

Students as science communicators: using podcast creation and reflection via collaborative autoethnography to develop students' science communication skills

Nicole C. Kelp,¹ Georgina Concha Paredes,² Lauren Ea,² Kate McCollough,² Leonie Weber,² J. Phil Gibson²

AUTHOR AFFILIATIONS See affiliation list on p. 11.

ABSTRACT Undergraduate science students will have opportunities, in their personal lives and future careers, to be science communicators. However, they must be trained in effective approaches to science communication. One medium by which students can engage in science communication is via podcasts, which are a tool for both science communication and science education. While there have been studies analyzing the impacts of podcasts on audiences, there is less examination in the literature of how the process of producing a science podcast influences the podcaster themselves, especially for student podcasters. Thus, in this article, we present a curriculum in which a group of student podcasters developed science podcasts about topics relevant to key concepts in biology and microbiology education, such as evolution as applied to antibiotic resistance. The students applied concepts of strategic and inclusive science communication to iteratively develop their podcasts. The second critical component of the curriculum is students engaging in collaborative autoethnography in order to reflexively consider how developing a podcast impacted them as developing science communicators. Thematic analysis of focus groups and student reflections revealed key themes about how students applied evidence from the science communication literature to their science podcasting process and about how students grew as scientists and science communicators during the process. This study provides insights for training of undergraduate science students in reflexive practice in science communication that is applicable to their future careers. Instructors can utilize the science podcast creation and/or collaborative autoethnography components of this curriculum in order to help develop their students as science communicators.

KEYWORDS podcast, science communication, reflexivity, collaborative autoethnography, thematic analysis

Students as science communicators

There have been calls for undergraduate science students to be trained in science communication, and communication is a core skill in Vision & Change (1, 2). However, students often do not have the training to engage in effective communication tactics to connect with audiences (3–5), and students often have higher motivation to communicate than opportunities to do so (6). Additionally, when students are trained in science communication, it is often in only the skills for unidirectional dissemination of information rather than in the skills for inclusive, collaborative, and reflective practice of science communication (7). Thus, we aimed to develop a science communication training program that gave students training in inclusive and effective approaches for science communication according to the research literature in science communication; gave students opportunities to practice science communication; and promoted students' reflection about their science communication. In this curriculum, we gave students a

Editor Jeanetta H. Floyd, Georgetown University, Washington, DC, USA

Address correspondence to J. Phil Gibson, jpgibson@ou.edu.

The authors declare no conflict of interest.

Received 19 September 2025

Accepted 14 January 2026

Published 10 February 2026

Copyright © 2026 Kelp et al. This is an open-access article distributed under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

structured opportunity to learn about evidence-based science communication, develop science podcasts, and then reflect upon the experience via the process of collaborative autoethnography (CAE).

Podcasts as a form of science communication

Podcasts have recently increased in popularity (8), both as tools for science communication (9) and science education (10). Storytelling and learning by listening are ancient pedagogical practices that can promote rich learning experiences to construct knowledge (11–13). Podcast producers use storytelling to leverage features and affordances of the medium and attributes of different genres to generate creative expressions of information that engage their audience in specific ways beyond a basic lecture recording (14). Thus, like case studies, podcasts are not just stories, but stories with an educational message (15).

While there have been various explorations of the impact of podcasts on public audiences (16) and student audiences (17–24), there has been less exploration of how creating podcasts influences the podcaster as a science communicator. One study surveyed 147 science podcasters in terms of strategic science communication, using the Theory of Planned Behavior (25, 26), and analyzed their science communication goals, objectives, and tactics (27). This study showed that podcasters' main objectives were eliciting excitement and interest in science. This study also found that podcasters do not often use strategic communication planning to guide their communication tactics (27). This highlights the need for both more science communication training for science podcasters, based on research and theory in science communication literature, as well as more research studies beyond Yuan and colleagues' excellent work to analyze the goals and perspectives of science communicators.

Students as science podcasters

While previous studies have mainly focused on science podcasters who are post-graduation professionals, undergraduate students are an intriguing group to study as science communicators. Students are more diverse than science faculty and can serve as boundary spanners who connect with their own communities as well as scientific communities (5, 28). Additionally, engaging in science communication increases students' identity and self-efficacy as scientists (29, 30). Students are also just learning and processing content, and communicating about this content with others via podcasting can help them learn the content. Writing-to-learn has been shown to be useful for student learning in science (31), and podcasting may similarly be a way for students to solidify their knowledge of scientific concepts through a form of communication.

Thus, in this curriculum, we aimed to give students the opportunity to receive training, practice, and reflection as science podcasters. Science podcasting has been used as an assignment to teach science communication in some previous studies (32, 33). In particular, a study focusing on master's students focused on their reflexivity in science communication as podcasters (34), but such investigation has not been conducted at the undergraduate level. We built on these and other studies in the podcasting literature to design a curriculum in which we trained students in inclusive science communication and strategic science communication, had students reflect on their experience creating science podcasts, and then performed collaborative autoethnography to analyze their individual and collective experiences.

Strategic science communication

As mentioned above, strategic science communication has been conceptualized using the Theory of Planned Behavior, which highlights how behaviors are influenced by people's self-efficacy, attitudes, and subjective norms about the behavior (26, 35). Importantly, science communicators should think both about their behavioral goals and about the goals they may have for the audience. We have previously found that students

often do not think about planning their intentions for science communication (36). Thus, we trained our student podcasters in the importance of considering the strategy for their science communication and why they were choosing the podcast storyline they developed. This aligns with concepts of metacognition in learning theory, which describes how students think about their knowledge and skills, as well as how they use tactics to regulate what they know and can do (37). The ability of science communicators to plan their strategies in science communication and make adjustments is critical for effective communication.

