

# Audio Dissemination for Qualitative and Broadening Participation Research: Lessons Learned and Future Possibilities

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# **Audio Dissemination for Qualitative and Broadening Participation Research: Lessons Learned and Future Possibilities**

*Background:* While a primary goal of education research is discovering and disseminating scholarly knowledge, traditional dissemination alone is insufficient to foster sustainable educational change. Journals and conferences target a particular audience invested in a specific topic; it is often not practical for stakeholders to engage with research outside of their specific areas of specialization. Thus, the research-to-practice gap continually widens as education research findings fail to influence wider audiences.

*Purpose:* In this paper, we highlight audio as a promising alternative format for dissemination. Audio dissemination has the potential to multiply the impacts of qualitative research by disseminating findings with more immediacy and accessibility than traditional research publications.

*Approach:* We summarize one specific audio narrative dissemination approach conducted as part of the pilot phase of the Audio for Inclusion Project, a recent National Science Foundation-funded project to foster inclusive understandings for engineering faculty. We organize the discussion around orienting goals and challenges encountered, as well as lessons learned and suggestions for future improvements.

*Findings:* Lessons learned for audio narrative dissemination include paying close attention to creating a coherent and cohesive narrative by removing distracting details, and aligning student actors with participants so that the tone, affect, and emphasis remain true to the participant.

*Implications:* This paper presents new possibilities for qualitative researchers on broadening participation, to repurpose their interview content to form practical resources and training that can improve faculty's knowledge, empathy, and understanding of students' diverse and marginalized backgrounds. Additionally, these findings will be useful for all researchers seeking new methods of translating research findings into actionable impact.

**Keywords** — Dissemination; Student experience; Narrative; Interviews; Inclusivity; Faculty

## **1. Introduction**

Dissemination is defined as “the act of spreading information or knowledge so that it reaches many people” [1], and it is a crucial step in a research process that enhances scientific and technical understanding. The 21<sup>st</sup> century has seen a massive increase in tools for disseminating information; yet, paradoxically, it has also reduced our collective attention span for receiving information [2]. As researchers, we have word processors, online databases, and Zoom webinars at our disposal, enabling researchers access to ever-increasing audiences, but our audiences have not equally increased their time for absorbing and acting on that information. In the case of engineering education, faculty are engaged in research dissemination activities of their own with little time to explore and implement research outside of their own domains. Most journals and conferences have their own audiences interested and invested in specific scholarly areas (e.g.,

biomechanics, robotics, broadening participation, or engineering education). There is a growing recognition across disparate fields (e.g., science communication [3] and public health [4-5]) of a disconnect between scholarly research dissemination and practice. As a result, the intent to disseminate research findings to a wider audience is not achieved, and the research-to-practice gap widens. This paper highlights a novel approach to audio dissemination for broadening participation, as one model for how to center impact and change in engineering education research design.

### ***1.1 Dissemination, Impact, and Change in Engineering Education Research***

Many in the engineering education community view the primary goal of education research as providing scientific or scholarly knowledge in the form of conference presentations or journal articles. The National Science Foundation's (NSF) guidance on example grant proposal dissemination plans suggests publishing findings on university websites, presenting at conferences, and publishing articles in peer-reviewed journals as [6]. These conference and journal outlets might be described as traditional dissemination. NSF also explicitly and implicitly asks Principal Investigators (PIs) to move beyond traditional dissemination towards creative and transformative forms of dissemination that will increase the impact of the project's efforts. For example, both the Research in Formation of Engineers (RFE) and the Broadening Participation in Engineering (BPE) program solicitations state, "All proposals must have a dissemination plan that goes beyond publishing research papers and presenting at research conferences. PIs should think creatively about who needs to hear about the research for it to have an impact and develop a strategy to reach that audience" [7-8].

The engineering education community often implicitly views dissemination as interchangeable with the impact of our research. When NSF grant proposals discuss their Prior NSF Support, they must list publications and products. When a panel assesses whether the Prior NSF Support has been productive, they browse the number and content of the citation list. When assessing tenure and promotion cases, publication productivity is a primary metric of the impact of the faculty member, and frequent publication in highly cited journals is looked at most favorably. More broadly, the language used for assessing journals also promotes this view—the Impact Factor suggests that relative citation levels are a good representation of impact.

