in maybe a different way." Therefore, peers inform one another based on their expertise. Malcolm adds to this idea by stating that the role of a panel is to "understand where the work is situated." Sami was explicit that her peers hold many roles. "I consider my peers to be teachers, parents, students, people in academia, people in business, who care about the future, current situations, and science." Malcolm referenced the capacity of the members of the panel to be critical. Therefore, the overarching goal of a peer-review panel is to serve as a contributor, based on one's expertise, to support the collective sensemaking of the panel.

5.2 | Who is in the room?

Our equity-oriented experts largely noted that academics are tapped to serve on the review panels for organizations like the NSF. As Sami said, "you've got people in academia reviewing academia," which yields specific limitations. One limitation is that academics are largely socialized in particular ways. That academics have, in essence, learned a "secret handshake" that maintains the status quo. At times academics who are, as Malcolm stated, "rockstars" are in the room but may not have the appropriate expertise given the proposals being reviewed. Malcolm noted that he recognizes the difficulty of getting people to serve on panels. There are times that the expertise on a panel is not well-positioned to justly review a proposal. Malcolm shared the following reflection,

I was on a panel, and there was a person...this person was a heavy hitter. I mean, they were top, top shelf in the field, but for the topic we were discussing, that person was totally out of their area. Again, phenomenal scholar, well-respected scholar—but for what we were reviewing on that panel, that person was out of place. Sensitivity [for someone] can have these people on the panel, but are they really able to contribute to that conversation in a way that's going to help those proposals [be assessed]? That person could probably, in a very generic way, talk about the structure of the proposal.

According to Malcolm, the expertise of those selected for a panel also offers insights that will enhance the recommendations and feedback for those who have submitted proposals. In addition, Kinnis expressed that those who are able to serve are largely dependent upon the expectations of one's university concerning workload. Finally, Bhaskar accepts that everyone in the room is his peer. Yet, all participants raised this question: who is not in the room?

5.3 | Who is not in the room?

When considering equitable proposal review processes, our participants all noted individuals who were missing from panels in their experience. As Bhaskar stated, one shortcoming about the process of reviewing is by "labeling peer to only those people who work with you in the context in which we work...we lose a lot because then there is a tendency not to value their ideas about certain things that they know more [about]. [T]hat's how I think about it." Bhaskar specifically spoke of elders who are "more" than his peer, as they know more than he about the community he has interest working with. Sami shared that artists and humanists often have a "pulse" of what is happening in society. Yet, they are not included in the reviewing process.



Kinnis specifically spoke to the need to support faculty at HBCUs and Black faculty to serve on panels,

There should be resources made available for faculty to be able to sit on panels. One idea is to provide stipends to faculty to participate in panels. Another idea is to have mock panels over the summertime to understand how the review process works and what goes on in them.

He suggested “mock panels” during the summer so that people have some experience and some insights into the process, which would promote their participation.

Sami and Bhaskar both spoke on how beneficiaries of grants do not have a say in the granting process. As stated by Sami, “I don’t know, are their voices ever part of this? I have no idea.” Sami also stated,

So yeah, I think very broadly about my peers, and that's not who I see on the panels; those I see on the panels are people who have jobs similar to mine, but that's not who I consider a peer, and it's definitely not who I consider as necessarily most knowledgeable about what would be best in the world to advance, you know increase our shared goals. So I could definitely see a totally different candidate pool.

There is a need to be targeted to consider who can and who is unable to serve and who should be invited to serve as members of the very communities to be served.

5.4 | Strategies for centering equity when reviewing

Our analysis of the interviews revealed two major practices for centering equity in the review process: (a) identifying collaborations with the community, and (b) broadening participation among underrepresented proposal competitors. Additionally, the interviews uncovered two common challenges to centering equity in the reviewing process, including the lack of focus on equity in the rubrics, and limited experience with equity among panelists.

Our equity experts identified practices they've applied and often recommend when approaching equity in the reviewing process. Of those practices, our experts underscored meaningful collaborations with communities as a key component of projects pursuing equity. Bhaskar stated,

I want to know if the support letter has this impression that they have a good collaborative relationship. It's an established relationship; people know each other. That is one of the hallmarks, in my opinion, that indicates if this proposal will really make a contribution to the community where they will be engaging. Or is it the researcher who is saying here's the [idea], you'll get a lot of money from it? It comes through in the letter very well. If there is a relationship, they will manage, and it'll say we have been working for three years, or we worked on this project, and this is the benefit we got... That letter is very indicative for me to say how much there is buy-in and how much of this idea is actually the need of the community, or is it the need of the researcher.

