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Gatherings to Transcend Barriers: For this Generation and Those to Come

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Abstract

In the fall of 2021 Indigenous and non-Indigenous scholars in the fields of science, technology, engineering, and mathematics were brought together for the virtual event “Gatherings to Transcend Barriers: For this Generation and Those to Come.” In the series of presentations over the course of the two-day event, individuals shared the story of their research, their projects, and individual hopes and aspirations. This paper presents a discussion of that gathering.

Keywords: Indigenous research, STEM, institutional racism, decolonization, oppression

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Introduction

During this two-day event, occurrences of racism and oppression were two of the main themes that emerged as barriers to success that Indigenous scholars frequently attempt to transcend. Speakers addressed the occurrences as “fact” and in some cases used these facts as opportunities through perseverance in their respective work to achieve goals. Supporting Native American, Alaska Native, Native Hawaiian and Pacific Island (NAAN-NHPI) students was the preeminent message carried through all the presentations. Support is shown through a variety of lenses, although not strictly financial. Students indicated that they need the support of faculty and mentors, individuals who listen to and value the world views of NAAN-NHPI students. Support appears in curriculum and curriculum changes that embrace Indigenous knowledges and western knowledge allowing students to “hear” the voices of their communities, which in turn respects the student, their community, and how students are positioned within the academy. This event was funded by the National Science Foundation (NSF).

Methods

Participants

The meeting was advertised through an online website as well as by word of mouth. Representing the United States and Canada sixty-seven individuals registered for the meeting. Within this group, thirty-three revealed they held university degrees in science, technology, engineering, and mathematics (STEM). Thirty-three held non-STEM university degrees. One individual abstained from sharing. For the twelve speakers, six held university STEM degrees and the remaining six held degrees in other disciplines.

Data

Our evaluation data was compiled from three sources. First, presenters were asked to complete a questionnaire from questions that were derived from the grant proposal; next, transcripts were created of the video presentations, evaluations and the chat narrative that was ongoing during each presentation; and finally participant data was gathered from the online registration portal. The diversity of the audience spanned Indigenous to non-Indigenous, retired to early professionals, and individuals within this spectrum.

Presenters

Prior to the event, presenters were sent a list of questions for their response:

- How do you transcend barriers to success? As you reflect on this question, share what “success” means for you.
- How does this type of engagement, the agenda of this meeting, support your professional development?
- How are community defined priorities identified?
- How can the "historical injustices surrounding much of western research be addressed?"
- What role does "decolonizing methodologies" play?
- In your academic discipline, what does “expert” mean? Does this align with your personal worldview?

As indicated previously, these six questions were derived from the grant proposal. During the video analysis, these questions served as a framework to gather data that was then synthesized with the returned presenter responses. Qualitative data from these sources serve to build the narrative.

Results/Discussion

This paper attempts to organize the qualitative data related to each of the six posed questions. Within the individual responses and shared presentations, it became apparent that deconstructing ideas was necessary. For example, “transcending barriers to success” became a discussion of ‘what is success?’ Before barriers can be transcended, what are the recognized barriers? Additionally, what is the meaning of success for Indigenous students? Considering the identified barriers of “racism,” “colonialism,” and “patriarchal dispositions” of agencies, we were left with some open questions.

Many other concepts emerged during the meeting that are not addressed within the narratives of the individual questions. Concepts such as “we” and “them” with respect to how tribal people perceive and experience the research agendas of NSF, an agenda that too frequently is one directional, an agenda of doing research “on” instead of “with” Native People, has to stop. This “new” generation of Indigenous STEM scholars no longer needs to adapt an outsider’s solution. This generation of “Two – Eyed Seers” understands the problem within their community, understands potential strategies and solutions, and can take part in, or lead the ceremony of the research. Adaptation of the etic view is no longer a necessary first step to the use of existing theories and perspectives that originated from outside the culture being studied. It is long past due. The time has arrived for “doing research with Indigenous people and communities rather than on them” (Wilson 2008, 108). Western trained researchers must understand that Indigenous researchers are “looking for meaning of why and how Indigenous people relate to things [i.e., research and the view of the world] rather than looking for causal relationships between things” (Wilson 2008, 41).