Defining impact as dissemination is a particularly researcher-focused approach; instead we call for defining impact in terms of the contexts, populations, and change-initiatives associated with the project goals. The institutional change literature is one prominent place that impacts on contexts are discussed. In a review of three bodies of literature (STEM Education, Higher Education, and Faculty Development literature), Henderson et al. [9] found that the institutional change strategy of dissemination of curricular innovations was the most common change strategy represented in the STEM Education literature; however, it was ultimately an ineffective strategy for institutional change (p. 978). Froyd et al. [10] suggest the paradigm of propagation as more effective than simple dissemination, where propagation focuses on translating pedagogical innovations to dissimilar contexts. Stanford et al. [11] examined NSF proposals to predict the eventual propagation impact of the study and found that many studies' predicted impact fell short because of a lack of intentional efforts to connect with stakeholders and to adapt recommendations to particular contexts. Litzinger et al. [12] identified similar concerns related to

a lack of dissemination of innovative assessment practices in engineering education. As a result, they recommended an integrative approach that considers innovation design and audience while developing an intentional diffusion plan that maximizes the chances that others will adapt or adopt it.

We note that while the majority of the work mentioned here highlights an important limitation of dissemination in creating impact; the lens is also narrowly defined around research with an intended impact to promote the usage of pedagogical and assessment approaches. Within broadening participation research we read, the desired change is typically not to promote the usage of a particular pedagogy, but perhaps promoting the reader's awareness, empathy, and understanding of marginalized and minoritized student groups.

To help us understand the dissemination style for a wider set of engineering education research, we reviewed publicly available NSF grant project summaries from the BPE and RFE programs. Grants that used terms like *disseminate* and *dissemination* were selected for further review. In total, 58 grants were reviewed to identify how researchers discuss dissemination in the project summaries. Those project summaries were grouped into two categories: 1) *Dissemination is mentioned*, and 2) *Dissemination is specified*. Definitions of each category, along with example studies and statements, are shown in Table 1.

<p><b>Category 1. Dissemination is mentioned:</b> The summary mentioned but did not specify methods of dissemination.</p> <p><b>Example Studies:</b> Award #2120443, 2208680, 1653854, 1734347, 1760002, 1825328 [13-18]</p>	<p><b>Example Statement:</b> “Results of the project will be widely disseminated <b>to academic research audiences, as well as educational practitioners and stakeholders in engineering and industry</b> who share the goal of increasing the representation of females in engineering.” [18]</p>
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<p><b>Category 2. Dissemination is specified:</b> The summary discussed several specific means of dissemination.</p> <p><i>Example Studies:</i> Award # 2024081, 1929484, 1848842, 1947114, 2106243, 1752598 [19-24]</p> <ul style="list-style-type: none"> <li>● <b>Subcategory 1. Dissemination activities:</b> Forms of dissemination that require the active participation of various stakeholders, such as empirically informed dissemination workshops, association with various organizations and stakeholders, outreach activities, etc.</li> <li>● <b>Subcategory 2. Dissemination archives:</b> Several types of project information have been set up for use so that it can be accessed later, such as websites, scholarly articles, reports, workshop summaries, etc.</li> </ul>	<p><b>Example Statement(s):</b></p> <p>“Broad dissemination of project results will be accomplished through a <b>website, brochure, and one or more webinars, as well as engagement with key stakeholders</b> representing diverse regions of the country.” [19]</p> <p>“The education aim is to develop research-based, actionable resources for administrators, counselors, faculty, advisors, and students. This is being accomplished through the <b>development of materials and interactive trainings</b> disseminated to different groups of stakeholders.” [20]</p>
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We note that researchers are not required to detail all dissemination plans in their project summaries, however, most funded researchers seem to disseminate via traditional means. Stanford et al. [11] found similar trends in their study of full NSF proposal and outcomes, despite program solicitations encouraging Principal Investigators (PIs) to use more innovative and transformative dissemination methods.