As Bhaskar explains, how the community was engaged in the work described in the proposal is critical to determining the intent and success of the idea. Grant reviewers may leverage this particular practice to examine to what extent the proposal centers equity in its approach. On the other hand, the interviewees noted several practices aimed toward funding agencies, particularly broadening participation among underrepresented proposal competitors. These practices were highlighted to both diversify the racial demographic pool of competitors and the types of institutions being funded (e.g., HBCUs, small colleges, etc.).



Review panels and program officers may intentionally create opportunities to specifically consider PIs with competitive proposals from racially marginalized groups and underrepresented institutions. Malcolm reflected on a conversation with a program officer who once stated,

This person has gone through the same review process, and if we're talking about expanding the scope of who does this work, here's an opportunity for us to do just that, and he wasn't saying that to brag. He was making sure I understood that when I'm in the panels, I should be mindful that if there are opportunities to support different institutions; these are the HBCUs and private colleges. Here's an opportunity to really live what we've been saying about being more equitable [concerning] who gets funded.

The opportunities to bring up equity in a review panel often fall on the individuals in the room.

The responsibility of centering equity in the review process falls on individual panelists. When and where reviewers and program officers bring up equity is at their discretion. Malcolm stated,

Here's [the early career scholar of color]. She put together a proposal; she's competing in that space. Where are you going to put your money, NSF? Because this is federal money at work, these are taxpayers' dollars at work. He's [the program officer] saying that's fair to bring up at that time, and it is well received. Sometimes, it is. Many times, it's not, but he has given me the message that to whom much is given, much is expected.

Our interviewees viewed this responsibility as an opportunity for program officers and review panelists to use their positions to promote equity and broaden participation among those who get funded (e.g., racially marginalized groups, early career scholars, underrepresented institutions). Malcolm noted that while reviewing, "I couldn't wait on my colleagues to bring up those kinds of points. That somebody in the room had to bring them up, and if I'm in the room and I'm aware of these issues that I can least bring those to bear on the conversation."

Some panelists use their positions to promote equity on review panels, pushing back when underrepresented scholars are not receiving appropriate consideration. Kinnis, in particular, stated, "If I don't feel like people have a fair shot, that's something. If I feel like the process is not fair, then I'll threaten to walk out of the panel." Our experts claimed that broadening participation must extend to how proposals are reviewed. Malcolm noted, "You have to make sure that if we're talking about broadening participation in a proposal, we have to broaden participation who's getting funded." In particular, African American faculty in these institutions require support to pursue funding. Kinnis states,

If I just talk about African-American faculty, I really think that those faculty should be supported because we put all this emphasis on trying to get more African-Americans to get these PhDs and the promissory. But then when they get there, you are kind of on your own. You've invested all this money in them and given them all of these scholarships, all of these fellowships, all of this support, and then when they get to the faculty ranks, you just say, "Oh, well. F*ck it. You are on the tenure track now, good luck."

The issue of centering equity is a larger systemic issue. Similarly, our experts expressed that issues of equity must be addressed before the review panel is constructed. Kinnis stated, "I don't think that panels are the arena to fight for equity. Either you are saying let's be fair with all the submissions, or you're saying we need to give some extra points to HBCU folks who submit... so which one is it?" Kinnis noted, "If the issue is HBCUs don't get enough federal funding, I don't think changing the reviewer's thoughts is the solution." Kinnis reflected on the support offered to potential reviewers from underrepresented institutions and shared, "I think there really should be



resources given to HBCUs to better prepare faculty to create competitive proposals." Therefore, creating equity in the review process must go beyond the decision room and be integrated into the other aspects of funding opportunities. Malcolm stated,

I remember serving on a panel, and the issue was about teacher recruitment, and we were having this conversation about diversifying the workforce. We were looking at different proposals, and I think we may have had at least two that said something about what they were going to do in terms of recruiting teachers from underrepresented groups. And it was lip service; it was, you know, the traditional lineup. "We're going to reach out to a few people; we're going to host these special sessions." And there was no depth to what they wanted to do. And we call them on it.

