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Student–Scientist Podcasting Across Borders: Insights from an International Project-Based Learning Approach to ANR Communication

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Abstract

As science communication increasingly occurs across borders, students should learn to engage experts and audiences through dialogue rather than dissemination alone. This study examined the design, implementation, and outcomes of an international agricultural and natural resources (ANR) communication course in which United States (U.S.)-based undergraduate and graduate students produced a podcast series featuring Canadian ANR experts. Guided by project-based learning and dialogic communication theory, the course emphasized sustained inquiry, collaboration, and public-facing communication. Using a case study design with convergent mixed methods, data were collected from instructor ethnographic journals, student-produced podcast episodes, and post-participation surveys with expert guests. Findings indicated that instructors experienced the partnership and course implementation as highly valuable, though time, coordination, and technical challenges emerged. Analysis of podcast content revealed themes related to sustainable ANR solutions, the importance of diverse perspectives, and systems-level thinking about agriculture, environment, and society. Expert guests reported high satisfaction with communication quality, collaboration, and student competence, while perceiving opportunities to strengthen message effectiveness for public audiences. Results suggest that international podcast-based project learning can effectively support global communication competence and dialogic science engagement when supported by structured scaffolding, iterative feedback, and explicit training in translating complex science for nonexpert audiences.

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Introduction and Problem Statement

Communication across continents, communities, and cultures continues to increase at rapid speed in the Information Age due to the internet, communication platforms and technologies (including artificial intelligence (AI), and access to transportation (Desmedt et al., 2025; Sälzer & Roczen, 2018). As a global society evolves, it is important for upcoming and future generations to develop communication competencies to navigate intercultural engagement and exchange (Chen, 2005; Cleofas & Labayo, 2024). Global communication competence includes (a) a global mindset (broadening perspective), (b) mapping the culture (cultural immersion), (c) unfolding the self (personal learning and growth), and (d) aligning the interaction (balancing complexity and conflict; Chen, 2005). Sustainable agricultural development increasingly depends on agricultural and natural resources (ANR) professionals who can communicate across disciplinary, institutional, and national boundaries to address complex challenges related to food systems, innovation, and public engagement (Moriba & Edwards, 2015). International project-based communication experiences can help prepare students for this work by engaging them with real-world ANR issues, diverse perspectives, and professional partners across contexts (McKibben & Murphy, 2021; Moriba & Edwards, 2015).

ANR college degree programs should consider developing and implementing intentional education lessons and experiences for rising science communication professionals and scientists to practice global communication skills (McKinnon, 2024; Wood, 2023). As science podcasts have become globally popular (MacKenzie, 2019), they could be leveraged as a teaching and learning method to increase (a) students' knowledge of global ANR issues, (b) interviewing skills, (c) digital creation expertise, and (d) connection to scientists and social responsibility (Kelp & Paredes, 2026; Oliveira et al., 2025). Little is known about how podcast-based experiences function within international science communication contexts. Therefore, this study explored the design and implementation of an international ANR podcasting course and the experiences of U.S.-based instructors, student communicators, and Canadian ANR experts.

Theoretical and Conceptual Framework

Project-based learning (PjBL; Erdogan & Bozeman, 2015; Krebs et al., 2021) and dialogic communication theory (Reincke et al., 2020) guided this study. In PjBL, students develop real-world projects for public audiences through the steps of researching an authentic issue through sustained inquiry, collaboration, and iterative creation (High Quality Project Based Learning, 2018). An international science podcast series served as the project of focus in this study. In dialogic communication, a sender and receiver listen and communicate through two-way transmission involving conversation, questions, and feedback (National Academies of Sciences, Engineering, and Medicine, 2017). Research over time has shown traditional deficit communication approaches of simply sending information to a person does not effectively change their thoughts and actions (Lerma-Mayer, 2025; Toomey, 2023). Instead, dialogic communication embraces the complexities of information sharing as people with different

backgrounds arrive at a shared understanding (Lorke et al., 2024). Dialogue in science communication has the potential to increase trust in science, science literacy, cultural understanding, and content knowledge (Lerma-Mayer, 2025). PjBL and dialogic communication together provided a lens to explore how instructors, students, and scientists collaboratively created cross-cultural communication and learning through science podcasting. The framework also supported development of global communication competence (Chen, 2005).