We contend that traditional dissemination is limited in at least three major ways. First, there are limits on an audience’s attention and the accessibility of journal articles. If engineering faculty are a primary audience who could be influenced by the findings of a grant, writing long journal papers using specialized vocabulary is simply not the best strategy to influence them. Second, for qualitative researchers, there is a loss of the immediacy of the written word. If our research can and does trigger empathy for the experiences and perspectives of our participants, writing them in a journal paper may not be the best way to translate that empathy to our audience. Third, dissemination is only one part of a broader change process, a lack of accompanying actions or coordination with other stakeholders leaves dissemination inert in terms of actionable change. As a research community, we must focus not only on knowledge generation but on the pragmatic impacts and collective change we can create. Since our current education research approaches consistently fail to produce the desired change, we should examine new approaches to research that center change and impact in the research design.

## **2. Novel Dissemination Approach: the *Audio for Inclusion* Project**

Our sense of these limitations of dissemination and our desire to try something different inspired this paper. We saw a disconnect between the level of empathy and understanding gained by us as researchers conducting qualitative interviews about marginalization, and the level of empathy and understanding we could convey in final written form [25-27]. We also noticed a paradox that the people most likely to read our journal papers are those most invested in broadening participation topics—not the audience of less aware or less invested faculty who may be the most important to reach with our findings. We were also inspired by researchers beyond engineering education who have utilized alternative modes of dissemination such as YouTube videos, podcasts, theatre, and other novel approaches [4, 28-31]. A small but growing number of STEM education researchers have also utilized audio or audiovisual dissemination techniques to increase the visibility of underrepresented groups in STEM [32-33], to inspire future STEM professionals [3], or to engage broader community conversations [34-35].

Motivated by these concerns, we designed the *Audio for Inclusion* project, which was funded by the National Science Foundation and began in August 2021. The project utilizes an intentional national recruitment strategy to recruit and conduct interviews with 20 students belonging to a range of marginalized identity groups. Using narrative analysis, we construct meaningful but anonymized accounts of each student's experience. These accounts are used to create narrative scripts that are member-checked with participants to ensure narrative accuracy and participant comfort with the information to be shared. The scripts are then anonymized by the research team and re-recorded by student actors. We contact faculty to distribute a Narrative Dissemination Survey (NDS) with embedded audio student narratives, and we assess their influence on increasing faculty inclusive understandings (see Section 5. Future Work). Finally, we disseminate the audio narratives through outlets such as podcasts, YouTube, and the American Society for Engineering Education Commission for Diversity, Equity, and Inclusion (ASEE CDEI) website, and we publish written analyses (traditional dissemination) of student narratives to provide insight into students' marginalized experiences.

The project has the potential to significantly influence faculty understandings of students' marginalized experiences by directly connecting faculty members to student narratives and experiences. This approach may help foster the empathy and inclusive understanding necessary for creating culture change in engineering education. The dissemination approach has the potential to multiply the impacts of qualitative research by disseminating findings with more immediacy and accessibility than traditional research publications. In this spirit, we present our initial methodological process so that other qualitative researchers may be encouraged to augment their process as well.

### **2.1 Pilot Study**

In the Summer and Fall of 2020, we conducted a pilot study of the project at a large public Minority-Serving and Hispanic-Serving Institution with a large international student population in order to test out the interview, analysis, and audio translation processes as we had conceived of them.

In the pilot study, we interviewed six engineering undergraduate students who have underrepresented, marginalized, and/or hidden identities in engineering education contexts. The Zoom video interviews lasted 45-90 minutes. Participants were recruited through a Qualtrics survey, and those who participated in the interviews were selected primarily based on the response of the optional question, *‘What aspects of your experience in an engineering classroom do you think one of your Engineering or Computing professors would not know about or would not understand?’* Out of the six participants, we chose one interview for further narrative construction and piloting the dissemination process. That participant (Alice) is a Latina female international undergraduate engineering student who must navigate mental health concerns. Analysis of that participant’s narrative can be found in a prior publication [27].

### **3. Methodological Goals, Challenges, and Lessons Learned**

In this section, we present a series of desired goals and encountered challenges while completing the pilot study. We organize the list both chronologically in terms of the research process (i.e., data collection, analysis, dissemination) and conceptually by overarching topical goals.

