

**Pre-Service Teaching Candidates Reflect on Science Identity through Narrative Podcasting**

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**Abstract**

This case study was completed in Fall 2021 with elementary and middle grades pre-service teaching candidates. The goal of the study was to engage candidates in storytelling and reflection of their science identity. Science identity is important as science discourse is historically not diverse. Candidates completed a narrative podcasting assignment within their science methods coursework that asked them to draw upon their experiences. Students were then invited to participate in a focus group during which the authors gathered more insight regarding the candidates' previous experiences and ideas for future teaching. Carlone and Johnson's (2007) Model of Science Identity was used as a framework for this study, which conceptualizes science identity within three intersecting components of *performance*, *recognition*, and *competence*. Conclusions and implications include using reflection in coursework to increase candidates' awareness of bias, support their science identity development, and investigating how narrative podcasting can impact current teaching practices.

*Keywords:* teacher education, identity, science education

Teaching is a dialogic endeavor; practitioners constantly dialogue with a myriad of factors, including personal beliefs and lived experiences; they must negotiate the reverberations of personal ideals and teaching philosophies with authoritative forces and dominant trends in making the daily decisions of designing and implementing instruction (Gierhart & Seglem, 2021). In recent years, science and scientific progress has been countered by political skepticism, misinformation, and disinformation (Avraamidou & Schwartz, 2021), making the work of science educators even more complicated and confusing.

Podcasting assignments and engagement may strengthen and amplify candidates' voices (Gonzalez et al., 2021), which holds increased value for students who have felt left out or jaded by their past science education experiences. Classroom practitioners draw upon a lifetime of experiences across personal and academic experiences in how they conceptualize and design instruction and make the daily decisions of teaching (Britzman, 2003). By 'performing' their stories and science narratives in a public-facing form of media, they can disrupt dominant forms around who can be part of the larger discourse of science forging greater equity in postsecondary education settings (Conquergood, 1995). Perhaps even more importantly, candidates can begin "Designing [revised] social futures" (New London Group, 1996, p. 81) and tell new 'stories' of science for themselves and their future students, navigating feelings of frustration or discomfort (Varghese et al., 2019).

The purpose of this study was to understand how candidates in our science methods courses developed insights about their science identities as they relate to current and future teaching through the completion of a narrative podcasting assignment. While most science identity research has focused on students' intentions for pursuing a science-related career, there is little research in the area of science identities and how candidates perceive their science identities (Stets et al., 2017). Podcasting, as a form of contemporary media production, is a fruitful area to research as an approach for teacher education and professional identity development given how identities have become increasingly mediated by social media and digital technologies, especially when identities may seemingly clash across sociocultural contexts (Bates et al., 2020).

The research question for this study was: How do elementary and middle grades pre-service teaching candidates develop insights about their science identities through planning and recording narrative audio podcasts?

### **Literature Review and Framework**

Carlone and Johnson's (2007) Model of Science Identity was used as the theoretical framework for this study. This model frames science identity within the three intersecting components of *performance*, *recognition*, and *competence*, all of which are mediated by one's core identities of race, ethnicity, and gender. This framework has been widely utilized in science and STEM identity research and scholarship since its publication and, according to Google Scholar, has been cited over 2,000 times as of this writing.

One scientifically *performs* by engaging in science practices (Carlone & Johnson, 2007), acting and being scientific within the conventions of the scientific community (Gee, 2015b). Engaging in this "identity work" is impacted by "historically legitimized norms, rules, resources, and practices that play a role in the cultural production of what science is and what it means to be a science person" (Calabrese Barton et al., 2013, p. 66). Candidates can increase their pedagogical self-efficacy and motivation to engage in science through authentic, real-world experiences, such as science-oriented service-learning projects (Roberts et al., 2020) or authentic science inquiries (Gierhart, 2022).