PjBL provided the primary instructional design framework for the course. Dialogic communication provided a complementary lens to examine communication processes within the international podcasting project. Global communication competence also provided a conceptual lens to explore the international dimension of the experience. Figure 1 outlines how the frameworks were integrated and aligned with the study's research questions.

Figure 1

Conceptual Alignment of Frameworks with the International ANR Podcasting Experience and Research Questions



Note. The three theoretical frameworks informed complementary dimensions of the study. PjBL guided project design and implementation (RQ1); dialogic communication informed analysis of student-expert dialogue (RQ2) and expert experiences (RO1); and global communication competence provided a lens to understand cross-national perspective-taking and interaction (RQ2 and RO1).

Purpose

The purpose of the study was to investigate how participating instructors, students, and scientists experienced an ANR PjBL communication university course focused on dialogic cross-cultural podcast production. The following research questions (RQs) and objective (RO) included:

- RQ1: How did the instructor and graduate student teaching assistant (TA) articulate their experiences with the design and implementation of the international ANR PjBL communication course?
- RQ2: What themes emerged about sustainable ANR through U.S. student-produced podcast interviews with Canadian experts?
- RO1: Describe Canadian ANR experts' perceptions of dialoguing in cross-cultural, student-produced science podcasts.

Methods

We followed a case study design (Yin, 2017) with convergent mixed methods to concurrently collect and analyze qualitative and quantitative data to then integrate the sources to develop a holistic picture (Guetterman & Fetters, 2018). The case included a U.S.-based ANR communication podcasting course at the University of Florida (UF) partnered with the University of Guelph Ontario Agricultural College (UGOAC). The partnership developed in part through the second author, a Canadian graduate teaching assistant (TA) who had existing connections with UGOAC, providing an opportunity to establish an authentic international collaboration. The partnership enabled U.S.-based students to engage with Canadian ANR experts while exploring shared agricultural and environmental issues through different institutional, disciplinary, and professional perspectives. UF's Institutional Review Board gave human subjects research approval for the study (IRB202301772).

The overall project included four phases from October 2023 – May 2025 including: (a) partnership development, (b) course design, (c) implementation, and (d) post-course analysis. The course included undergraduate (n = 6) and graduate (n = 9) students who each produced a podcast episode featuring Canadian ANR experts (n = 14). Students completed scaffolded assignments of topic research, pre-interviews, recording, editing, peer review, and publication. The podcast series was titled *Sustainable Solutions: From Guelph to Gainesville* and published on *Streaming Science* (see Table 1).

Table 1

Overview of Sustainable Solutions Episodes

Episode Topic	Student Producer	Expert Guest
Series Introduction	Undergraduate 1	Graduate Teaching Assistant
University of Guelph's Mission	Graduate 1	Interim Vice President of Research
Connecting Universities	Undergraduate 2	Associate Dean of External Relations
Cover Crops	Undergraduate 3	Professor of Sustainable Soil Management
Tomato Breeding	Undergraduate 4 Undergraduate 5	Research Professor of Tomato Horticulture
Livestock Methane Emission Reduction	Graduate 2	Doctoral Candidate in Animal Bioscience
Timed Artificial Insemination for Cattle	Graduate 3	Doctoral Student in Livestock Genetics
Animal Breeding Genetics	Graduate 4	Vice President of Research and Innovation in Genetics Industry
Dairy Cow Resilience	Graduate 5	Doctoral Student in Animal Science
Crampy Disease in Cows	Graduate 6	Master's Student in Dairy Cattle Genomics
Conscious Agricultural Communication	Graduate 7	Chief Operating Officer of Agricultural Communications Company
Strawberry Production	Graduate 8	Farmer in Strawberry Industry
Science of Safe Eating (Parts 1 and 2)	Undergraduate 6 Graduate 9	Director of Canadian Research Institute for Food Safety