#### ***3.1 Goal 1: Collecting students’ impactful stories***

The first part of our research process was to conduct qualitative interviews that would elicit students’ stories with the most impactful interview content. Impactful in our case meant the stories that would shift the way a professor sees or understands their students to be more empathetic and inclusive. We were driven by the concept of hidden identities, such as non-apparent disabilities and LGBTQ identities that are not readily perceived. We conceived of inclusive awareness and creating inclusive classrooms as mutually constituted and reinforced, where a level of inclusive awareness is required in order to see the dynamics of inequities in a classroom or to be trusted enough by students as a safe listener for their marginalizing experiences. For this reason, we prioritized the stories that we thought would be the most surprising to or misunderstood by less-inclusive professors, helping provide the student perspective that might otherwise not be shared with them.

Our definition of impactful required a balance between authenticity to student identity and experience and an awareness of which of the student experiences and perspectives would be most worthwhile to share with engineering faculty. The interview protocol first sought to establish trust and rapport with the interviewer and to establish a common language and understanding. To establish a common vocabulary around identities and to elicit thinking, we provided a scaffold of an iceberg or identity wheel containing many identities, including the concept that some identities are more visible and some are less visible (while acknowledging that visibility - or apparentness - is not fixed but depends on context and person). To help establish rapport, we asked students to share as many or as few identities as they felt comfortable with and to tell us stories about one or more of those identities and how they came to understand or find meaning in them. We then transitioned to how these salient identities (or others) influenced their experience in engineering classrooms.

Additional specific challenges emerged as a result of the pilot interview process. Students sometimes felt the first part of the interview (identities salient to their personal selves) and the

second part (identities in the engineering classroom) were disconnected. For example, one of our participants, Leah discussed being non-binary, white-passing Middle Eastern, and bisexual at length in the first part of the interview but did not think that any of those identities were relevant in the engineering classroom. When probed on why she did not think she would ever disclose those identities to an engineering professor, it seemed clear she did not think her professors would be inclusive or understanding. This was not entirely surprising to us given our assumptions about engineering students and inclusion; however, it made the interview somewhat abrupt when trying to discuss her engineering-specific experience. More generally, we had challenges coming to a common language and vocabulary around the identity experiences salient to the engineering classroom. We tried versions of our protocol asking about “engineering culture” or “engineering education” but noted that it was difficult to maintain clarity around experiential aspects of engineering education that intersect both identities and professor or classmate interactions, curricular choices, or other relevant aspects. Less relevant aspects were those that related to contexts outside of or had limited connections to the classroom and therefore have less bearing on faculty understandings. These aspects included student organizations, lack of tutoring opportunities, and financial aid.

The lessons learned for ourselves and for other researchers included the importance of providing substantial time to establish rapport and to pivot between stories and perspectives more important to students and those stories and perspectives more impactful for faculty. For us, this included a second interview for students we wanted to develop narratives with. The second interview allowed additional strategic probing if some categories of experience or details of stories were underdeveloped in the first interview. It also allowed a member-check on our interpretive authenticity of their experience as we iteratively constructed their narratives.

### ***3.2 Goal 2: Synthesizing interview content into narratives***

The next part of the research process was analyzing the interview content using a narrative analysis methodology. While thematic interview analysis dissects participant experiences into cross-cutting themes, we thought the most impactful way to represent participants’ experiences was to preserve the emotion and continuity of the stories they shared in the interviews [36].

Certain challenges, trade-offs, and decisions emerged when trying to construct a concise and coherent narrative. First, narrative can refer to an entire participant’s storied and lived experience [25], but even sharing the entirety of a 1-hour interview transcript is not a manageable resource for dissemination to engineering faculty. Thus, we focused instead on forming discrete smaller narratives with a particular topical focus. We broke the interview transcript content into approximately 10-minute selections of narrative/script, highlighting particular experiences and identities within that selection. This approach allowed us some modularity to how the resources are shared. The shorter narratives can be shared together for a more nuanced understanding of the participant, or they can be shared individually for a specific purpose/topic.

Second, participants’ stories are not typically shared in the most concise or linear way. Student participants would frequently start explaining the present, jump back to the past to provide context, and return to the present, before jumping back to other past events that preceded the prior ones shared. For an audience’s consumption, it is easier to reassemble the events shared in a



chronological or logical order, so that information and context are not missing and filled in later. Our focal pilot participant, Alice, discussed her background and core formation of her identities, including her life before and after arriving in the United States [27]. We identified the chronological order of events she described with us after hearing and reading her responses multiple times. To make the narrative easier to follow as a reader, and to illustrate her journey holistically rather than as a collection of individual replies to interview questions, we reordered the events in chronological order. We then member-checked our reordered narratives for accuracy and authenticity.