The results have been organized around the six posed questions, each highlighted below. Within the narrative for each question, included in our inferences is an attempt to support and further illustrate the data. The included quotes were either taken from the questionnaire or the transcribed talks. In an attempt to protect the anonymity of individuals, the source of the quotes is not distinguished. An outcome of the presentations and questionnaire responses highlighted that the first question generated the largest engagement. To that end more space is devoted to unpacking this item.

How do you transcend barriers to success? As you reflect on this question, share what “success” means for you.

How do we define success? I was successful. I don’t feel like all the time success is measured in degrees. I think we need to support our kids, our students. I absolutely encourage my kids, my grandkids, my nephews, my nieces to go to college. I also support them in the decision they make otherwise.

The above quote taken from a participant captures an essence of the meeting and how there was an understanding that “a successful person doesn’t always have a PhD behind their name.”

Framing success occurs first in this writing as it was a theme of importance. During the two-day event it became evident that there was not a universal definition of success for the attendees. Merriam-Webster (1974, 683) defines success as “1: satisfactory completion of something 2: the gaining of wealth and fame.” Considering how this dictionary defines success, there was a theme within the Gatherings To Transcend Barriers (GTBS) of ‘completion.’ The NSF’s agenda of broadening participation is frequently understood to include degree completion with the emphasis being in the STEM disciplines, and whose graduates would become Indigenous researchers and professors in academia. As an NSF sponsored event, this use of success was frequently repeated.

A pipeline metaphor is frequently employed as a discussion tool toward generating a understanding of how NAAN-NHPI students are moving through higher education, from undergraduate education through doctoral studies. At a micro level, the individual student who completes a higher education degree, could be used to argue that item one in the dictionary definition was achieved and that individual student has realized success; “Success is when we have more Indigenous PhD and Master’s graduates.” From this event it was evident that success is much more than an individual. Success carries a responsibility for those who came before and the next generation. As one respondent stated, “Success may not mean conquering a challenge but learning from it and moving on.” Considering this pathway, those that have passed through hold a responsibility to share their learning with the generation that follows.

Considering the individual supporting others, it became clear that success is much larger than a one-to-one correspondence, success is a community responsibility: “We transcend barriers to success for indigenous students by developing nurturing staff and faculty that support a sense of belonging and becoming.” In the context of this meeting with a higher education agenda, the role of faculty and staff was repeatedly emphasized: “Success comes out of a shared vision to authentically connect to and support Native students, to meet them where they are with an open heart.” Unfortunately, there were stories shared of individuals that do not have an ‘open heart’ and were not interested in meeting Native students “where they are,” this is discussed later.

An outcome of the discussion on success is a potentially new model for “Transcending Barriers of Success.” The elements of this model include:

1. Making Indigenous and Western knowledge systems connections for redesigned curriculum;
2. Tackling grand challenges such as ecological and biocultural restoration;
3. Supporting STEM success for NAAN-NHPI students;
4. Building authentic, durable campus-community partnerships for continuity and sustained positive impact on the environment and increasing the NAAN-NHPI students in STEM fields.

Deconstructing this model, elements of success for individuals, groups, curriculum, as well as the needs of the earth emerge. With respect to research methodology, relationship is critical according to Lambert (2014, 2) who states:

Involve a tribal epistemology, means that the information is gained through a relationship with Indigenous people in a specific community. While these research methods and methodologies aligned with several western qualitative approaches, there are distinctions. Some of these distinctions include a relationship with the source of the research data, or the person who knows and tells the story. Another distinction is the relationship that the researcher has with the story, how it is told, and how the knower and the researcher interpret the story. I believe that researchers who conduct research with Indigenous communities have accountability to that community's ethics, epistemology, ontology and methodology.

Considering these elements and others, we suggest that success is a relationship that needs to be nurtured. It is natural in a meeting of this type, with a specific higher education focus, for the shared ideas of success to be contextually focused. But, as one respondent shared:

Transcending barriers to success comes in many forms, and some of the best ways to overcome them has been with healthy support systems. Those support systems can be with family and relatives, friends and colleagues, mentors and advisors, spiritual leaders and ceremonies, and a mixture of any one of these and all of them.