We collected data from dual-ethnographic instructor pre-and-post journals (RQ1), student-produced podcasts (RQ2), and Canadian partner post-survey responses (RO1). We used an evaluative coding approach (Saldaña, 2016) for RQ1 to analyze the instructor and TA journals, with attention to their experiences designing, facilitating, and evaluating the international PjBL podcasting course. Initial coding captured perceptions of the partnership, successful and challenging aspects of course implementation, student responses, instructional scaffolding, problem-solving, and opportunities for improvement. We then compared codes across the instructor and TA reflections and grouped related codes into four themes. We followed elements of podcast ethnography (Lundström & Lundström, 2021) to re-listen to episodes and identify themes for RQ 2.

We developed a post-survey to measure expert guests' experiences with students' communication clarity and responsiveness, collaborative process quality, perceived competence and credibility, and perceived message effectiveness for RQ 3 (Besley et al., 2018; Hall et al., 2019; McCroskey & Teven, 1999; Zhao et al., 2022). The survey had 19 Likert-Scale

items (1-*Strongly Disagree* to 5-*Strongly Agree*) and two open-ended qualitative questions. We considered the quantitative survey to be descriptive, case-level feedback as there was a small sample size. We interpreted higher scores as positive across constructs, and we computed descriptive statistics by aggregating item responses within each construct. Consistent with common practice in communication and education research, we treated Likert-scale responses as approximately interval-level data to permit calculation of means and standard deviations, based on the assumption of roughly equal distances between scale points (Allen & Seaman, 2007; Jamieson, 2004). We sent the survey to podcast guest experts via Qualtrics two weeks after completion of the class with a follow-up nudge one month after the class. Six of the 12 podcast guests completed the survey. We also examined guests' open-ended responses and found the overall survey results to provide useful context for future PjBL course designs. Table 2 provides an overview of the relationship among research questions and objective, data sources, data, and analysis procedures.

Table 2

Overview of Study Design

RQ	Data Source	Data	Analysis
RQ1	Instructor and graduate TA	Pre/post ethnographic journals	Evaluative coding; framework-informed interpretation
RQ2	Student-produced podcasts	Audio/transcripts; student–expert exchanges	Podcast ethnography; thematic/framework-informed interpretation
RO1	Canadian ANR expert guests	Likert items and open-ended responses	Descriptive case-level statistics; qualitative interpretation

We established trustworthiness through triangulation of multiple data sources (Creswell & Poth, 2018; Lincoln & Guba, 1985). All authors participated in establishing a codebook with deductive evaluative codes. We engaged in peer debriefing and discussed emerging interpretations and resolved discrepancies (Lincoln & Guba, 1985). Coding consistency was addressed through an iterative constant comparative process rather than a statistical assessment of interrater reliability; researchers compared codes and interpretations across the data and used discussion and consensus to crystallize the final themes. As an additional analytic check, we used generative AI tool ChatGPT to independently review de-identified data and compare AI-identified patterns with the researcher-developed themes. We retained responsibility for all final coding and thematic decisions.

For the post-survey, we established face and content validity by having two ANR communication professionals external to the project review the items (Haynes et al., 1995). Because findings are presented at the construct level, internal consistency reliability would typically be assessed through Cronbach's alpha. However, given the small sample size (n = 5–6), such estimates would be unstable and were not calculated (Bonett, 2002). Instead, constructs were informed by previously validated measures and expert review of item content.