Sometimes we found prior context could be distracting or misleading. To narrate the story of how Alice developed a strong identity as an international student, we included a description of her moving several times internationally across seven countries and four continents since the age of nine. Alice noted that this sort of instability also resulted in her developing anxiety and being fearful about the future. While this discussion provides an important backdrop for her multiple identities, we noticed in initial presentations or peer reviews that the background information became distracting to some readers and/or audiences, who wondered if her family was in the Venezuelan military or if they were rich enough to travel frequently. While these were interesting questions, neither seemed to be the right assumption about the participant, and they were not as relevant to understanding the engineering classroom experience. More troublingly, questions about background details sometimes seemed to function to question the participant's experience as marginalized (e.g., whether she should really be classified as an international student). Our experiences constructing these shorter narratives to represent aspects of Alice's experience helped us think more deeply about what information is most pertinent to the messages we want to convey.

### ***3.3 Goal 3: Accessible faculty dissemination that maintains student privacy***

At the heart of this project was the goal to connect student experiences more directly with professors in ways that they do not typically have access to hearing. Since student experiences of marginalization and inequity are private and painful experiences, they may reasonably assume they would never share them with their professors, let alone the broader public. As we create the conduit for connecting student marginalizing experiences directly with professors, we sought ways to retain as much privacy and protection of the student participants as possible.

The literature warns of similar issues in video or audio dissemination. Confidentiality and privacy become major concerns when presenting individual stories through audio or audiovisual formats where a participant may not recognize the consequences or potential harm associated with having their own image, name, or story disseminated in a more accessible way (i.e., one that could "go viral"). Other issues include researcher and participant agency regarding shaping the end product, balancing vocabulary levels and communication styles that may vary across potential audiences (e.g., researchers, participants, audiences), and evaluating the effectiveness and quality of the end product [4, 37].

We particularly focused on protecting student confidentiality and privacy in our research design. We de-identified the student narratives, removing or changing as many details as necessary to protect student identities. We carefully weighed which details were crucial to understanding the

specific student experience and which could unnecessarily compromise the student's privacy. Perhaps our most unique methodological innovation to address privacy concerns, we are partnering with the Florida International University (FIU) Theatre Department to recruit student actors who are re-recording the deidentified narratives. This ensures that even the student's voice (or face, if disseminating video) would not unintentionally reveal their identities. Having the knowledge that multiple levels of member-checking, de-identification, and actor re-recording are in place to protect the privacy and confidentiality of the participants helped us secure Institutional Review Board compliance and conduct interviews without fear of unintentional consequences of publicly sharing those experiences.

### **3.4 Goal 4: Creating high-quality, understandable, and authentic audio resources**

As the entire project focused on attempting this innovative audio dissemination, we needed to ensure the audio narrative resources that resulted from the project were as high quality, understandable, and authentic to the student experience as possible. Secules's prior professional and educational experience in acoustics enabled his exploration of the topic, and the funded grant's advisory board includes members with expertise on podcast audio specifically.

One of the specific challenges encountered was matching the tone and accent of student actors to interview participants. We selected student actors in collaboration with an Associate Professor of Theatre at Florida International University (FIU), and aligned the actor with the participant in terms of gender and approximate age (since both participant and actor are Bachelor's degree students). Although we were intentional about this matching, some listeners later informed us that the actor's accent was not representative of a Venezuelan individual. We also were unsure how to help the actor match the vocal tone and emotion of the interviewee. We annotated the narrative script with indications of tone and emotion for the pilot study, while leaving room for the actor to provide suggestions. For example,

*// The entire passage is very hesitant, tentative, words coming slowly. Extra pauses and upward inflection when introducing ideas like "safety" and "mental health".*

#### **Identity and Formative Experiences**

**Topic #1: "Alice's identity as an international student experiencing insecurity and mental health issues".**

I am Venezuelan, and in this time and age, it means a lot of different things. It means that in order to have a better life; I have to be very, very hardworking. It means that in some ways I am a refugee, escaping for my own wellbeing, for my life.