Closely related to performing one's identity is receiving *recognition* as being scientific (Carlone & Johnson, 2007). Students may participate in the "big D Discourse" (Gee, 2015a, p. 2) of science by engaging in authentic scientific inquiries, developing understanding of what scientists do, how they do it, and receiving feedback and recognition as being 'scientific' (Lucas & Spina, 2022). Receiving recognition can prove challenging for those attempting to enter or

seek induction into a specific community if their other core identities are not viewed by current members as a ‘fit’ (Teng, 2019) on top of how teachers’ personal and professional identities may conflict with expectations in public education settings (Gee, 2017). Acceptance is also subject to biases and hegemonic norms, including current politicization of scientific knowledge (Avraamidou & Schwartz, 2021).

Science discourse has historically been prohibitive of the equitable participation non-White and non-male populations, especially when considering the disparities of sociocultural and gender representation that have persisted in science and STEM programs of study and career paths (Fry et al., 2021; National Science Board, 2021). Possessing a steadfast science identity, especially by those who are racially or ethnically diverse, can contribute to persistence and achievement (Chen et al., 2021). Rodriguez et al. (2022) noted that peer networks and organizations can “address issues specific to [one’s] experiences and roles” (p. 195) to support identity development.

Finally, *competence* is demonstrated through “knowledge and understanding of science content [which] may be less publicly visible than performance” (Carlone & Johnson, 2007, p. 1191). While social recognition is critical to developing a science identity, one must also develop “self-recognition [through] deep understanding and alignment with the learning of STEM concepts [and understanding] one’s place within the STEM community” (Rodriguez et al., 2017, p. 13). Educators feel more agency if they are involved in making decisions that impact daily classroom work (i.e., curricular revisions, school policies) (OECD, 2020). Specifically regarding science, candidates should understand what it means to be scientific (Gee, 2014) by engaging in scientific inquiry themselves (Gierhart, 2022).

Professional identities, such as being ‘scientific’ or a ‘teacher of science,’ may be challenged by how policies are created and implemented, especially if those policies clash with one’s professional or sociocultural identities (Karousiou et al., 2018). Historically, females have been adversely impacted by dominant norms in science and STEM discourses and made to feel that they would not be as successful in advanced coursework (Educational Research Center of America, 2016), resulting in less representation and participation in these types of career paths (Fry et al., 2021; National Science Board, 2021).

As a multimodal teacher education activity, narrative podcasting was a fruitful approach to foster candidates’ reflection on science and science education experiences, expressing components of their science identities (Norsworthy & Herndon, 2020). They were able to look back on their time as K-12 science learners and project towards their future teaching and the ways their students would engage in scientific inquiry (Muchnik-Rozanov & Tsybulsky, 2021). Furthermore, podcasting is an effective way to share stories across networked spaces, including those relevant to matters of practice, social issues, and coursework (Hatfield, 2018).

Also, through multimodal, nontraditional approaches in teacher education coursework, such as podcasting, students can construct “aesthetic” (Eisner, 2005, p. 96) understanding of their past experiences with science and science education and how they can reframe their students’ science narratives as a central emphasis in their instruction. By telling their stories, the candidates constructed meaning of how they scientifically performed, were recognized, and felt or demonstrated competence (Gierhart, in press). Finally, finding and exercising one’s professional voice in authentic, meaningful ways is critical to successfully inducting and retaining candidates in the teaching profession (University of Georgia, 2022) and creating more

welcoming, polyphonic working environments for practitioners (Naot-Ofarim & Solomon, 2016).

### Research Design

In Fall 2021, we implemented a podcasting assignment with elementary and middle grades pre-service teaching candidates that we developed during a professional development fellowship. In this assignment (Figure 1), we sought to leverage a popular form of contemporary digital media production—podcasting—as a means of engaging candidates in narrative storytelling and reflection. Recording and publishing narrative podcasts allowed the candidates to share their science and science education experiences, reflecting on how they intended to teach science with *their* current and future students (Gierhart, in press). We refer to the candidates' recordings as *narrative podcasts*, in that they are using this digital media format to tell stories they perceived as particularly impactful on their journeys within the discourses of science and science education (Webster & Mertova, 2007).

### Figure 1

#### *Podcasting Assignment*

### Science Narrative Badge

**Purpose:**

- Record a short audio podcast in which you relate and connect your narrative and identity as a scientist to a specific scientist, social issue, and/or previous teacher you had as a science student.