Our research team operated from constructivist and pragmatic paradigms (Creswell & Poth, 2018; Patton, 2015) and included authors from agricultural and marine science backgrounds. The first and second authors, who served as the course instructor and TA, approached the study from a constructivist perspective and recognized participants develop understanding through their own experiences and interactions within an international PjBL context. The remaining authors contributed a pragmatic perspective focused on examining the process and outcomes. The complementary perspectives supported interpretation of participants' experiences. To reduce bias, non-instructor authors coded instructor reflections. We used AI tools (Microsoft CoPilot and ChatGPT) to support analytic rigor through a) verification of qualitative coding patterns, b) statistical accuracy checks of means and standard deviations, and c) to improve writing clarity. All data were anonymized prior to use and the research team reviewed and confirmed all final coding and statistical decisions. This study was conducted within a single course context, which may limit transferability. The sample size was small and context specific.

Findings

RQ1: How did the instructor and graduate student teaching assistant (TA) experience the design and implementation of the international ANR PjBL communication course?

Analysis of the instructor and TA reflections revealed four themes related to designing and implementing the international podcasting course: (a) designing an authentic international podcasting experience, (b) scaffolding student autonomy and problem-solving for confidence and creativity, (c) navigating the complexity of PjBL implementation, and (d) learning about PjBL through implementation.

Designing and Adapting an Authentic International Podcasting Experience

The instructor and TA described the course as an authentic application of PjBL in which students created public-facing science communication products in collaboration with external ANR experts. They appeared to view the authentic nature of the project as central to the course design. The instructor emphasized that PjBL involved more than simply designing a sequence of podcast production assignments:

> This experience expanded my awareness of how to apply PjBL to an international partnership and context. It also taught me there is more to PjBL than the design and implementation of a course. It taught me that the nuances of PjBL are more important than the larger design of the course.

The international context also required substantial preparation before students began producing their podcasts. The pre-planning visit to Canada helped the instructors identify experts and topics, develop relationships, and obtain institutional and expert buy-in. Looking back on implementation, the instructor explained, "The pre-planning trip was also fantastic and set the stage for the entire course and podcasts. The trip helped us get buy-in from OAC administration and ANR experts."

At the same time, the scope of the authentic project required adaptation of the original course design. More students enrolled than anticipated, requiring additional experts and changes to students' topic choices. The number of experts interested in participating also exceeded initial expectations. Before the course, the TA reflected:

> I initially assumed we would have around 5–10 scientists that we would chat with for episodes. However, we now have around 20-ish individuals who are interested in participating.... I think we're going to have a lot more episodes than we originally thought, and that might mean that I will have to produce some episodes myself to not overwhelm the students.

Thus, designing an authentic project involved more than establishing the assignments and production process; it required the instructors to continually scale the project to enrollment, expert participation, and the capacity of students to complete the work.

Scaffolding Student Autonomy and Problem-Solving for Confidence and Creativity

A central challenge for both the instructor and TA was determining how much structure students needed while preserving the autonomy and problem-solving inherent in PjBL. The TA observed that some students struggled when the project did not provide the predictability of more conventional coursework:

> Putting this into practice gave me a new perspective on project-based learning and how it's definitely a learning curve, especially for students who are more accustomed to a cut-and-dry type of education.

The TA particularly noticed students' reliance on rubrics and explicit directions. They reflected:

> It was also frustrating to deal with their resistance to creativity and needing explicit instruction from the rubrics.... I ultimately believe that project-based learning is more about the process rather than just trying to check very specific boxes, but it's not always easy to see that when your main/only concern is the final grade you receive.

The instructor reached a similar conclusion. Although students needed traditional production assignments and steps to learn how to create a podcast, those structures alone did not prepare them for the ambiguity of working on an authentic project with external collaborators. The instructor reflected:

> There is also a need for major learning scaffolding for students in an international PjBL context. The typical podcast production assignments and steps are needed and fine. However, the students also need additional supports to increase their self-efficacy in how to problem-solve and be creative when challenges arise.

This realization led the instructor to identify a specific change for future iterations of the course to add “a lesson or instructions for students to engage in more problem-solving and creativity and ownership of their projects.” Together, the reflections indicated that implementation required the instructional team to balance the structure students needed to learn podcast-production skills with opportunities for them to independently make decisions, solve problems, and take ownership of the final product.