Inclusive science communication

Inclusive science communication highlights the importance of diverse perspectives in conversations about scientific issues and the importance of promoting equity in science communication (38–40). The key tenets of inclusive science communication are intentionality, reflexivity, and reciprocity (39). Intentionality refers to choosing communication goals that are inclusive and aimed to promote collaboration, equity, and multiple voices being heard. Reflexivity refers to the communicator reflecting on their identities, goals, and potential biases in their communication. Reciprocity refers to mutual collaboration in solving socioscientific issues (39, 41). These tenets are in contrast to the deficit model of science communication, which focuses on unidirectional delivery of simplified scientific information in order to fill a public deficit of knowledge about science and includes the assumption that, when the public understands science, they will support it (42–44). Podcasts can often be aimed to fill these public deficits in knowledge about complex science. Instead, podcasts should be more inclusive, focusing on the stories of diverse scientists and community members who all have important contributions to scientific discoveries and solutions. Thus, we trained our student podcasters in inclusive science communication in order to explore the use of podcasting in inclusive science communication.

Collaborative autoethnography

Collaborative autoethnography (CAE) engages a group of researchers to pool their lived experiences in a social phenomenon (45). As CAE promotes diverse perspectives and reflexivity, it aligns well with inclusive science communication (46). The CAE process involves collective and individual reflection on the key themes of experiences during a research process. CAE is particularly transformative for people, such as women and people of color, who have been traditionally excluded from conversations about science (47). In this particular study, author N.C.K. is a science faculty member who does teaching and research in inclusive science communication and was responsible for science communication training sessions and guiding the collection of information for the CAE. Author P.G. is a science faculty member who creates science podcasts, analyzes their impact on student learning, and was responsible for the podcast development and production training facets of this work. Authors G.C.P., L.E., K.M., and L.W. are students who were tasked with creating podcasts for their peers. These authors worked collaboratively to reflect on their experience as science podcasters.

Communication about socioscientific issues

Socioscientific issues are complex issues intersecting science and society, in which there are multiple perspectives and ethical and moral considerations involved. Engaging with socioscientific issues is critical for students to develop functional science literacy (48–51). Storytelling is a useful method for communicating about socioscientific issues (52), and as such, the storytelling approach in podcasting (53) engenders this science communication tool to be useful for engaging with socioscientific issues. Thus, student podcasters in this study created podcasts related to socioscientific issues in which their classmate and public audiences would be interested.

Intended audience

This curriculum is designed for undergraduate science students. We worked with upper-level microbiology and botany students, but other subjects or levels would be appropriate.

Learning time

The students spent 1 h per week in group podcast production meetings and an additional hour each week in individual meetings for a semester. Students also received a 1-hour training on science communication at the beginning of the process and engaged in two 45-minute focus groups at the middle and end of the semester to reflect upon their science communication experience. While we ran this curriculum as an extracurricular program, it could easily be run as a 1- or 2-credit course.

Prerequisite student knowledge

Students need to have taken coursework relevant to the topic of the podcast they are creating. However, students do not need to be experts in every aspect of the specific topic—students can learn throughout the podcast production process.

Learning objectives

We intended for students to be able to do the following by the completion of this project:

1. Design a podcast narrative for an intended audience.
2. Utilize strategic and inclusive science communication principles in science podcast creation.
3. Reflect upon your science podcast creation experience via collaborative autoethnography.

PROCEDURE

Materials

We utilized an audio recording studio for podcast creation. Recordings were made using a RØDE Pro II mixing board with RØDE podcasting microphones and studio-quality headphones. Audio was recorded and edited using Audacity, a free audio software package available for download. However, this curriculum could be run in a more low-tech way, with students capturing audio recordings on their phones or computers using software such as GarageBand, Teams, or Zoom.

Faculty instructions

Faculty need to work with students for the following components of the curriculum.

1. Student recruitment: Student podcasters were recruited from courses that covered the focal topics for the episodes (see Material S1 for more information). Interested students were interviewed and selected to participate in the project based on their scientific background (what courses they had taken and what grades they had achieved in those courses), their interest in science and science communication and podcasts, and their comfort presenting on a microphone in a podcast studio. Podcast development was not an assignment for a course or similar type of capstone experience but rather an extracurricular activity. The podcasts were aimed to be produced on the BioTA podcast which is available on podcast aggregators such as Spotify.