**Description:**

- Each of us has had different experiences across our life journeys. Regarding science, we have had experiences with science as students, educators, and individuals. It is important that you become more comfortable in wearing the identity hat of a 'scientist' to inspire the students in your future classrooms to see themselves as scientists.
- In this assignment, you will share a portion of your narrative (i.e., story) and relate/connect it to a specific scientist and his/her work and/or a social issue that you can relate to your experiences in some way.
  - If you feel strongly about basing this assignment around one or more specific science teachers you had as a student in the past, that is acceptable as well.
- An episode of NPR's *Short Wave* podcast titled "[The Science Behind Storytelling](#)" will be assigned as required 'reading' prior to Course Meeting 10. Please consider listening to this earlier to better understand this assignment and hear examples of science narratives.
- You will present your narrative as a 'podcast' audio recording. Consider using an open source digital recording tool such as Vocaroo.
  - Students from past sections of this course have agreed to share their [Science Narrative recordings as exemplars for your reference](#).
  - If you would like your recording featured on Dr. Gierhart's "Journeys of Teaching" podcast feed to share your story with a wider audience, please let him know.
- We will have a Science Narrative Workshop in which you will have class time to complete this assignment and workshop ideas with peers and Dr. Gierhart.

In preparation for this project, we assigned the candidates episodes from Aaron's seasonal *Journeys of Teaching* podcast as 'required readings' in which guests shared stories and discussed how they developed their current teaching practices. We also required them to listen to a 2020 episode from NPR's *Short Wave* podcast, "The Science Behind Storytelling," which positions storytelling as a way to make others' lived experiences in science and science education more relatable.

Candidates worked independently or in groups to write an outline before recording their podcasts on Vocaroo (an open source recording tool). They shared ideas with instructors and peers to receive feedback, discussing what their stories meant to them and how they wanted to narrate them in their podcasts (Evans et al., 2021). The students invested about 2-3 hours of time between planning, discussing, recording, and sharing their podcast recordings; some chose to include intro/outro music and do some editing so that their episodes were more professional-sounding, though this was not a requirement for the assignment.

While all of the participants in this study chose to publish their recordings on Aaron's *Journeys of Teaching* podcast feed, they were not required to do so. The value of this assignment was not necessarily having an authentic audience - though this was perceived as motivating for the participants and a chance to engage in public-facing advocacy (Guggenheim et al., 2021) - but rather an opportunity to engage in a discourse in a safe environment about the profession they sought to enter and a content area they would teach (Bjorkland, Jr., et al., 2020). This project aligns with Standards 4 (Professional Development) and 7 (Public Advocacy) of the Association of Teacher Educators (2008) Standards for Teacher Educators.

Recording and sharing - either amongst their peers and instructor or with a wider audience - their stories allowed the teaching candidates to reflect on the positive and negative

experiences they have had with science and science education they will draw upon as they design and implement instruction with their own students in the future. Science education is part of the larger discourse of science, which is framed by specific norms, practices, and power structures that result in individuals being accepted or rejected to varying degrees (Lave & Wenger, 1991).

A single case study was conducted in order to describe and understand the candidates' podcasting experiences in our elementary and middle grades science methods courses during the Fall 2021 semester at a mid-sized state university in Georgia (Yin, 2010). Students were informed that their decision to participate in this study would not impact their course grades (Glesne, 2010). All participants were assured pseudonyms would be used after initial data collection.

We purposively solicited candidates enrolled in our courses to participate in this study due to their completion of the focal assignment (Andrade, 2021). Studying a single case, as opposed to conducting a multiple case study, allowed us to more immediately examine the candidates' experiences and learning outcomes of this assignment to inform our own future practices and coursework design efforts (Merriam & Tisdell, 2016). Also, case study research has the potential to make the experiences and challenges of specific groups more comprehensible to those in positions of authority, informing future decisions and efforts (Teram & Ungar, 2017).