I started the conversation. I said I'm not saying that their intentions aren't great. What I am calling to question is the boilerplate language they put in place that we are expected to interpret as they're sincere about doing that work. I'm not questioning your sincerity; I'm interrogating the language that is used to describe their intentionality. I much rather them either take it out if you're not going to be sincere about it. Take it out and tell us that's not what you want to work on. Because what you put here at least leads me to believe that you're not going to be sincere about that work.

And there were a couple of people on the panel who agreed, who said, "Yeah, this looks like the kind of language where we want people to be taking some risks." I mean, don't just do the normal. Take some risks with this work, because that's what we really need. If we're going to diversify the teacher workforce, we've tried all these things they are listing and look where we are.

5.5 | Challenges to centering equity in the reviewing process

Our experts identified challenges to centering equity during the review process and before reviewing proposals even takes place.

Bhaskar shared,

Whenever there's an equity issue [raised in a proposal], I tend to see the way it's described and the kind of things it says they are going to [study, and it] generally comes across as just basic. There is nothing really connected to the core issue of culture, history, and politics. It's all about if they get a good science curriculum, they'll be great, or if we do hands-on, they'll be great. But in a good curriculum and hands-on, there is very little conversation about how would the historical experience influence this experience, or how does the politics of engaging in these curricula influence how one received [it], and two is what is its influence on what happens if there is already buy-in [considering equity]?

Most of the STEM areas suffer from it because our focus is, do you know Punnett Squares, do you know Newton's law, do you know oxidation-reduction? We generally focus on it [as a panel?]: How do we make it better? and then whenever it comes to cultural or historical [matters], it's always, "Let's talk about [George] Washington Carver" and then just disappears from there and never goes anywhere else. Except for mentioning the man's name and saying that he did this or a female scientist... If we want equity, then we want to see how these things are embedded in it or encourage people to think beyond [superficial practices].



Bhaskar critiques how proposals explicitly address equity and shares that many are subpar in this area. He shares that there is a canon of knowledge that is often perpetuated rather than considering the historical, political, and cultural impact of specific science content. George Washington Carvers' work was groundbreaking, but we fail to recognize the results of Edward Bouchet or Rosalind Franklin and the complexities of their work context and environments in which they worked.

Sami adds to this idea by stating that equity should be taken up in each part of the review rubric,

[W]hen they give you that review schema [in the rubric], and it's talking about the intellectual contributions to research and so on, why can't you then have a subpart under there? How is equity being addressed in the research? How is equity being addressed in so far as that's making a scholarly contribution and everything else, intellectual merit, broader impacts, all of that? Where is [equity] being addressed in each facet *because I don't know any other way?*

Sami speaks to the innate capacity for some scholars to map equity onto all of their work. It is ingrained as part of their being. This capacity is not innate for others. Therefore, we must expect equity to be addressed explicitly so that those whom it is not innate for will be forced to consider it and discuss it during the panel review process. Another way to make sure equity is being considered is to, as Malcolm said,

I think one of the biggest things that folks can do is cast a wider net for the people who are doing the review process, the panelists. That's how I work, and I will never say that it's easy, but it's necessary. We have to get more people in the room, who are thinking, who will see what we're doing through an equity lens in a way that we have critical masses of folks who are bringing these issues to bear on this work.

If equity-minded people were able to review on a panel together, there would be a depth to conversations on equity that are not always had. According to Malcolm,

[There is a] need for having additional eyes and ears and checks and balances. [Those who are on panels] can change the conversation at that level of the review process, such that we are having a much richer conversation about where equity is centered in this work, so that's my thinking.

Malcolm shared that equity being centered during the review process was dependent upon reviewers having the capacity to do so, and this experience informed a form of "checks and balances." Kinnis believed that as long as a proposed project's merit was well-grounded, a proposal from an HBCU is well received. However, some proposers were given what seemed to be substantial credit by reviewers for what was not written but instead because the proposals' authors have a strong reputation. Kinnis stated,

But I've been on panels when I feel like the panelists have been very supportive of HBCUs if they feel like the merit is at the same level as other proposals. Now there are other issues that happen, like hero worship, where they might say, "Oh, well, this person didn't go into detail, but look at their body of work. I'm sure they'll figure it out.", right? I think that's just a universal issue; I think it is less about equity and more just an issue with reviewing that thing. NSF has done some steps or is taking some steps to reduce the amount of that kind of stuff.