2. Training in strategic and inclusive science communication: A 1-hour training session on evidence-based strategic science communication, drawing on the published literature (26) and the science engagement practice briefs published at <https://lternet.edu/stories/scrree-practice-briefs/>, as well as evidence of inclusive science communication using publications (38–41), was provided early in the curriculum. This training was very interactive, with discussions about possible goals for science podcasts as well as ways that science podcasts could promote inclusivity. This included instruction for students to keep reflective journals about their motives and reasons for making different decisions about their podcasts, which would help support both student reflexivity and enable the faculty and students to study the impact of the project on students via CAE (see below section). See Material S2 for more information on this training.
3. Podcast creation: Faculty and students worked together to choose podcast topics. In our case, topics for seven podcast episodes were selected to be overlapping scientific concepts across different fields of biology, such as botany and microbiology. Thus, topics such as mutation and selection, which are key concepts for biology students to learn according to Vision & Change (54), apply to both botany and microbiology in terms of topics such as antibiotic selection and herbicide resistance. The students then worked to develop episodes intended to be used by students (i.e., peers) or the general population. Each podcaster had the option to work individually or in pairs to develop an episode approximately 15–20 min in length. In our case, their episodes were expected to address one of three core topics: viruses and vaccines, antibiotics and antibiotic resistance, or the evolution of herbicide resistance. All episodes were designed to be both informative and accessible to undergraduate students and members of the general public. Student podcasters could choose a podcast genre of their liking, as long as the episode followed a clear narrative structure through either storytelling or interview and used only essential terminology, with clear definitions provided. Weekly production meetings were held as collaborative planning sessions, where student podcasters discussed different aspects of educational podcasting. The initial meetings served as immersive workshops focused on the primary literature around educational podcasting and podcast genre structure. These meetings also included hands-on activities to build technical skills for podcast recording and production. To further develop these skills through application, students began by co-creating a collaborative podcast episode. This initial group podcast allowed them to engage in the full process of episode production: scripting, editing, scheduling studio time, sound engineering, audio editing, addition of sound effects, and releasing the final product. After this foundational experience, students met weekly to plan their individual episodes. These sessions focused on refining episode topics and scope, identifying key content, developing scripts, and shaping audio design. This allowed podcasters to retain creative identity in their podcast while working within the structure and tone of the larger podcast series. Individual activities and progress were then shared during weekly production meetings. Students presented work in progress, received group feedback, and collaboratively worked to address challenges. These open discussions provided an essential space for reflection and exchanging ideas. They were also an opportunity for everyone to participate in peer-driven iterative improvement of their episodes. See Material S3 for more information on podcast creation.

Student instructions

Students were instructed to choose a podcast topic that matched core concepts in Vision & Change and fit their curriculum/discipline. Students were also instructed to develop the podcast using principles of strategic and inclusive science communication. Finally,

students were instructed to keep reflective journals about their choices, motivations, feelings, and experiences during this science podcast creation process.

Suggestions for determining student learning

We determined student learning about the science communication process via the CAE process. During our CAE process, we began with a conversation and training about inclusive and strategic science communication. Students then worked on their individual podcast episodes over the course of a semester. Halfway through the semester and at the end of the semester, focus group sessions were held with the student podcasters for them to reflect on how they were considering inclusivity and strategy in their science podcasts, as well as to reflect on how being a science podcaster and science communicator impacted their science identity. Focus group questions included:

Mid-project focus group:

1. What reflections do you have about your science communication goals?
2. What reflections do you have about inclusive science communication?

End-project focus group:

1. What changed from your plans originally to the final podcast and why?
2. What changed during this process in your identity as a scientist or science communicator?
3. Do you feel like your sense of self-efficacy changed during this project?
4. Have any of your career plans changed based on this project?

Students were also encouraged to keep reflective journaling notes about their science podcasting process, and these notes were also utilized in thematic analysis. Students were given weekly thought prompts such as “consider how you are addressing this topic”

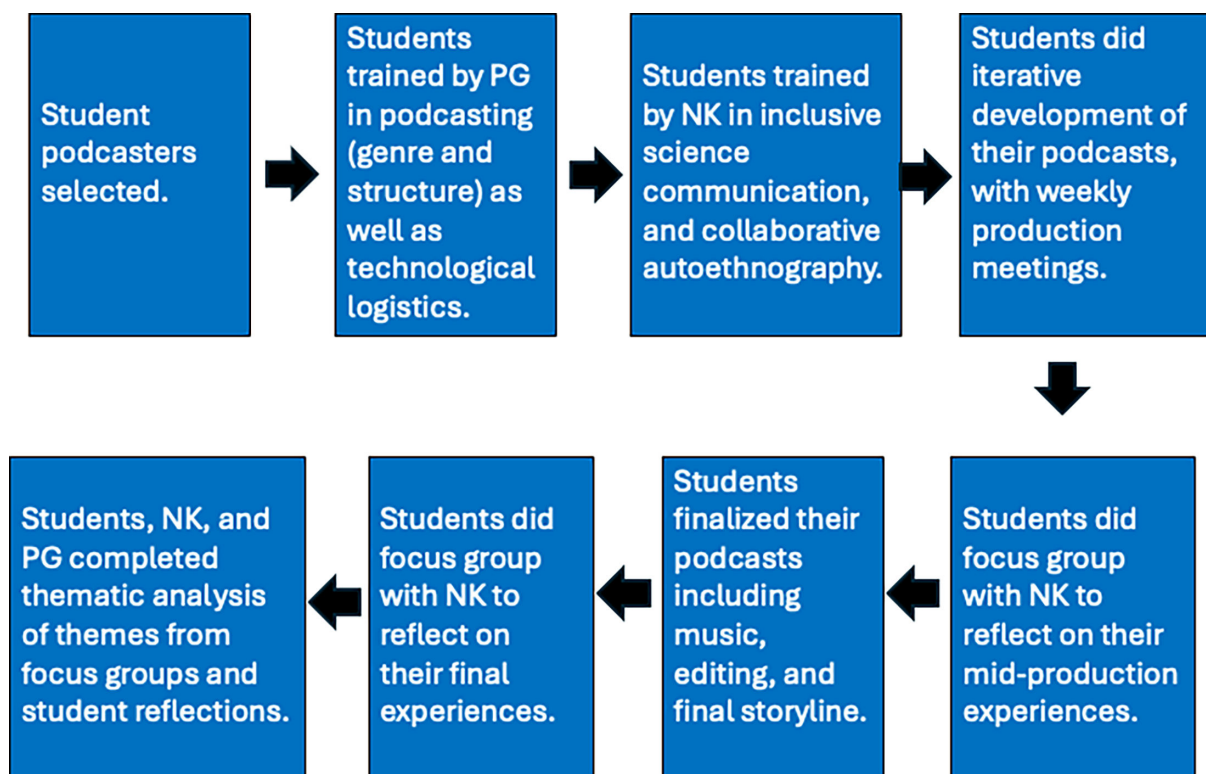


FIG 1 Podcast production process.

or “think about why you want to include this in the storyline of your podcast” and “what is giving you the biggest challenge right now?”