Ultimately, three total candidates between our two courses consented to participate; Annie and Tommy were enrolled in Aaron's elementary science methods course, and Laurie was enrolled in Jessica's middle grades science methods course. The elementary education candidates (Annie and Tommy) were enrolled in a block of undergraduate coursework in the Fall 2021 semester requiring 90 field hours in an elementary classroom.



The middle grades participant, Laurie, was a Master of Arts in Teaching student who was enrolled in a science methods section cross listed with an undergraduate course. She completed 60 field hours in a middle school classroom. Participant demographics are included in Table 1.

**Table 1**

*Participant Demographics*

Name	Age	Race	Gender	Program of Study
Annie	21	White/Caucasian	Female	Elementary
Laurie	42	White/Caucasian	Female	Middle Grades
Tommy	40	White/Caucasian	Male	Elementary

Multiple data sources were collected to describe the case with validity and rigor (Yin, 2017). Each participant's podcast was transcribed and relevant work samples from their coursework were referenced, as needed, to corroborate or reframe later analyses (Song, 2020).

Additionally, a 45-minute focus group interview using a semi-structured protocol with open-ended questions was conducted and transcribed at the end of the Fall 2021 semester. The purpose of the focus group was to gain additional insight about the participants' experiences of preparing, recording, and publishing their podcasts and the insights they developed about their science identities (Lahman, 2022). Follow-up questions were posed, as needed, for additional probing (Cyr, 2019).

The transcripts were coded in three rounds of increased specificity to better understand the case (Chalkey et al., 2022; Williams & Moser, 2019). We began with open coding by annotating and highlighting hard copies of the transcripts, followed by axial coding in which the initial codes were revised and organized in a digital spreadsheet. Finally, selective coding was

conducted, applying Carlone and Johnson's (2007) Model of Science Identity deductively to describe the ways participants perceived and expressed their science identities through *performance, recognition, and competence* (Flick, 2022). Select transcriptions of the participants' podcasts and responses in the focus group are included in the "Findings" section to illustrate results (Lahman, 2022).

### **Limitations**

Identity research sometimes uses purposive solicitation and respondents are chosen subjectively, which can lead to a smaller sample size (Klar & Leeper, 2019). This research was limited by sample size as only a single case of three agreed to participate and results are only generalizable to this group of participants. It would be ideal to repeat data collection with future cases of teaching candidates who complete the podcasting assignment to strengthen the validity of findings (Merriam & Tisdell, 2016). However, learning from the stories of these participants can be helpful in understanding specific lived experiences as they relate to supporting teaching candidates' development of science identity along with pedagogical content knowledge (Clandinin & Connelly, 2000; Gierhart & Seglem, 2021).

It can be assumed that all candidates in this single case had similar experiences with higher education courses (science and otherwise) due to being enrolled at the same institution (Flick, 2022). Our methodology is similar to other identity research studies, though we chose to collect oral narratives as opposed to written ones (Adler et al., 2017).

### **Findings**

The research question for this study was: How do elementary and middle grades pre-service teaching candidates develop insights about their science identities through planning and recording narrative audio podcasts?

Since this article is in a written format, it is important to depict the content of the audio podcasts each participant published as well as their experiences of planning and recording them. Therefore, each participant's podcasting experiences will be presented with references to how they expressed or reflected on the *performance*, *recognition*, and *competence* of their science identities (Carlone & Johnson, 2007). Findings will be summarized and disseminated in the "Conclusions and Implications" section.

### **Annie**

Annie recalled her experiences as a middle and high school science student when she began to lose interest in science:

I began noticing in middle school that my teachers would start leaning more towards lecturing. In freshman year, my teachers would [lecture and] move on to a new topic until it was time for a test. After the test, that process would start over. When I was in high school, I think we only did two experiments. I would find myself bored in science class because we always knew what was coming and that pattern never changed. It made me feel sad because [I] always enjoyed science [in elementary school], and now I was finding myself almost dreading coming to science class. I don't want my [elementary] students to ever feel like I did.

In the field, Annie noticed science was deemphasized compared to other elementary content areas. "It kind of breaks my heart," Annie noted on her podcast, "because students are not getting that interest sparked."