Each of us holds a responsibility of supporting others' success. While an individual may have goals for achieving success, it was apparent throughout the data that there is a collective of support, sphere of influence, from others within our lives, both personally and professionally. If the reader pauses for a moment to consider what success means in their life and then considers 'were there individuals that supported you to achieve your interpretation of success?' it is conjectured that this is unlikely to be a rhetorical question. It was stated: "[t]his support and success are shared, so no one carries the burden on their own. And when one succeeds, we all succeed." The altruism inherent in this statement extends to a global responsibility.

Success for this group is relational, it is not about "the gaining of wealth and fame." Each individual, each collective of individuals, and each institution holds a responsibility for the success of us "all."

How do you transcend barriers to success?

A response to this question begins with a sharing of the perceived and experienced barriers that participants shared. Racism has many faces, experienced by participants. Institutional racism that does not respect or accept the knowledge of "Elders" was a repeated theme. According to Ladson-Billings (2003, 402): "western epistemological privilege pervades the academy and that the epistemological challenge that is being mounted by some scholars of color is not solely about racism, however, it is also about the nature of truth and reality" (Kovach

2009, 28). Kovach continues (2009, 77): “while colonization came to affect every aspect of Indigenous life, Western science in particular has worked to first subjugate and then discredit Indigenous knowledge systems and the people themselves. In the colonization of Indigenous people, science was used to an ideological and racist justification for subjecting Indigenous cultures and ways of knowing.”

Who is allowed to create knowledge? Is knowledge only created in the realms and halls of academia by Western researchers? Is it only through Western knowledge systems that students are allowed to create knowledge? Indigenous peoples argue that knowledge is created by everyone including Elders, children, the four legged, the winged, and the animals in the sea. Indigenous people all over the world discuss how their ancestors learned from animals and that they are continually gaining knowledge from animals.

For the purposes of this writing, Scholarship Racism is used to acknowledge that some of those that hold the power for publication are recognized for their oppression of Native Elder Knowledge when paper submission reviews are returned with remarks “there’s no published work on that, you can’t use that” which is an experience Native Scholars experience when quoting Elders and acknowledging them as the knowledge holders of their people. Published scholarship by non-Native authors, as reported by a participant,

on Native people was missing the mark. It was often a non-Indigenous person submitting the articles, writing the papers, and sometimes it really seems they are reaching to find something to write about, never really addressing the pressing issues affecting us [Indigenous People] today or they’re scared to say it, maybe they didn’t know about it.

A barrier that Native Scholars are trying to transcend when publishing occurs which conveys the message “believe us, we have the tribe’s interest in what we do” as the non-Indigenous authors frequently “don’t.” Indigenous Scholars “are not just responsible to the work, but to the community, ‘Am I doing this in the right way?’”

Individual racism was captured in a shared “bad experience” of a participant:

I don’t understand the issues with Native students, why aren’t they more like Japanese students? What kind of question is that? She’s a professor and she has a lot of power and you run into things like that where it’s an attitude. I wish Native students didn’t have to face that sort of thing but it is reality, it’s out there so you’re having to navigate racism a lot of times, ignorance and so sometimes you get that “Oh you’re Native” from folks in power like that, they just dismiss you.

Recommendations

If the NSF and other external government agencies want to participate in Transcending Barriers for NAAN-NHPI then action in the following forms is a beginning.

Collaboration

Request for proposals (RFP's) must be explicit that funded agendas are done in cooperation with Native communities. Representatives of funding agencies "need training in how to be good allies to tribes and really start to acknowledge and understand what it means to have a government-to-government relationship, nation to nation, what sovereignty means, what self-determination means, how to not cause more harm." "For land grant institutions to come into communities after they get an award and then say 'hey we want you guys to be part of this because we have this award,' or they write in the grant the name of the community in order to get the award none of this is helpful."

With respect to inequality, Odedina and Stern (2021, 2) state:

There is a disparity of funding and resources for Indigenous researchers, institutions such as tribes and tribal colleges: Some of the reasons for the observed extramural funding disparities in science and medicine are funding agency priorities that may not be aligned with the research focus of scientists who are under-represented in science and medicine; competition with experienced, well-funded scientists who are often white; bias in the scientific review process; and a funding decision process that not appropriately weigh the potential impact of awards and the importance of promoting careers of Black, Latinx, and Indigenous scientists.