However, we found that in some places the actor still didn't fully capture the range of emotions the participant exhibited during the interview. Our lessons learned in this regard included the importance of effort around matching gender, age, and accent, but there are some limits to the matching process. In the future, we plan to amend the IRB protocol so that student actors are permitted to listen to interview excerpts to better understand accent, tone, and affect. This

adjustment should not significantly compromise the confidentiality of the students, since participants and actors will not be from the same university going forward.

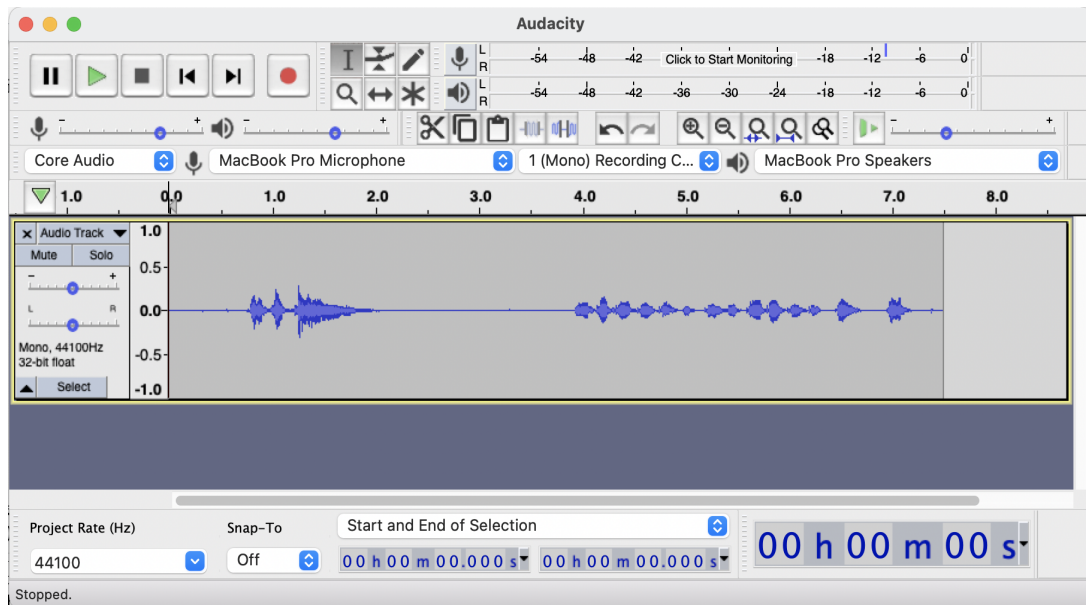
Additional technical challenges or decisions included the choice of audio or video—we thought that video might further increase the immediacy of the narratives shared, but could also make the matching process more significant. If a student reading a script on video did not visually resemble the racial group they were portraying, it would likely lessen the impact of the audio. And, given the limited number of student actors available to facilitate recording, we may not have access to students for one-to-one matching. A compromise we considered in this area is a YouTube cartoon video, which could give a visual impact without relying on the actual student actor's physical features.

The equipment we used was a Zoom-brand video camera [38] with high-quality direction microphones and a high-quality Yeti podcast microphone [39] (Figure 1). Due to piloting the interview during the COVID-19 pandemic and the need for social distancing, we met with student actors in a typically-sized classroom rather than a small office or recording studio. This impacted the audio somewhat, as typical classrooms have more background noise and reverberation. If we had met in a typical office, we would have had some more control of in-room acoustics (e.g., unplugging computers, and the room is already less reverberant), however, some of the noise sources (e.g., HVAC, people passing in the hallway) would still be hard to avoid. We could also attempt at-home or Zoom recording, however, the logistics of sharing and training the students how to use expensive audio equipment would be daunting. Until we find a recording studio to partner with, we will continue to investigate other relatively quiet options for our recording location.

Figure 1: Zoom Q8 HD Camera (left) and Blue Yeti Podcast Microphone (right)



Figure 2: Audacity audio recording software.



We used Audacity ([40], shown in Figure 2), a free audio software, to edit the audio content (e.g., removing ancillary noises) and export the file as an .mp3 to be shared more widely. In continuing to share the content with others, we have noticed that mastering (setting the overall volume setting) is an important step. Some of the audio settings we have played the audio resource in have been so quiet that people cannot hear it over their headphones or speakers. We have budgeted for an audio consultant on the project to help master and curate the audio for different formats, including potential intro music for podcast dissemination. Now that we are aware, we can also investigate this more easily ourselves—playing the audio on a few different platforms to ensure that it is audible at normal volume settings.