Annie perceived her science competence as low, based on her middle and high school experiences coupled with her waning interest over time. However, she concluded her podcast by expressing a resolve to be better than her own middle and high school science teachers:

I wanna' spark my students' interest and love for science like my elementary teachers did. But I also wanna' make time for science and include the hands-on aspect so students can get involved and don't [feel] bored. I wanna' create these very meaningful science lessons so that my students are getting more out of it than just knowledge.

In the focus group, Annie explained that talking through her podcast plans and stories with her peers was helpful, providing recognition of the value of her stories. "I remember one of [my classmates] told me [to share] an experience related back to [my] topic," Annie recalled. "Tommy [also] helped make me more comfortable and confident with what I was talking about" (personal communication, December 6, 2021).

Annie was not going to initially publish her podcast; however, she decided that if someone "had a similar experience, they could relate to [my story] and [realize that they] could do something, even small, [to] help students have a better [science] experience" (personal communication, December 6, 2021).

In an end-of-semester written reflection, Annie described her intention to utilize non-traditional assessment approaches in her science teaching:

I can relate to [traditional testing cycles] personally and that is why I do not want to have my classroom operate this way. It takes away so much from the learning experience that students have. I do not want my students to feel bored or feel as if science is rushed or not important. It does not need to feel "routine."

Annie transferred this resolve to her field-based teaching, as she designed and implemented a hands-on lesson with first grade students in which they simulated water cycle phases using shaving cream, food coloring, and water. Despite perceiving low competence based

on her past science experiences as student, Annie performed her science identity through teaching, resolving to *break the cycle* of uninspired science teaching.

### **Laurie**

Laurie began her podcast by sharing that she was not a great student during her school years until she developed a love and competence for science:

To put my feelings around science simply would be to say that I love science. I was a difficult student for my teachers, and I always felt like I couldn't do well in school. Once I found science class, that all changed. This was my place to shine. It was one of the few classes that would hold my attention, and I would actively seek out more information to learn on my own. I learned through science that connections can be made to science everywhere.

During the focus group, Laurie explained that her love of science continued to flourish when working towards an Animal Science postsecondary degree, mentioning, "I definitely do view myself as a scientist and I think we're all born that way" (personal communication, December 6, 2021).

On her podcast, she went on to speak towards middle grades students and her self-perceived competence as a science educator:

By the time the students meet and reach the middle grades, they've had many science experiences — some good and some bad. So, my job is to ensure my students make the connections to science and confidently put themselves in the role of a scientist. Students are trying on different hats, trying to define themselves, and their sense of wonder and exploration is changing. I want to [harness] that energy and openness of these students and help them develop the skills needed to continue on their scientific journey.

Later in her podcast, Laurie discussed the value of students making connections to relatable scientists, noting that “students will relate to scientists who are similar in background. [They] also greatly benefit from seeing a diverse group of scientists.”

Laurie then connected her experiences and opinions to her role as a science educator: Science goes beyond the acts of observation and conclusion. It’s failing, discovery, and learning how to process the information that comes our way. So, here’s my chance to help students to organize their methods and create structure in their processes.

Laurie completed her podcast by affirming her passion for science and students stating, “I hope that [my] passion sparks wonder and a continued love of the sciences and provides a home for my students to shine.”

Throughout the focus group, Laurie mentioned how her partner at home encouraged her reflection on her background for this assignment. Jessica gave Laurie similar feedback when discussing initial plans for the podcast. Laurie mentioned one detail she omitted from her podcast, because it helped shape her as a scientist: her connectedness to nature (this information was shared during the focus group but she was not comfortable sharing it associated with her real name with a larger audience). Laurie’s background and connection to nature was evident in her coursework as she created lessons that allowed students to work outside and do investigations in nature.

### **Tommy**

In his podcast, Tommy recounted his experiences with his son, who is on the Autism spectrum, and reflected on the type of science teacher he aspires to be:

When we’re teaching science, you really [need] more [investigations]. You really have to do a lot of collaborations, observations, data [collection]. A neurotypical student can

handle all these processes. An atypical student might have issues in different areas. When it comes to sensory issues, we have to start thinking about how these students [are] going to collaborate with others if they have issues communicating in general or deal with their sensory issues. Or what if working in groups is just too much for them?