At the end of the curriculum, N.C.K. and the student podcasters then analyzed the themes of these focus groups to analyze how being a science podcaster influenced students’ science identity, science communication self-efficacy and other factors using inductive reflexive thematic analysis (55) to generate an initial table of themes from student reflections and focus group discussions. The other authors then reviewed this table and provided feedback on the table of themes, leading to the final table of themes in the results section. Our overall podcast creation process is illustrated in Fig. 1.

Sample data

All podcasts produced in this study can be accessed via podcast aggregators such as Spotify at <https://open.spotify.com/show/3wqJlhtlVS4EZN92jtygrJ?si=2405c73e39ee4f6d>.

Safety issues

There are no physical safety issues involved. Our student podcasters were trained as researchers doing CAE and are co-authors of this paper; as such, the Colorado State University Institutional Review Board indicated that this study is “not human subjects research.” However, if students will create podcasts and complete surveys or other evaluative metrics for researchers to determine the impact of the podcast creation process on these students, and the students will be research participants and not researchers on the project, then IRB approval and consent processes should be instituted.

DISCUSSION

Field testing

Author P.G. has guided nine individual students in podcast creation over six semesters. He has also used a compressed form of this curriculum in two courses with a total of 37 students. We completed the collaborative autoethnography process with four of those student podcasters who are coauthors on this paper (G.C.P., L.E., K.M., and L.E.). We are currently repeating this curriculum every semester, with students completing podcasts and reflecting on their science communication process via collaborative autoethnography.

Ultimately, the students in this semester created seven podcasts, aligning with curricular concepts from Vision & Change and applied across biology fields, such as botany and microbiology. The podcast episodes on BioTA and the main episode contributors are:

- “Jurassic Park Genetics” Episode #041 (P.G., L.E., K.M., G.C.P., L.W.)
- “Genotypes and Phenotypes in the Biology Zone” Episode #042 (P.G., L.E., K.M., G.C.P., L.W.)
- “DIY Evolution – Darwin and Artificial Selection” Episode #043 (P.G., L.E., K.M., G.C.P., L.W.)
- “Vampire Bats, Rabies, and You” Episode #044 (L.E.)
- “Antibiotics: The Solution We Found” Episode #405 (G.C.P., L.W.)
- “Antibiotic Resistance: Monsters We Created” Episode #046 (G.C.P., L.W.)

- “Dandelions and Dogs” Episode #48 (K.M.)

Evidence of student learning

Our collaborative autoethnography process involving individual and collective reflection led to the generation of three key themes: students’ strategic science communication considerations, students’ inclusive science communication considerations, and students’ personal reflexivity as science communicators (see Table 1). Below, we further expound on each of the themes.

Strategic science communication and inclusive science communication considerations

Students considered strategic science communication, including both the goals of the communication for themselves and for diverse potential audiences, as well as the tactics they used to achieve these goals (26). In particular, student podcasters were trying to provide both an educational tool for their peers and a science communication tool for a public audience, and they had to balance the goals of these audiences in creative and scientifically accurate ways. For example, P.G. noted:

“I saw them trying to balance creativity and scientific accuracy. Sometimes you come up with a great way to tell a story, but the content is more difficult to convey. Trying to strike the balance between informative and entertaining is something the students worked on.”

This finding aligns with previous reports on the various goals that science communication could aim to achieve and the tactics that science communicators could use (56, 57), as well as various indicators of quality in science communication (58). This theme provides *evidence of student learning of objective 1 (creating a podcast narrative for an intended audience)*.

One student podcaster reflected on how strategic science communication considerations and setting goals aligned with their desires to make the content accessible and inclusive:

“At the beginning, we got so much information about how to communicate, who you’re communicating with, why you’re communicating. I really focused on why I’m communicating and what I want listeners to understand. So we had to make changes on words to make sure listeners would understand. We even added a second episode. It’s hard to incorporate all content while keeping style and flow. It’s easier to write for other scientists, like publishing in a journal. Podcasts are accessible to everyone. It was hard to not make it too simple – it still needed to be interesting – but also make it accessible to everyone.”

In general, the literature on strategic science communication and the literature on inclusive science communication have been separate—such reflections from the students highlight the need for more theoretical work and research on synergy between strategy and inclusivity in science communication.

In terms of accessibility and inclusivity, one student noted that common tactics of “busting vaccine myths” or talking about “misinformation” could be triggering or alienating to some audiences, which aligns with literature on the backfire effect when attempting to “debunk” misinformation (59). This finding also highlights the power of new voices and perspectives in science communication, with students noticing the issue with current tactics in science communication and advocating for more inclusive approaches to dealing with societal science communication challenges (60).

Overall, these themes and quotes provide *evidence of student learning of objective 2 (using principles of strategic and inclusive science communication in podcast creation)*.