There is a need for proposals to be critically reviewed with the same expectations—which is central to an equitable process.



Overall, our experts highlighted various recommendations during their interviews. Since the interviews were conducted, the authors of this essay have already found that the words of these experts have become a guiding compass as they strive to center equity in their work as an assistant professor and senior researcher.

6 | WHAT AN EQUITY-CENTERED PROPOSAL IS NOT

In light of what our thought leaders shared, we define equity in the reviewing process as a value operationalized through an ecological approach where practices and policies account for what is needed for individuals and communities to have access to competitive opportunities. We need to emphasize that equity *needs to be valued and centered in decision-making to be operationalized*. Our thought leaders offered insights on what they saw as problematic during the review process. Rather than share what a proposal should demonstrate, we share *what it should not demonstrate*. This decision was made in light of respecting that serving a community means leading with and being in community with those to be served through a grant. Therefore, what is equitable in a proposal largely depends on the community being served. However, we hope these ideas of what an equity-centered proposal "is not" raises one's awareness. Equity-centered proposals do not (are not),

1. Ignore the ideals of the community (Bhaskar & Sami).

In reflecting on these themes, the second author shared,

In conducting the interviews, the experts influenced our ways of knowing, our responsibility to the field, and how we think about our work moving forward. I, in particular, began another grant proposal cycle, but this time with an enhanced sense of responsibility to the field. Our thought leaders' comments and reflections resonated with me in a way that wouldn't allow me to approach grant writing the same way again. During previous grant proposal cycles, I always believed in working with the community, rather than on the community. I would say this in my proposals and make sure that the research we conducted was grounded in the needs of the community. However, Bhaskar's comments about collaborative relationships with the community, and Kinnis' willingness to stand up for equity in the rooms where decisions are made pushed me to see the inclusion of the community and equity from a new perspective. So this time around, I approached the grant proposal cycle differently—I included high school teachers on my advisory board and invited school leaders to review my proposal for quality, feasibility, and equity. I immediately spoke up in our proposal development meetings to challenge inequities and asked the question, "who isn't in the room?"

Making decisions about how to spend money comes with its own set of challenges, including approaches to reinvesting in the communities we are doing research *with*, evaluating proposals from an equity perspective, and embedding equity holistically in the review process. The thought leaders presented in this essay didn't have to say yes, but they each recognized the individual responsibility required to transform science and STEM education in pursuit of equity for all.

2. Only contribute boilerplate language when discussing the community (Sami, Malcolm, and Kinnis).

Sami and Malcolm both discussed the need to move beyond the boilerplate language on equity. Sami shared,

I just don't think people get it. I think there's been so many decades of it being an add-on that equity can just be a checklist or a short boilerplate paragraph that we don't really have that operationalization of what it means for there to be a comprehensive equity focus through every program.



The first author centered this recommendation in her approach to reviewing a proposal said to be written in service of a community. The first author shared,

What is equity for the community is a question I asked myself again, and again, as I reviewed a proposal. There were descriptions of the local community that could be found on the internet, but no evidence that they were already in community with local community members.

A boilerplate statement is the requirement but is insufficient.

3. Led by a Principal Investigator who has limited experience leading equity-focused efforts (Kinnis and Malcolm).

The first author noted what she looked for as she considered, can the PI execute the equity work being proposed? She shared,

Beyond the repetition of diversity, equity, and inclusion (DEI) stated again...and again... There was no clarity in the proposal that the Principal Investigator had the capacity to conduct the work being proposed.

As Kinnis shared,

What I am calling into question is the boilerplate language they put in place that we are expected to interpret as they're sincere about doing that work. I'm not questioning your sincerity; I'm interrogating the language used to describe their intentionality.

Malcolm adds to this in his recognition that the reviewing process depends upon the panel's collective considerations. Malcolm shared,

I think being in a room with like-minded people who are along that spectrum and trying to push the envelope, we hope to contribute to that conversation. I think we also can't get a lot out of every single time we get a chance to do that. We're moving equity more and more to the center and away from the margins.