Tommy provided more context in his podcast about his family's journey with his son and how they have learned to support his needs:

We got him into Applied Behavior Analysis, speech therapy, and occupational therapy. So, all those things were just very individualized for him to be as successful as he's become. If he didn't have those tools and those resources, he wouldn't be doing as well as he is. And so I'm carrying that mentality over to teaching [because] I want to have a classroom that is inclusive. (personal communication, December 6, 2021)

Tommy explained that he published his podcast to share his experiences with other parents and educators, showing them the importance of individualized support and accommodations:

These [supports] aren't necessarily a negative thing. [They] are just [ways] of helping every child. Even if they have a learning disability or a physical disability whatever the case may be, all students are different in some way. If we can just get people [to] look at kids, [we can ask], "How do we help them individually?" (personal communication, December 6, 2021)

Tommy received recognition from his peers and Aaron in class as he prepared his podcast regarding the validity of the stories and how he applied them to his future teaching:

Obviously me and Michael (pseudonym) have a pretty good friendship, and I would bounce a couple of ideas off of him. Of course I [shared] ideas [with] Dr. Gierhart. I felt

that my direction was going to be [about] how passionate I am about my son and making sure that those types of kids get a fair shot. (personal communication, December 6, 2021)

Tommy incorporated his resolve for supporting diverse science learners' needs in an action plan assignment, reflecting on how he would apply the Universal Design for Learning (UDL) Guidelines (CAST, 2018) in his future teaching and classroom environment. He noted, "The reason I want to be a teacher is to help make the lives of my students better. [UDL] is a great way for me to assess myself on creating an inclusive environment."

### **Discussion**

The three participants reflected on and expressed their science identities in terms of performance, recognition, and competence. We will discuss findings from each of these components of Caroline and Johnson's (2007) Model of Science Identity. Finally, we will detail the conclusions and implications of this study.

### **Performance**

Each candidate discussed the concept of performance, considering how they would use hands-on science learning experiences with their current and future students. Annie implemented a hands-on lesson with first grade students in which they simulated the water cycle. Laurie remembered her science education experiences being an opportunity to feel inspired and successful and develop methods and process skills for engaging in the sciences. Tommy drew upon his experiences as a parent to his son and resolved to foster equitable science participation with all of his students.

Taking time to reflect upon and share experiences candidates perceive as critical to their 'relationships' with academic content is critical, as these are the stories they will draw upon, consciously or otherwise, in making the daily decisions of designing and implementing



instruction (Gierhart & Seglem, 2021). Regardless of the decision to publish, the intentional, explicit act of planning and committing their stories to recorded audio can serve as an opportunity for making sense of their experiences with different areas of the curriculum (Hatfield, 2018; Norsworthy & Herndon, 2020). By telling their stories, they acknowledge their own performance of science, recognizing their place in the fields of science and science education (Gee, 2015b; Gierhart, in press).

It is also noteworthy that each participant connected their stories to their current and future teaching, expressing intentions for designing and implementing impactful and inclusive science instruction. Annie and Laurie, in particular, transferred goals they expressed on their podcasts towards the facilitation of engaging, hands-on science inquiry in the field during that same semester.

### **Recognition**

Laurie implicitly shared feelings of recognition of her science identity through her previous science education experiences, eventually earning a postsecondary science-oriented degree; however, the participants did not share stories or reflections about recognition of their science identities in terms of being explicitly scientific.

Yet, each participant recalled feeling recognition from their instructors and peers during course meetings as they prepared their podcasts prior to recording. They shared ‘drafts’ of the stories they wanted to tell and received feedback from their instructors and peers about the value of their narratives and how they might narrate them. By receiving recognition and feedback about their narratives, they were able to view themselves as part of the larger discourse in the science and science education communities (Teng, 2019), reinforcing their identity development as science educators (Rodriguez et al., 2022).