Navigating the Complexity of PjBL Implementation

The authenticity of the podcast project also introduced challenges that would be difficult to replicate in a traditional classroom assignment. Students had to work around experts' schedules, coordinate interviews, manage technology, and respond when collaborators did not communicate according to the students' desired timelines. The TA described how these real-world conditions affected course implementation. They wrote, “There were issues where folks [experts] didn't get back to them [students] in time, or had different schedules or ideas that didn't align, and that was challenging to work through.” These challenges created an instructional tension between helping students and allowing them to independently navigate authentic professional problems. The TA explained:

> When they would come to us and talk about these concerns, it was hard to offer advice other than a shrug and explaining that it simply comes with the territory of working with other people. They have their own lives and priorities that don't always align with you and your timeline and it's up to you to adapt to these things rather than expecting myself or the instructor to do the work for you and find other options.

Yet, allowing students to solve these problems independently was not always feasible. The TA acknowledged, “I feel like I did a lot of that, where I was scrambling to find other participants for them to work with or to find alternate solutions.” This experience demonstrated the difficulty of deciding when instructors should intervene to keep an authentic project moving and when students should be responsible for developing their own solutions.

Despite these challenges, the instructional team identified several successful elements of implementation. The instructor noted that “the technology to connect the U.S. and Canada locations worked well (for the most part)” and that students successfully researched their topics, worked with experts, and used new podcasting tools. The instructor perceived that students ultimately learned both technical production skills and “the nuances of working with ANR administrators and subject matter experts for collaboration on a public science communication product.” The final podcast products also reflected the variability inherent in authentic student production. The TA explained:

> There were some podcasts that had to be re-recorded or ended up being almost unlistenable due to sound quality issues. Some were very long-winded and less engaging. Others had little substance. However, I am happy with the majority of the work the students created. I think there were some episodes that were genuinely engaging, interesting, and thought-provoking.

Rather than uniformly producing polished products, students experienced technical and communication problems that required revision and adaptation throughout implementation.

Learning about PjBL through Implementation

Ultimately, both the instructor and TA described implementation of the course as deepening their understanding of PjBL. For the TA, the experience demonstrated that an authentic project could be difficult for students accustomed to highly structured learning environments, but she viewed the challenge as worthwhile. They concluded that implementing the course gave them

"a much more nuanced understanding of what these processes actually entail and the different challenges and benefits that come along with them." The instructor similarly concluded that the experience shifted attention from simply designing the components of a PjBL course toward the more detailed work required to implement it successfully:

> It's imperative to take the time to establish goals, relationships, and a true partnership in an international context. It's not just about the subject matter and skill development, but also about the people participating and their backgrounds and perspectives and how they interact with one another.

The experience also revealed the workload associated with sustaining an authentic project. The instructor reflected that international PjBL "takes time, resources, and energy" and that responsibility for public dissemination should not fall entirely on the instructor. Nevertheless, the instructor concluded that the experience demonstrated the feasibility and potential of international PjBL, noting that students "faced many challenges that pushed them to problem-solve, be creative, and they ultimately ended up with a final product they can be proud of and can share in their portfolios."

RQ2: What themes emerged about sustainable ANR through U.S. student-produced podcast interviews with Canadian experts?

Across episodes, dialogue was examined for ANR sustainability topics, reciprocal questioning, explanation, connection, and elaboration between student hosts and expert guests.

Theme 1: Dialoguing with experts across countries through PjBL supports the exploration of sustainable ANR solutions.

Podcast topics and discussions highlighted diverse, research-based approaches to sustainable ANR solutions. Experts described innovations in animal and plant genetics, soil health and cover cropping, and climate mitigation strategies such as methane production to increase ANR adaptation and resilience. For instance, one scientist explained using agricultural management practices to enhance soil health:

> Undergraduate 3: Could you just explain the term cover cropping to any listeners who aren't familiar?
>
> Professor of Sustainable Soil Management: Absolutely. So, it's right in the name. Right? So, we're planting a crop to cover the soil, so it's a cover crop. Now in terms of cover crop, I like the term "service crop," right? So, we're planting a crop instead of harvesting for food, or fiber, or feed, or fuel, like instead of harvesting, we're planting this crop for a purpose to do a service. So, it could be covering the soil as a service or it could be catching nutrients, and sometimes you might see the term catch crop.