Accordingly, the first author prepared her notes to argue that organizations should not continue to support the funding of work that will not make a difference for minoritized youth.

6.1 | Calls to action for granting organizations and reviewers serving on panels

The following paragraphs explore goals in the pursuit of equity in granting broadly. Specifically, these goals are organized as they are considerations that are: societal, institutional/organizational, and individualized. The science and STEM experts each raised individual, organizational, and societal factors influencing the reviewing process. We raise considerations at the macro-, meso-, and individual levels—as these considerations/recommendations influence one another and are contextually grounded.

- macro (changing the culture of STEM/STEM ED research—the ideologies, attitudes and the political/economic/social): for example, traditions, discourse, power, and expertise;
- exo (Funding decision-making): for example, the program officers determining the grants to be funded;



- meso (Reviewing): for example, reviewers engaging in the reviewing process, the relationship between the reviewers and the program officer;
- micro (Individual): for example, reviewers, proposal writers

6.2 | Macro: Changing the ideologies and culture of Science and STEM education research funding will require centering the needs of the communities being served

In addition to the research responsibilities, reviewers look for in grant proposals, our leading experts in science and STEM education point toward the need for research to *involve* and *benefit* the community. Therefore, grant funding organizations should emphasize responsibility to the community as review panelists are chosen and the award amounts are considered or allocated.

6.2.1 | Involve the community

Community partners (organization leaders, teachers, parents, etc.) must be involved in determining what will work in proposals. This sentiment is underscored by an award-winning pilot project at the University of Michigan that demonstrated an institutional effort to gather a council of faculty, staff, and community partners (9–12) committed to reviewing funding proposals for community–academic partnerships (Paberzs et al., 2014). The Community Engagement Coordinating Council (CECC) specifically reviewed proposals to determine the extent of community participation in shaping the direction of research, community priority, the tangible benefits that would be left with the community, diversity of the project team, budget, sustainability, and external funding.

6.2.2 | Benefit the community

Grant writers and reviewers should strike a balance between what the institutions and communities are receiving from the partnership. Therefore, the award amount and granting organization's request for proposals (RFP) should reflect a similar commitment to developing mutually beneficial community–academic partnerships.

6.2.3 | Reject context-free research

Current equity approaches to writing and reviewing grant proposals often focus on creating access to resources for participants, particularly those from groups that experience marginalization. Our leading experts in science and STEM education point toward the omission of important social, historical, and cultural contexts that influence science/STEM. The rejection of context-free research by grant funding organizations might broaden the operational definition of equity beyond “access” to include social, historical, and cultural aspects of science/STEM.

6.2.4 | Approach equity in a holistic manner

Pursuing equity requires acknowledging and understanding that people, especially marginalized groups, face different obstacles that result in unequal outcomes. Holistic approaches to embedding equity in the review process should go beyond giving these groups access and using boilerplate “equity statements.” Instead, proposal authors



should demonstrate how they are moving toward meaningful collaborations and changes in policy, practices, and attitudes fueled by the voices of marginalized groups and the community's needs. In doing so, granting organizations, reviewers, and proposal writers may provide different kinds and levels of support to people according to *their* needs. The Culturally Responsive Evaluation (CRE) framework is an example of a holistic framework centered on culture and emphasizing equity (Hood et al., 2015). Frameworks like CRE may be helpful to grant reviewers, writers, and funding organizations to frame how equitable proposals are developed and data is collected/analyzed.

6.3 | Exo: Institutions and granting organizations

6.3.1 | Adopt equity-focused rubrics and models

The standard grant proposal rubric used to assess scientific merit may be enhanced by equity-centered review criteria and questions that address community involvement/benefit, sociocultural and historical underpinnings of STEM—specifically. Like the CECC review criteria, the Community Based Participatory Research (CBPR) model emphasizes engaged and equitable partnerships between the community and the research investigators (Black et al., 2013). Studies that employ CBPR place value on community expertise and involve the community members in research beyond compensation. The CBPR research/community partnership findings are equitable and impactful to the community once the project is completed. Traditional methods of grant reviewing may be improved through the lens of equitable models such as CBPR.