Educating Government Personnel

Governmental personnel must be educated about Indigenous communities, it cannot be acceptable for personnel to arrive and have no understanding of the geographic span of a reservation or to be surprised they have no cell reception. It is not acceptable that governmental personnel arrive on tribal reservations and communities without knowledge of the people and lands they are visiting.

Respecting Indigenous Knowledge

Funding agencies must take the lead in respecting Indigenous knowledge and Indigenous Knowledge holders. To be a leader, agencies need to push back against the academic racism of "questioning Indigenous knowledge, [the instances when an Indigenous Scholar is told] you can't say that because it wasn't cited, you can't say that because your grandmother isn't a scholar, you can't say that because your great grandmother is not a doctoral holder. These people are Indigenous Knowledge Holders."

It's always that question of where does that Indigenous knowledge come from? If there has to be citations, there has to be previous work done in these fields for it to be legitimate and that's one of the areas NSF could do a better job in, is helping recognize that lot of the work we do with Native science has been observational. We watch this over time so we're aware that these things work and we have an understanding of where we position ourselves as emic researchers within the culture of our communities and in these fields. We're in no place to facilitate any

sort of research or digging into our epistemologies, our methodologies to have any good answers. For NSF to come along and say ‘you guys don’t know what you’re doing and your science isn’t valuable because it doesn’t fit into a hyper-capitalistic model,’ I just don’t think any of that’s helpful for Indigenous communities.

Knowledge and models of knowledge are not universal, agencies need to acknowledge this. “How Native people think about things is a lot different than a lot of the models at NSF, at NIH, or NASA know about. It’s looking at the whole world, the whole universe, the whole galaxy, holistic view, a lot of the backbone of Native Science, how one can effect everything else.”

Institutes of higher education have to abandon the academies’ racist view about knowledge and what is “counted” as knowledge. Cajete (1993, 193), Tewa scholar and author discusses Native science in this way:

Ethnoscience is a term invented by ethnologists to describe methods, through processes, philosophies, concepts and experiences by which a primal group of people obtains and applies knowledge about the natural world...The use and application of the term “ethnoscience” are very telling of how Western scholars and educators have viewed non-Western cultures...

Cajete (1999, 81) in later writings explains further,

Indigenous science is the collective inheritance of the human experience with the natural world. It is a map of reality drawn from the experiences of thousands of human generations which give rise to a diversity of technologies for hunting, fishing, gathering, making art, building, communicating, visioning, healing, and being.”

It is a racist perspective to marginalize Indigenous knowledge since this knowledge doesn’t “fit” the Western standard. “Traditional knowledge...timeless knowledge, it’s knowledge people have known since the beginning of time and they don’t need a reference for that, because the people are here. They figured out food, they figured out how to store food, they figured out how to trade animals, they figured out how to live in harmony on Mother Earth, since the beginning time. Timeless knowledge.” Battiste (2013, 117), Mi’kmaq educator and scholar stated,

Eurocentric science has ignored Indigenous science...Such knowledge systems represent enormous wealth...they harbor information as yet unknown to modern science but they are expressions of other ways of living in the world.

Resource Access

Participants believe that the NSF has to acknowledge and remedy the perceived lack of access and resources for Indigenous Scholars.

Native or Indigenous scientists don't have the resources to do what's been done in western science here in the Americas or in colonized nations. That was afforded on the back of Black slavery and Indigenous lands that were stolen and taken. Those resources that they use to fuel the scientific enterprise, we don't have access to that. They don't give us access to it and I think that is an issue. If NSF wants to do anything better for Indigenous communities for whose lands they do research from and do research on and in those communities they should allow us access to that and they shouldn't ask us questions about what we need through a proposal. I think that we should be allowed access to that and we should be able to outline what we need.

Yellow Bird and Chenault (1999, 206) wrote: "The history of Indigenous education is replete with oppression, racism, discrimination, cultural genocide, social control, and the imposition of hegemonic European American education methods." Here we are over twenty years later, listening to the repetition of history.

According to Kirkness and Barnhardt (1991) "Institutional policies to improve American Indian postsecondary achievement should spell out the need for multicultural and relevant education that spawns reciprocity in faculty-student interactions" (cited in Pavel, 1999, p.249). According to Gordon (1994)

To improve outcomes for American Indian students, institutions of higher education have to cultivate enduring academic advisor-advisee and intellectual mentor-mentee relationships. These faculty-student relationships should be characterized by caring attitudes conveyed through good communication skills, likable personalities, a willingness to learn cultural norms, respectful interactions, appreciation for different ways of knowing, and high expectations (cited in Pavel, 1999, 249).