TABLE 1 Themes from inductive thematic analysis of student podcaster experiences

Themes	Sub-themes	Examples
Strategic science communication considerations	What content is included	Identifying essential content versus unneeded content
	Tactics (narratives, metaphors, language, etc) and matching tactics to goals of communication	Aligning content with podcast genre structure Keeping examples and metaphors relevant
	Challenge of trying to achieve multiple goals and reach multiple audiences	Developing script that has content appropriate for different class levels and students (e.g., majors vs non-majors) as well as public audiences
	Balancing science content and creativity considerations	Having personal growth as a creative person as well as educator in science content Adjusting the podcast storyboard to not be only creative/entertaining but also educational
Inclusive science communication considerations	Utilizing effective pedagogy principles guiding science communication	Utilizing backwards design – final goals to influence decisions
	Accessibility of language and content	Limiting jargon Intentionally defining terms
	Connotations of language	Avoiding potentially derogatory or alienating terms like “myth” or “misinformation”
	Who is interviewed	Interviewing students doing research or other less-commonly-elevated voices in addition to established experts
Personal reflexivity as a science communicator	Inclusive pedagogy principles guiding inclusive science communication	Avoiding “lecture” style in the podcast
	Balancing being a science learner and teacher of the complex content	Struggling to teach and frame something that students were just learning themselves Being a science communicator helped the students learn the science itself Solidifying knowledge of the science topic by communicating about it via the podcast
	Boundary spanning	Developing podcasts that could be used in different educational contexts (i.e., majors non-majors, etc.)
	Humility, flexibility, and letting go of ideas	Enjoying weekly production meetings with open safe discussions and sharing of ideas, and feedback Being open to changes in storyboard Experiencing the challenges of working collaboratively and synergizing ideas with others
	Identity as a scientist and a science communicator is complex	Growing in confidence but still struggling to identify as a science communicator
	Sense of accomplishment	Being able to have a podcast the student created be publicly shared on Spotify

Personal reflexivity as science communicators

Students had to balance many seemingly competing demands during the process, including balancing creativity and scientific content, balancing the needs of different podcast audiences, and balancing working in a team across disciplines. Regarding teamwork, one student podcaster noted in reflective journaling the feeling of “carefully painting a portrait, layer by layer, only to have someone gently brush over its mid-process to begin a new one.” However, this same student noted that working in a collaborative environment with other student podcasters and receiving feedback helped clarify and improve her own ideas, and feedback was most useful “when it extended or clarified [my] existing thoughts.” This student appreciated collaboration but also felt the challenges of final decisions landing with certain individuals in the process. The

collaboration helped the student grow and learn to work across disciplinary boundaries but also created some challenges.

This multifaceted experience with collaboration was also seen with students' multifaceted experience with feeling accomplishment during the process. Some students felt positive senses of accomplishment from their work, for instance, a student who said, "Throughout the process, I feel a lot more competent as a storyteller and a scientist" and also:

"I feel more like a scientist-creative, or a creative scientist. Coming into this, I was looking at this as an assignment, and I'm a student, and I have to do my homework. But towards the end, and now that we've recorded, it feels more like a product, not quite like a research paper, but something I have more ownership over. The identity of 'science communicator' is something I'm ending up with."

However, other students commented that "I'm not really a science communicator" or reflected on the shortcomings of their work. But a student commented in their reflective journaling, "It's easier to write about what's going wrong, but overall this experience has been positive."

Thus, students felt a variety of emotions and senses of self-efficacy throughout the process. This provides *evidence of student learning of objective 3 (reflecting upon the science podcast creation experience)*. Further coaching and encouragement of students to grow in their identity as science communicators is merited in the fields of science communication teaching and science podcast creation.

Overall, the four student podcasters created science podcasts on socioscientific issues and reflected via collaborative autoethnography on their experience as science communicators. Students utilized considerations about strategic science communication and setting goals for themselves and their audience (25), inclusive science communication (40), and personal reflexivity (61) to guide their work.

Interestingly, the student podcasters utilized science education principles, such as backward design and avoiding pure lecture, to guide their strategic and inclusive science communication. Such integration of science education and science communication theory and praxis is necessary for the growth of both fields and better addressing complex socioscientific issues, as has been argued from both a science philosophy perspective (62) and a science education perspective (63, 64).

Possible modifications

Instructors may utilize the science podcast creation process without the collaborative autoethnography process, or instructors may utilize the collaborative autoethnography process for students to practice reflexivity about their science communication in formats other than science podcasts (such as conversations with friends and family, creation of infographics or other deliverables, and science outreach to K-12 students). While many science communication trainings for STEM students and scientists may be purely skills-based, it is also important to provide training in the theory underlying effective science communication skills (65, 66). This curriculum provides a case study of how science communication theory—such as strategic science communication and inclusive science communication—can be applied to STEM students learning a science communication skill, like podcasting, in a way that is guided by theory and evidence.

Additionally, science communication training should emphasize the importance of reflexivity (61, 67). This will enable students to metacognitively reflect upon their motives, identities, skills, knowledge, and goals in science communication. This will promote not only more effective and more equitable science communication (38, 39, 41) but also help prepare students for a diversity of careers in science. While much training for students in science communication centers on disciplinary scientific communication skills, such as writing lab reports for fellow scientists (7), this does not equip the majority of our undergraduates who will enter careers outside of academic research. Helping

students reflect on their communication with peers and public audiences and develop skills to do this communication in an audience-centered and inclusive way will prepare students to engage in their future careers and communities with more efficacy. In this study, we utilized collaborative autoethnography as a way for student podcasters to critically reflect upon their podcast creation experience (45, 47). However, other methods of practicing reflexivity, such as self-reflection questions on the goals of a science communication experience (38), can be applied in diverse learning contexts beyond collaborative autoethnography or podcasting. Thus, our findings show the importance of reflexivity in science communication, and this process can be broadly applied.

ACKNOWLEDGMENTS

This work was funded by a Howard Hughes Medical Institute (HHMI) BioInteractive Scholars Grant (HHMI #GT17720) to J.P.G.

We also thank the editors and anonymous reviewers who provided valuable suggestions on the manuscript.