### **Competence**

The participants expressed their scientific competence through experiences that they perceived as foundational or impactful, particularly during their time as science students. Annie did not see herself as being scientific, disenchanted by the cycle of lecturing and tests during her middle and high school years. Conversely, Laurie perceived herself as a challenging student, eventually finding her niche in science classes and earning a postsecondary science degree. Despite divergent science education experiences, both women pledged to ensure their future students would develop a passion for science.

Each participant elected to publish their podcast, noting that they were motivated to share their stories with a wider audience to potentially make a difference in how listeners perceive science education (Guggenheim et al., 2021). These individual decisions to publish are indicative of feeling enough of a sense of competence to position their stories within the larger, public-facing discourse of science education (Rodriguez et al., 2017). This was particularly notable for Annie, who felt jaded by science after her less-than-engaging experiences during her middle and high school years and found a new resolve for teaching science in hands-on, engaging ways (Karousiou et al., 2018).

### **Conclusions and Implications**

Findings from this case study are not generalizable beyond the sample of three participants; however, the stories they shared in their podcasting assignment reinforce the importance of reflection in pre-service teacher education coursework. All participants in this case reflected upon their experiences, connecting them to current and future teaching (Muchnik-Rozanov & Tsybulsky, 2021). Having teacher candidates recognize and explore their biases may

foster a generation of teachers that are more aware of the *why* behind their pedagogy (Gierhart & Seglem, 2021).

A primary goal of teacher education is to prepare future *professionals*; however, elementary and middle grades teaching candidates are often charged with teaching multiple content areas and must be prepared to facilitate their students' engagement in the discourses of those disciplines. The discourses of science and science education have historically excluded non-White, non-male individuals from equitably participating (Fry et al., 2021; National Science Board, 2021). Allowing teacher candidates to gain experience with science discourse, while reflecting on their own experiences, may very well support their facilitation of more equitable science learning experiences for future generations of students.

Podcasting as a form of reflection can support identity development within and across content areas as they project towards future action in clinical settings (Muchnik-Rozanov & Tsybulsky, 2021). Podcasts are an easily recorded and shared form of contemporary digital media, conducive to active student engagement; candidates are aware of a potential or intended audience without having to speak in front of that audience in real time (Bjorkland, Jr., et al., 2020; Thomas, 2017). In addition, they can speak out in favor of or against their previous experiences with science and science education, advocating for teaching approaches that effectively engage and motivate students (Guggenheim et al., 2021) and disrupting dominant preconceptions and who can be 'scientific' (Conquergood, 1995; Gonzalez et al., 2021).

We recognize that this study was limited to a single case of three participants (Merriam & Tisdell, 2016), which limits the generalizability of the findings of this research. However, by sharing the design of the podcasting assignment and outcomes perceived by the teaching candidates' themselves, other teacher educators and educator preparation programs can utilize

this study as a framework for similar assignments and projects (Teram & Ungar, 2017).

Conversations students have as they plan their podcasts before recording are incredibly valuable as they reflect on stories they want to share, how they want to narrate them, and what the stories mean to them as they consider their future work as science teachers (Evans et al., 2021; Hanna et al., 2020).

Podcasting can bolster students' voices (Gonzalez et al., 2021), especially those who may have been previously silenced or excluded from science discourses. Approaches to teacher education, such as the public-facing podcasting assignment we have described, are socially just and culturally relevant, allowing teaching candidates to engage in "performance as kinesis" (Conquergood, 1995, p. 138) and disrupt hegemonic norms in the discourses of science and science education. It is critical that teacher educators provide opportunities for candidates to examine and forge their own professional identities, which are constructed and situated in a social, dialogic manner, amongst the discourses of content area communities (i.e., science) (Eisner, 1979).

While this investigation explored the identities of future science educators, future research could be completed to understand how certified science educators view their identities. Teacher preparation programs may benefit from understanding how the identity built through science experiences, even at the postsecondary level, can impact pedagogical practices throughout one's career. Researchers and practitioners should also investigate how narrative podcasting can impact observed classroom teaching practices with an emphasis on equitable science teaching and learning.

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