While the reporting by Pavel (1999, 247) is focused upon higher education, it is imperative that the institutional policies of the NSF and other such governmental agencies "spell out the need for multicultural and relevant education" in order to "spawn reciprocity" in research agendas.

The cliché, knowledge is power, is important as a lens to view a perception of the NSF, a perception that the Foundation must work toward changing.

We are marginalized, marginalized, and marginalized, and that I think is done on purpose. I think we don't have access to science because if we generate scientific knowledge we would actually have power, power in our communities. I'm not talking about electricity, I'm talking about the power to have authority to have the ability to make decisions in what's going on in our lands. And they don't want us to have the power...

When funding agencies ask the question of a lack of participation of tribal schools pursuing external funding, they must pause and realize their responsibility in supporting the endeavor.

We talked about the barriers, what we responded to was, we are not prepared to compete with MIT, Harvard, Yale, and these larger universities, and different places that can write and so we told them [NSF] we need assistance in development of technical writing, not all of us can write these types of grants... Unexpectedly, when NSF was informed of this need for writing support and told 'Tribes really do want to be involved in solving their problems' NSF representatives returned home never to be heard from again.

The many forms of institutional racism shared in the meeting may stand as a daily reminder of barriers Indigenous scholars face. It is not acceptable for a group of Indigenous scholars being denied laboratory space by a university body that does not have the authority to make a declination. Through perseverance these Indigenous scholars prevailed to secure the laboratory space only to realize another racist act of their institution that would not fund the laboratory but charged the scholars with securing funding.

How does this type of engagement, the agenda of this meeting, support your professional development?

This participants' verbatim responses to this item include:

- I love my work with Native students and helping them to succeed, as they define it. The agenda embodies many of the areas that intersect with my work.
- The agenda addresses these campus and community transcending practices, but with an equal emphasis on unique and diverse place-based histories and experiences. The emphasis includes valuing both the assets and needs of partners engaged in transcending barriers.
- The agenda with the presenters and audience brings us back around to see beyond our localized issues and problems. There are Indigenous communities feeling and working through similar issues and problems in the same ways, but different too. To see them and interact with them is inspiring. I felt re-motivated to keep doing the good work we are doing here at home.

Responses remind us that individuals working with Native students, scholars, communities, Elders, and Knowledge Holders, are not alone. It is not unreasonable that participants and presenters left this meeting knowing that the good work they strive to achieve is not being done in vain nor in isolation. There is a 'community' of others that each of us in this meeting have joined.

How are community defined priorities identified?

The obvious answer, as shared by some "the community." One responder shared "through campus-community collaborations and aspiring to durable partnerships for this generation and those to come. Assets, needs and priorities may change over time, so share mutually beneficial, and reciprocal goals need to be identified." It is important to recognize that collaborations are being established, need to be established, that live beyond today.

In the following response, we are all charged with the responsibility of “listening:”

By the community. We have to be good listeners and hear what our community is saying, what ails them, what our needs are, and how they are trying to cope with trauma. Both the historical and recent trauma is ongoing and hits twice as hard whether we know it or not. The twice as hard is the historical context of why the recent trauma is occurring, and ongoing. To see how it is impacting us in deficit statistics is real, it hurts. Trying to witness the patterns to make sense out of the complexity and messiness to what is happening, it is so heart-wrenching. Through the pain, we try to see the priorities our community is defining.

How can the "historical injustices surrounding much of western research be addressed?"

Throughout much of this narrative, injustices are brought to light. These instances span from occurrences experienced by an individual, occurrences experienced by groups, and the continued injustices of institutes of higher education and governmental agencies. Indigenous scholars find themselves in a position mandating that they continue “chipping away at the western research paradigm.” These scholars are too frequently in a defensive posture against the western paradigm as to what constituted knowledge and who the knowledge holders are. This must cease. With respect to Indigenous Research Methods, an internationally recognize body of research, Indigenous scholars spend too much energy, intellectual and emotional, in their constant fight to educate “mainstream administrators, as well as communities. There is a greater emerging body of knowledge to demonstrate these methods.”