Authors G.C.P., L.E., K.M., and L.W. were undergraduate students at the time of the study.

AUTHOR AFFILIATIONS

¹Department of Microbiology, Immunology, and Pathology, Colorado State University, Fort Collins, Colorado, USA

²School of Biological Sciences, University of Oklahoma, Norman, Oklahoma, USA

AUTHOR ORCIDs

Nicole C. Kelp  <http://orcid.org/0000-0001-8462-5689>

J. Phil Gibson  <http://orcid.org/0000-0003-0817-4120>

AUTHOR CONTRIBUTIONS

Nicole C. Kelp, Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review and editing | Georgina Concha Paredes, Investigation, Writing – original draft | Lauren Ea, Investigation, Writing – original draft | Kate McColough, Investigation, Writing – original draft | Leonie Weber, Investigation, Writing – original draft | J. Phil Gibson, Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review and editing, Supervision, Funding acquisition, Project administration

ADDITIONAL FILES

The following material is available [online](#).

Supplemental Material

Recruiting materials (jmbe00222-25-S0001.pdf). Application materials for recruiting student podcasters.

Inclusive science communication training (jmbe00222-25-S0002.pdf). Resources for introducing student podcasters to inclusive science communication principles, approaches, and resources.

Podcasting training materials (jmbe00222-25-S0003.pdf). Resources for training student podcasters in stages of podcast production.

REFERENCES

1. Brownell SE, Price JV, Steinman L. 2013. Science communication to the general public: why we need to teach undergraduate and graduate students this skill as part of their formal scientific training. *J Undergrad Neurosci Educ* 12:E6–E10.
2. Brownell S.E, Freeman S, Wenderoth MP, Crowe AJ. 2014. BioCore guide: a tool for interpreting the core concepts of vision and change for biology majors. *CBE Life Sci Educ* 13:200–211. <https://doi.org/10.1187/cbe.13-12-0233>