6.3.2 | Institutional and organizational responsibility

It is fundamental that higher education institutions provide funding management for awards, employ policies that reward service related to granting organizations (e.g., reviewing, serving as program officers, etc.), and support the application process. Specifically, faculty at smaller, teaching, or minority-serving institutions may not have the institutional support needed to engage substantially with funding organizations. The stipend offered by some organizations may just not be sufficient.

Individuals must also consider the role of program officers at organizations like the NSF. Program officers play an integral role in the process of grant funding. The program officer can shape the experience of those serving on panels. However, from our experts, the authors recognize how important it is for panelists to understand the processes when serving on panels so that they can actively work toward equity despite norms guided by goals of standardization. Despite the acts of resistance and grounding in equity, we would be remiss if we did not recognize that every experience described in this paper was framed by a program officer. Is there potential for Principal Investigators to submit a list of potential reviewers in their field?

6.3.3 | Support marginalized grant writers

The current state of the peer-review assumes there is an equitable system for the reviewing process. However, factors such as experience with reviewing, the size of the institution's office of research, and the faculty's course load may influence participation and success in proposal writing. There is a need to be attentive to the intersectional identities of the proposal writers/researchers so that their opportunities to apply and be awarded grants are equitable.



6.4 | Micro: Reviewers and proposal writers

6.4.1 | Push back when witnessing inequity

When participating in the review process, we are responsible for bringing forward inequities among participants, communities, and/or proposal writers. This may include, but is not limited to, speaking up about unfair practices and creating space for researchers of all backgrounds to take risks. *Even raising a concern as if there's a desire to better understand the ambiguities of equity within a proposal is better than saying nothing—since this might be interpreted by others as endorsement via the silence. This also means those panel reviewers who may not fit the stereotype membership of being from a marginalized group should also raise questions rather than absolve such responsibility to others who are imagined to be spokespersons because of their identities.*

6.4.2 | Share your experiences (if you choose)

We found the words and experiences of our experts evoked an awareness in us and caused us to critique our own practices given our new understandings (Meyer, 2001). Being reviewed and the process of reviewing can be a deeply personal and demanding experience (Bloch, 2002). We also want to thank the engagement of our Reviewing SECRET group, and those who reviewed our paper. What was revealed by our diverse collective is that the process of being reviewed and reviewing can be an emotional and taxing experience, and when shared, collective confirmation is engaged (Bloch, 2002). Review panels whose perspectives and worldviews are dismissive (or ignorant of) critical theoretical approaches and different orientations to community-centered projects are harmful to people who experience marginalization and are engaged in radical, culturally grounded and driven research and collaborations. Our experts reminded us that equity requires deliberate and intentional actions in the decisions we make day-to-day both individually and collectively.

Closing Reflection

After just a brief time during the collective review process, I clearly recognized I just so happened to sit next to someone who exuded brilliance as she critiqued proposals—while centering equity. She began to pose questions expressing her concern about issues of equity—and I took note. I began to model my actions myself after hers as I saw and heard her make a point and express her expectations for a proposal that centers on equity. Over time, I began to hear others question problematic statements in proposals. I heard a group of panelists with good intentions but at times offering the benefit of the doubt for some and not others. We had never met before that day, but I expressed to my newly found peer [Sami] that I was thankful to have served with her before leaving.

Almost 2 years later...

I served as a reviewer again, and it was different. It felt different. I arrived to review and knew many of my colleagues as equity-focused researchers. Our conversations were framed and engaged in a loving manner for the communities who would potentially be served by the proposed work. I hope this was not a chance experience, but rather a responsive shift in processes in an organization towards more equitable practices.



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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX A

Interview Protocol

- Can you tell us a bit about your experience reviewing on review panels for grant awarding organizations? Can you describe your overall experience for us?
- Now, we want you to think about one specific experience. Can you tell us the granting organization as well as describe the review process from beginning to end?
- Were you offered a rubric or other materials to review as you examined the proposals?
 - How was equity specifically addressed in these materials?
- How do you center equity in your practice of reviewing proposals?
 - What do you look for?
- Are there currently any challenges that exist in centering equity in the reviewing process?
- What recommendations would you offer granting organizations to center equity in the review process?
- What recommendations would you offer to reviewers as they strive to center equity in their practice of reviewing on panels?
- Is there anything additional you would like to share with us?

Sub-goals

- explain & describe standards and practices;
- identify barriers to equitable review;
- inform practice and policy on equitable review to remove barriers.