One response captures the role of critical thinking in science education: “[c]ritical thinking is one avenue for addressing injustices in Western science approach to knowledge production. Students should be given opportunities in science courses to engage in debate and to question the absence of non-Western science in the classroom and beyond.” Students must be empowered to engage in this debate.

Institutes of higher education hold responsibility for many of the historical injustices that were brought forward. This is captured in the following:

Historical injustices in western research are embedded in a larger context of colonialism, exploitation, land and resource theft, and discrimination. American higher education is complicit in these processes. The university needs to put forward a mission that ameliorates the problems for which they are responsible and embed research injustices within that mission. More authentic, durable and comprehensive community outreach and engagement, and amplifying Native voice, perspectives, and expertise in research, are two important first steps.

It is critical that while these scholars acknowledge their awareness of injustices, they offer solutions. Solutions, unfortunately, that too often are ignored. Students need to empower themselves and advocate for themselves. Often PhD students in mainstream institutions have to be the educators of racist faculty and members of their doctoral committees. Too often graduate

students fear that their professors will not understand or permit Indigenous research methods, or a literature review that includes Elders' stories or knowledges. It is imperative that in many circumstances the student must educate their faculty by demonstrating how Indigenous methods fold into Community Based Participatory Research (CBPR) and Feminist Research Methodologies. In these academically accepted research methods, the researchers' voice is incorporated into the narrative (Webb 1993, 2).

Finally, empowerment is significant, as captured below:

To empower Indigenous peoples as the leaders in research, the research question must come from the community. That power comes from relationships within their communities to address the systemic problems related to historical injustices.

The trick is identifying those individuals who can advocate for the community, who can acknowledge the racist attitudes from academia, researchers, and their own internal harm-causers. Decolonizing means re-centering the colonial practices that got Indigenous peoples into this mess. Those people in community are hard to find, and difficult to empower since most of the communities have worked so long in dysfunction that the members feel safe. In other words they don't want change. The false sense of safe is difficult to disentangle.

Disentangling it makes those who are uncomfortable become saboteurs in their own community.

What role does "decolonizing methodologies" play?

"Decolonisation itself refers to the undoing of colonial rule of subordinate countries but has taken on a wider meaning as the 'freeing of minds from colonial ideology' in particular by addressing the ingrained idea that to be colonized was to be inferior. Decolonisation then offers a powerful metaphor for those wanting to critique positions of power and dominant culture" (What is Decolonising Methodology?" University of Warwick, UK, n.d.).

The words of these respondents capture the essence of the importance of decolonizing methodologies. One respondent stated: "[It is] extremely important in keeping traditional views of knowledge and its attainment challenged. Another respondent stated,

Decolonizing methodologies can allow for a critical lens to help interpret and redefine the methods, and those attending paradigms, that limit our potential. The work of decolonizing asks for us to tend to the role of colonization embedded in our educational systems.

The third respondent stated,

Decolonizing methodologies is the anti-venom to the loss of lifeways. Distinct Indigenous cultural lifeways are being lost. Piecing them back together, protecting what we have left, and preserving our lifeways for practice bringing back who we are in our homelands is imperative. It is imperative to the ways we remedy the issues of land destruction, fragmentation and disconnection that are the root causes to climate change,

and the mass extinction event we are currently living through. Beyond technology saving us is Decolonizing Methodologies, a change in human behavior. A simplistic act to change our behavior about how we take of the place we call home. The belonging of animals is situated in place, our niche. Colonialism is the loss of belonging, and loss of niche. There is a collection of evidence that DM could be proposed as a synthesis of work. I'm interested in this as a direction of research. The premise is largely posed by Viola Cordova in her life's work and book titled, "How it is". Among the role(s) DM plays the role of helping us change human behavior is one of them.

There is a body of evidence describing the concept of decolonizing methodologies from Cordova (1982), Wilson (2008), Lambert (2014), Tuhiwai-Smith (2021), Battiste (2000), Archibald (2018), and Chilisa (2020). For example, Dr. Erica Irine Daes (2001, 143-150) of the United Nations states, "Displacing systemic discrimination against Indigenous peoples created and legitimized by the cognitive frameworks of imperialism and colonialism remains the single most cultural challenge facing humanity." Also Tuhiwai-Smith (2021, xii-xiii) echoes the need for decolonization of research methods in this way,

No real progress has been made to decolonize the major knowledge and political institutions of academia, although discourse may have shifted to words such as reconciliation, inclusion, and diversity...Decolonizing methodologies is about forcing us to confront the Western academic cannon in its entirety, in its philosophy, pedagogy, ethics, organizational practices, paradigms, methodologies and discourses and, importantly, its self generating arrogance, its origin mythologies and the stories it tells to reinforces its hegemony.