3. Bowen CD, Summersill AR, Google AN, Aadnes MG, Barnes ME. 2023. Exploring black undergraduate students' communication and biology education experiences about COVID-19 and COVID-19 vaccines during the pandemic. *CBE Life Sci Educ* 22:ar42. <https://doi.org/10.1187/cbe.22-11-0233>
4. Bowen CD, Coscia KA, Aadnes MG, Summersill AR, Barnes ME. 2025. Undergraduate biology students' climate change communication experiences indicate a need for discipline-based education research on science communication education about culturally controversial science topics. *CBE Life Sci Educ* 24:ar24. <https://doi.org/10.1187/cbe.23-07-0134>
5. Couch B, Wybren E, de Araujo Bryan M, Niravong T, Jin Y, Bowen C, Barnes ME. 2022. Exploring undergraduate biology students' science communication about COVID-19. *Front Educ* 7:859945. <https://doi.org/10.3389/educ.2022.859945>
6. Murphy KM, Kelp NC. 2023. Undergraduate STEM students' science communication skills, science identity, and science self-efficacy influence their motivations and behaviors in STEM community engagement. *J Microbiol Biol Educ* 24:e00182–22. <https://doi.org/10.1128/jmbe.00182-22>
7. Vickery R, Murphy K, McMillan R, Alderfer S, Donkoh J, Kelp NC. 2023. Analysis of inclusivity of published science communication curricula for scientists and STEM students. *CBE Life Sci Educ* 22:ar8. <https://doi.org/10.1187/cbe.22-03-0040>
8. MacKenzie LE. 2019. Science podcasts: analysis of global production and output from 2004 to 2018. *R Soc Open Sci* 6:180932. <https://doi.org/10.1098/rsos.180932>
9. Rehman N, Edkins V, Ogrinc N. 2024. Using podcasts to bridge the gap between science communication and specialized scientific fields: a case study of mass spectrometry. *Front Commun* 9:1384389. <https://doi.org/10.3389/fcomm.2024.1384389>
10. Pegrum M, Bartle E, Longnecker N. 2015. Can creative podcasting promote deep learning? The use of podcasting for learning content in an undergraduate science unit. *Brit J Educational Tech* 46:142–152. <https://doi.org/10.1111/bjet.12133>
11. Egan K. 2001. The cognitive tools of children's imagination. <https://eric.ed.gov/?id=ED469669>
12. Lindgren M. 2016. Personal narrative journalism and podcasting. *Radio J* 14:23–41. https://doi.org/10.1386/rjao.14.1.23_1
13. van Krieken K, Sanders J. 2021. Storytelling on oral grounds: viewpoint alignment and perspective taking in narrative discourse. *Front Psychol* 12:634930. <https://doi.org/10.3389/fpsyg.2021.634930>
14. Drew C. 2017. Edutaining audio: an exploration of education podcast design possibilities. *EMI Educ Media Int* 54:48–62. <https://doi.org/10.1080/09523987.2017.1324360>
15. Herreid CF, Schiller NA. 2013. Case studies and the flipped classroom. *J Coll Sci Teach* 42:62–66.
16. Pinto B, Matias A, Granado A. 2024. Measuring the effectiveness of communication of a podcast on food sustainability. *Front Commun* 9. <https://doi.org/10.3389/fcomm.2024.1421692>
17. Hew KF. 2009. Use of audio podcast in K-12 and higher education: a review of research topics and methodologies. *Education Tech Research Dev* 57:333–357. <https://doi.org/10.1007/s11423-008-9108-3>
18. McGarr O. 2009. A review of podcasting in higher education: Its influence on the traditional lecture. *AJET* 25. <https://doi.org/10.14742/ajet.1136>
19. McKinney D, Dyck JL, Lubner ES. 2009. iTunes university and the classroom: can podcasts replace professors? *Comput Educ* 52:617–623. <https://doi.org/10.1016/j.compedu.2008.11.004>
20. Heilesen SB. 2010. What is the academic efficacy of podcasting? *Comput Educ* 55:1063–1068. <https://doi.org/10.1016/j.compedu.2010.05.002>
21. Hew KF, Cheung WS. 2013. Use of Web 2.0 technologies in K-12 and higher education: the search for evidence-based practice. *Educ Res Rev* 9:47–64. <https://doi.org/10.1016/j.edurev.2012.08.001>
22. Fernandez V, Sallan JM, Simo P. 2015. Past, Present, and Future of Podcasting in Higher Education, p 305–330. In Li M, Zhao Y (ed), *Exploring learning & teaching in higher education*. Springer, Berlin, Heidelberg.
23. McNamara S, Drew C. 2019. Concept analysis of the theories used to develop educational podcasts. *EMI Educ Media Int* 56:300–312. <https://doi.org/10.1080/09523987.2019.1681107>
24. Lazzari M, Betella A. 2007. Towards Guidelines on Educational Podcasting Quality: Problems Arising from a Real World Experience, p 404–412. In Smith MJ, Salvendy G (ed), *Human interface and the management of information. interacting in information environments*. Springer, Berlin, Heidelberg.
25. Besley JC, O'Hara K, Dudo A. 2019. Strategic science communication as planned behavior: understanding scientists' willingness to choose specific tactics. *PLoS One* 14:e0224039. <https://doi.org/10.1371/journal.pone.0224039>
26. Besley JC, Dudo A. 2022. Strategic communication as planned behavior for science and risk communication: a theory-based approach to studying communicator choice. *Risk Anal* 42:2584–2592. <https://doi.org/10.1111/risa.14029>
27. Yuan S, Kanthawala S, Ott-Fulmore T. 2022. "Listening" to science: science podcasters' view and practice in strategic science communication. *Sci Commun* 44:200–222. <https://doi.org/10.1177/10755470211065068>
28. Shah H, Simeon J, Fisher KQ, Eddy SL. 2022. Talking science: undergraduates' everyday conversations as acts of boundary spanning that connect science to local communities. *CBE Life Sci Educ* 21:ar12. <https://doi.org/10.1187/cbe.21-06-0151>
29. Alderfer S, McMillan R, Murphy K, Kelp NC. 2023. Inclusive science communication training for first-year STEM students promotes their identity and self-efficacy as scientists and science communicators. *Front Educ* 8:1173661. <https://doi.org/10.3389/educ.2023.1173661>
30. Cameron C, Lee HY, Anderson CB, Trachtenberg J, Chang S. 2020. The role of scientific communication in predicting science identity and research career intention. *PLoS One* 15:e0228197. <https://doi.org/10.1371/journal.pone.0228197>
31. Balgopal MM, Casper AMA, Wallace AM, Laybourn PJ, Brisch E. 2018. Writing matters: writing-to-learn activities increase undergraduate performance in cell biology. *Bioscience* 68:445–454. <https://doi.org/10.1093/biosci/biy042>
32. Kaur AW. 2022. Podcasting neuroscience: a science communication assignment. *J Undergrad Neurosci Educ* 20:A120–A145. <https://doi.org/10.59390/FKXM3006>
33. Vainieri I, Thackeray L, Hillman S, Perez A, Roberts R, Panagiotopoulou E. 2024. Evaluating podcasts as a science communication assessment for postgraduate students. *Innov Educ Teach Int* 61:1446–1459. <https://doi.org/10.1080/14703297.2023.2267047>
34. Fantini E. 2024. Podcasting for interdisciplinary education: active listening, negotiation, reflexivity, and communication skills. *Humanit Soc Sci Commun* 11:1–9. <https://doi.org/10.1057/s41599-024-04119-6>
35. Ajzen I. 1991. The theory of planned behavior. *Organ Behav Hum Decis Process* 50:179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
36. Worthington D, Graham B, Gilliard H, Kelp NC. 2024. Development of a scale to measure planned behavior in inclusive science communication: validity evidence in undergraduate STEM students. *CBE Life Sci Educ* 23:ar48. <https://doi.org/10.1187/cbe.24-01-0012>
37. Braithwaite DW, Sprague L. 2021. Conceptual knowledge, procedural knowledge, and metacognition in routine and nonroutine problem solving. *Cogn Sci* 45:e13048. <https://doi.org/10.1111/cogs.13048>
38. Callwood KA, Weiss M, Hendricks R, Taylor TG. 2022. Acknowledging and supplanting white supremacy culture in science communication and STEM: the role of science communication trainers. *Front Commun* 7:787750. <https://doi.org/10.3389/fcomm.2022.787750>
39. Canfield KN, Menezes S, Matsuda SB, Moore A, Mosley Austin AN, Dewsbury BM, Feliú-Mójer MI, McDuffie KWB, Moore K, Reich CA, Smith HM, Taylor C. 2020. Science communication demands a critical approach that centers inclusion, equity, and intersectionality. *Front Commun* 5:2. <https://doi.org/10.3389/fcomm.2020.00002>
40. Kelp NC, Anderson AA, Enyinnaya JC. 2024. All STEM students should learn inclusive science communication. *Nat Hum Behav* 8:1232–1235. <https://doi.org/10.1038/s41562-024-01918-4>
41. Kelp N. 2025. Inclusive science communication as a tool to address One Health challenges. *Bioscience* 4:biaf011. <https://doi.org/10.1093/biosci/biaf011>
42. Grant WJ. 2023. The knowledge deficit model and science communication. In *Oxford Research Encyclopedia of Communication*. Oxford University Press, Oxford, UK.
43. Simis MJ, Madden H, Cacciatore MA, Yeo SK. 2016. The lure of rationality: why does the deficit model persist in science communication? *Public Underst Sci* 25:400–414. <https://doi.org/10.1177/0963662516629749>
44. Suldovsky B. 2016. In science communication, why does the idea of the public deficit always return? exploring key influences. *Public Underst Sci* 25:415–426. <https://doi.org/10.1177/0963662516629750>