We utilized this audio dissemination approach at the 2021 Collaborative Network for Engineering and Computing Diversity (CoNECD) Conference [27] to convey the overarching themes we were capturing in student interviews. Rather than solely presenting quoted text on a slide, we played audio clips for audience members, which enabled them to engage more meaningfully in students' narratives. Because audience members could hear a human voice speaking the words, the audio narratives provided a powerful tool that prompted reflection and discussion in ways different from text-based formats.

#### 4. Implications

In a society that heavily consumes information through video and audio media (e.g., YouTube, podcasts, etc.), the audio dissemination approach described in this paper provides a unique opportunity to make our work more readily available and accessible to promote change. Specifically, it provides a strategy for leveraging contemporary tools to translate research findings into broad impact. Audio dissemination removes a level of anonymity and otherness to remind us that these are the lived experiences of our students, colleagues, etc. For this reason,

this approach can further promote impact by fostering empathy and understanding of others' diverse and marginalized identities that differ from our own.

For researchers, faculty developers, and other stakeholders considering whether to employ audio dissemination in their work, we encourage intentional reflection on the goals, challenges, and implications of the research project and unconventional approaches that could achieve new results. Here, we provide prompts that we found helpful for developing and utilizing audio dissemination in our own work and offer them as points of reflection for others to consider in their own contexts:

1. What are the overall outcomes or goals of the work?
2. What change would you like to see as a result of that work?
3. What institutional, social, and cultural barriers may limit your capacity to employ alternative dissemination approaches?
4. What are the implications of your dissemination approach on your participants?
5. How will you maintain the authenticity or credibility of participants' experiences?
6. What equipment or skills would you need to employ an alternative dissemination approach?

While we provide these prompts as a starting point, we also encourage the engineering education community to expand on this list and further articulate necessary considerations for employing alternative dissemination approaches across contexts.

## **5. Future Work**

We realize that one critique of this dissemination approach may be the uncertainty surrounding faculty engagement with the narratives, particularly among faculty who are not already invested in diversity and inclusion topics. To address this concern, our future work includes working with engineering faculty, faculty developers, and project advisory board members to identify the approaches and outlets that will promote that faculty engagement. As the first step in this work, we are designing a Narrative Dissemination Survey (NDS) to provide faculty members with direct access to students' recorded experiences. The NDS will be specifically distributed to faculty who possess a wide range of knowledge and perspectives on DEI topics, so that impact on less aware faculty can be measured. Subsequently, our multi-pronged dissemination strategy will collaborate with faculty developers and organizations to provide accessible audio resources to as far-reaching audiences as possible. By using this approach, our hope is that we can broaden the reach of the type of faculty who can access student narratives of marginalization and learn from and engage in DEI conversations. We will continue to publish the findings from student narratives, the impacts of the NDS, and ways to access the final audio resources (as podcasts, audio clips, etc.) as the project progresses.

## **6. Conclusions**

Researchers in institutional pedagogical change contend that traditional dissemination of educational innovations does not alone create change, and that there is a significant need for

additional scaffolding and strategies that promote the change initiative [41-42]. Other strategies include approaches for supporting more reflective educators and passing progressive pedagogical policies [41]. We have conceived of one promising research strategy for broadening participation change: disseminating qualitative research on student experiences through media that are more accessible to and impactful for engineering education stakeholders beyond the typical DEI journal-reading audience.

The audio dissemination approach described in this paper was developed to address limitations of traditional forms of dissemination that slow translations of DEI research to practice and to capitalize on the burgeoning use of audio media in our society. Moreover, this approach was informed by our own assessment of the state of DEI research in our field, its patterns, and impacts, including our own prior work [25, 26]. We recognize that this approach is likely not a ‘silver bullet’ that will address all issues related to research dissemination and practical impact. While we find broad, frequent statements of a desire for change, these calls are most often met by enactments of traditional and ineffectual research dissemination approaches. Broadening participation researchers need to try something different; amplifying marginalized and minoritized students’ voices in engineering is a good place to start.

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