In your academic discipline, what does "expert" mean? Does this align with your personal worldview?

It was immediately apparent that "expert" for many in this meeting, presenters and participants, was not always 'letters at the end of a name' (i.e., BS, MS, or PhD). This idea was captured throughout the narrative. One respondent stated,

I believe we should respect a person's knowledge and the work and dedication represented in a life's pursuit to attain a certain level in academia. Respect for one's disciplinary expertise does not negate that others, outside of academia, are also experts.

Another respondent stated,

Expert means someone who has a degree in a given discipline, even sub-discipline and has publications, speaks at conferences, and makes money from this expertise. This is on one end of my worldview. On the other end is mostly the opposite. A medicine man is interdisciplinary, does not publish their work, speaks at ceremonies to very specific, small audiences in personal everyday way, and

may make a living from this but in many ways besides just money. I live in-between these two ideas of expertise. I'm still learning from both.

Exemplars

Multiple programs were brought to the attention of the participants that exemplify what is occurring that is inclusive of NAAN-NHPI Peoples. There were shared instances of individuals being in a positive, supportive space and there were stories of actions getting close to exemplifying what should be occurring, but then fell short.

Humboldt State University has developed “place-based learning communities to introduce all first year STEM students to Indigenous knowledge in a manner that will allow them to move to help collaborate with Indigenous tribes.”

Problem based learning communities provide purposeful curricular and co-curricular activities that incorporate real world and community-based learning in a collaborative, student-centered environment that link STEM curricula to social justice, empathy, and equity matters of our local Tribal communities.

At Humboldt State, they are purposeful in curricula decisions that “linked issues faced by Tribes to basic, fundamental coursework that all students take in their first semester.” An outcome reported by the Humboldt scholars; “by working together with our Tribal collaborators, we’re able to link the importance of understanding botany, math, basic chemistry, and the necessary component of working with Tribal communities to help resolve community issues.” It is important to recognize that at this institute of higher learning (IHE) **ALL** first year STEM students are introduced to Indigenous knowledge.

The courses are not just GE [general education] courses, but it is in STEM. There’s an entire hands-on science experience that allows students to incorporate both Western science, Native science, and other Indigenous knowledges to really understand the impacts of climate change, but also to talk a lot about working with various Tribes and other groups as you are a STEM professional. This is a course that is taken by all first year STEM students.

Through their curriculum of connecting the STEM education of Humboldt State University to Indigenous knowledges, participants are realizing the concept of “two-eyed seeing.” This phrase, *Etuaptmumk* in Mi’kmaw, is credited to Mi’kmaw Elder, Mr. Albert Marshall. According to Marshall:

We often explain *Etuaptmumk* – Two-Eyed Seeing by saying it refers to learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of Western knowledges and ways of knowing – and learning to use both these eyes together, for the benefit of all (“Guiding Principles (Two Eyed Seeing) Integrative Science,” n.d.).

It might be argued that the concept Marshall (“Guiding Principles (Two Eyed Seeing) Integrative Science,” n.d.) put forth has grown in meaning. As a doctoral candidate shared in an exchange with her advisor on protecting “data sovereignty,”

...it wasn't a need for me to explain to her [advisor]. She understood and I was really appreciative that I didn't have to go into the reasoning and the justifications. She was really understanding and she acknowledged the importance of that.

Here we have an exemplary faculty member that is not a barrier, embracing the importance of Indigenous knowledges as a Western trained scientist, embracing the importance of her relationship with this Indigenous scholar.

The University of Hawaii – Manoa, has developed,

[A] sense and responsibility of place people and knowing by creating a fund of knowledge and practical experience, including practices of sustainable living and learning from the land itself and the caretakers of the land itself.