45. Hernandez K-AC, Chang, H, Ngunjiri FW. 2017. Collaborative autoethnography as multivocal, relational, and democratic research: opportunities, challenges, and aspirations. *a/b: Auto/Biogr Stud* 32:251–254. <https://doi.org/10.1080/08989575.2017.1288892>
46. Gemignani M. 2017. Toward a critical reflexivity in qualitative inquiry: relational and posthumanist reflections on realism, researcher's centrality, and representationalism in reflexivity. *Qual Psychol* 4:185–198. <https://doi.org/10.1037/qup0000070>
47. Blalock AE, Akehi M. 2018. Collaborative autoethnography as a pathway for transformative learning. *J Transform Educ* 16:89–107. <https://doi.org/10.1177/1541344617715711>
48. Dauer JM, Sorensen AE, Wilson J. 2021. Students' civic engagement self-efficacy varies across socioscientific issues contexts. *Front Educ* 6:628784. <https://doi.org/10.3389/educ.2021.628784>
49. Herman BC, Clough MP, Rao A. 2022. Socioscientific issues thinking and action in the midst of science-in-the-making. *Sci & Educ* 31:1105–1139. <https://doi.org/10.1007/s11191-021-00306-y>
50. Owens DC, Sadler TD. 2024. Socio - scientific issues instruction for scientific literacy: 5e framing to enhance teaching practice. *School Sci & Mathematics* 124:203–210. <https://doi.org/10.1111/ssm.12626>
51. Sadler T. 2011. Situating Socio-scientific Issues in Classrooms as a Means of Achieving Goals of Science Education, p 1–9. In Baldovin T (ed), *Socio-scientific issues in the classroom: teaching, learning and research*. Springer Netherlands, Dordrecht.
52. Gopal S, Honwad S. 2022. Using storytelling as an approach to researching. *Teaching and Learning about Complex Community-Based Socio-Scientific Problems Annual Meeting*.
53. Kulkarni S, Whitworth BA. 2022. Podcasts in science classrooms: storytelling for all ears! *The Physics Teacher* 60:419–421. <https://doi.org/10.1119/5.0038642>
54. American Association for the Advancement of Science. 2011. Vision and change in undergraduate biology education: a view for the 21st century. <http://visionandchange.org/finalreport>
55. Braun V, Clarke V. 2006. Using thematic analysis in psychology. *Qual Res Psychol* 3:77–101. <https://doi.org/10.1191/1478088706qp0630a>
56. Besley JC, Dudo A, Yuan S. 2018. Scientists' views about communication objectives. *Public Underst Sci* 27:708–730. <https://doi.org/10.1177/0963662517728478>
57. Besley JC, Newman TP, Dudo A, Tiffany LA. 2021. American scientists' willingness to use different communication tactics. *Sci Commun* 43:486–507. <https://doi.org/10.1177/10755470211011159>
58. Olesk A, Renser B, Bell L, Fornetti A, Franks S, Mannino I, Roche J, Schmidt AL, Schofield B, Villa R, Zollo F. 2021. Quality indicators for science communication: results from a collaborative concept mapping exercise. *JCOM* 20:A06. <https://doi.org/10.22323/2.20030206>
59. Swire-Thompson B, Miklaucic N, Wihbey JP, Lazer D, DeGutis J. 2022. The backfire effect after correcting misinformation is strongly associated with reliability. *J Exp Psychol Gen* 151:1655–1665. <https://doi.org/10.1037/xge0001131>
60. Judd K, McKinnon M. 2021. A systematic map of inclusion, equity and diversity in science communication research: do we practice what we preach? *Front Commun* 6:744365. <https://doi.org/10.3389/fcomm.2021.744365>
61. Chilvers J. 2013. Reflexive engagement? actors, learning, and reflexivity in public dialogue on science and technology. *Sci Commun* 35:283–310. <https://doi.org/10.1177/1075547012454598>
62. Fooladi EC. 2020. Between education and opinion-making: dialogue between didactic/"Didaktik" models from science education and science communication in the times of a pandemic. *Science & Education* 29:1117–1138. <https://doi.org/10.1007/s11191-020-00156-0>
63. Baram - Tsabari A, Osborne J. 2015. Bridging science education and science communication research. *J Res Sci Teach* 52:135–144. <https://doi.org/10.1002/tea.21202>
64. Kohen Z, Dori YJ. 2019. Toward narrowing the gap between science communication and science education disciplines. *Review of Education* 7:525–566. <https://doi.org/10.1002/rev3.3136>
65. Mercer-Mapstone L, Kuchel L. 2017. Core skills for effective science communication: a teaching resource for undergraduate science education. *Int J Sci Educ Part B* 7:181–201. <https://doi.org/10.1080/21548455.2015.1113573>
66. Wood M. 2023. Science communication as interdisciplinary training. *J Sci Commun* 22:Y01. <https://doi.org/10.22323/2.22060401>
67. Jensen EA. 2022. Developing open, reflexive and socially responsible science communication research and practice. *JCOM* 21:C04. <https://doi.org/10.22323/2.21040304>