Hawaii is recognized as the first Science Evaluation for New Civic Engagement Responsibilities (SENCER) model state. Through the work at the University of Hawaii, it is acknowledged that

Indigenous knowledge is scientific knowledge. [Through] thousands of years of empirical observations of ecological phenomena, culturally relevant hypothesis can be generated from extensive amounts of Indigenous knowledge.

The Hawaii groups' sharing of ethnobotany, demonstrated experiments that support Indigenous knowledges, experiments conducted by students, which allows them a hands-on experience of Two-Eyed Seeing.

For example, Bian et al. (2020, 7) applied Western research methods to determine the healing properties of kava or 'awa and found that "...overall, kava and its ingredients have demonstrated their anti-inflammatory effects and their potential for ameliorating certain inflammation-related diseases [such as arthritis]" The work of Bian et al. (2020, 7) recognizes the medicinal properties of Indigenous Knowledge and healing properties of 'Awa – *Piper methysticum*. 'Awa, also known as Kava, "...is the cherished and sacred narcotic of the Hawaiian culture. Farmers offered 'awa to the gods so their crops would be bountiful. Canoe builders would offer 'awa when choosing a koa log for a canoe. 'Awa was used by all classes of people, especially any whose strenuous work left them stiff and sore" (University of Hawaii, Manoa, n.d., 1).

In Hawaii, the four components of the Transcending Barriers to Success Model are:

- 1) Make Indigenous and Western knowledge system connections for redesigned curricula;
- 2) Tackle grand challenges in environmental and natural resources and health;
- 3) Support STEM success for under-represented Native American, Alaska Native, and Native Hawaiian; and
- 4) Build authentic, durable campus community partnerships for continuity and sustained positive impact on the environment and increasing the number of
- 5) Indigenous students in STEM.

Participants were reminded that we are all responsible to: “amplify Indigenous and community voices, humble scientific community voices”, and “Partnerships must be aspired to, not simply asserted.”

Concluding Remarks

For many, the story of outsiders arriving to do research “on” and not “with” Indigenous communities was a reality. Agencies such as the NSF and IHE must prioritize collaboration with Indigenous communities when research agendas are proposed. As one scholar stated, “we can figure out anything if we work together, if we work together, we have a much better chance of success.”

Outsiders must also understand that communities “own the data.” How outsiders interpret data, how agencies such as the NSF support investigations, how research is conducted “on” and not “with” must cease. A colonial outcome too often realized is “this is what’s best for you.”

When the participants discussed the negative impacts of racism, oppression, colonialization, they were stating “facts” that must be acknowledged.

Accepted as fact so we can move on. That way we can have a real discussion of where the power structures lie, when the funding gets sourced, and where it’s going and who has access to it. Because I think that’s some of the limitations and some of this relationship is that the gate keepers or the structures of the paradigms, we are operating under tenant to keep us excluded from it and we have limited access.

This paper reflected the perceptions of participants regarding funding from government entities such as NSF, NIH, etc. It is apparent from the views of participants that they have no concept regarding the level of funding directed to tribal entities. In the future for similar gatherings with students it would be wise to orient participants on these issues.

Indigenous Scholars believe it is often a “we” versus “them” division, a difficult barrier to transcend. In this context “them” refers to those that hold the purse strings, hold the power, power that could support honest partnership in Indigenous communities. Through many cited examples “them” oppress and marginalize Indigenous scholars and their communities.

However, much is being done by NSF including these initiatives to tribal entities: “[NSF] has awarded \$14 million to tribal colleges and universities (TCUs) to establish four new research centers -- the first of their kind” (“NSF Awards New Level of Support for Tribal Colleges, Establishes STEM Centers” n.d.); a new STEM website in the Tribal College Journal; and post-doctoral research funding for STEM fellowships (Native Science Report, n.d.).

The National Science Foundation also provides grants to IHE’s that support academically talented students that need financial support. Through this support, these students are able to complete post-secondary education (associate, baccalaureate, or graduate) STEM education. This support enables these students to enter the STEM workforce. The National Science Foundation also supports undergraduate students through “Research Experiences for Undergraduates (REU.”

These research experiences offer students opportunities to engage in ongoing research projects. (NSF Tribal College Workshop Program of Interest November, n.d.)

But more could always be done in the way of attitude-changing workshops for the high level administrators within government agencies regarding the value of Indigenous science and research methods at NSF, NIH (National Institute of Health), NASA.

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