Similar dialogic exploration occurred in an interview about dairy cattle genetics, as the student host followed the expert's explanation of fertility research by asking how the work contributed to broader livestock resilience. The conversation then expanded from an individual research project to an international research initiative addressing heat stress, disease, fertility, and methane emissions:

> Graduate 5: Right, so how do you hope that research, I guess, will add to resiliency in dairy cattle as a whole?
>
> Doctoral Student in Animal Science: I think that fertility is an important part of resiliency, and sustainability. Like many of the traits in dairy cattle, I think we often think about sustainability in terms of environmental sustainability, and breeding and genetics as a whole focuses on trying to make more efficient animals, more sustainable animals, or resilient animals. And one of the ways that we can do that is fertility.... So having good fertility in our herds is really important to be a sustainable industry.
>
> Graduate 5: Very cool. So, you're part of the Resilient Dairy Genome Project. Can you talk a little bit more about that and I guess the goal of the organization?
>
> Doctoral Student in Animal Science: Yeah, the Resilient Dairy Genome Project is a huge international project with several collaborators. The overall goal is to create a more resilient animal.... things like resistance to heat stress, resistance to disease, and maintaining fertility, decreased methane production.

A strawberry industry farmer discussed that environmental sustainability meant, "the responsibility to conserve natural resources to protect global ecosystems to support health and well-being." The Vice President of Research and Innovation in the genetics industry emphasized agriculture's role in addressing climate change. They said, "We already have a lot of the tools… to achieve net zero," positioning agriculture as a contributor to and solution for environmental challenges.

Theme 2: Understanding diverse perspectives is essential to effectively communicate ANR sustainability.

In several of the interviews, it appeared student hosts and expert guests were able to find commonalities in their lived experiences and ANR sustainability perceptions. Some podcast interviews also included the importance of public science communication. In one interview, the student host and expert discovered common ground through their shared Brazilian backgrounds while reflecting on their different experiences studying in the United States and Canada. The expert described international study as an opportunity to encounter new cultures and grow personally, which prompted the student host to connect their experiences to the cultural diversity they encountered in their own U.S. graduate programs:

> Doctoral Candidate in Animal Bioscience: It's really a unique experience to go abroad, especially when you go to other countries and you meet different people and new cultures, and you learn so much, and you grow so much throughout the process. And I think that's what happened to me.
>
> Graduate 2: And it's very curious hearing this podcast episode, because both of us are Brazilians. So, I'm here in the University of Florida, I studied my master's in Canada, so it was a great time, because it's not easy to find, like Brazilians over different countries.

> And we have the experience to conduct a podcast interview together. So it is great to have you here.
>
> Doctoral Candidate in Animal Bioscience: Yeah, that's, that's really nice from you. There's a couple of universities, especially for animal science and animal breeding, there seems to be more and more Brazilians, every time we meet.
>
> Graduate 2: It's true. And I think that it's very important to have different cultures together. Because here in my department, here in Gainesville, I've been able to meet people from Africa, from Asia, from many different places. So, it's been great even to conduct research.

In another interview, Graduate 1 asked a podcast guest expert about the role of science communication in ANR sustainability. The Interim Vice President of Research responded:

> What intrigues me about what you [communication professionals] do is it helps those of us who don't think about this every day and are not experts to realize that so much of it is about drilling down to the why's. Why am I communicating to this person, to what end? Why aren't they hearing what I think I'm communicating and how is that working or not working?

Theme 3: Engaging with international ANR expertise fosters systems thinking about the interconnected relationships between agriculture, the environment, and society.

Throughout multiple podcast episodes, students and experts noted global connectedness, and they stressed the importance of taking a systems mindset to find sustainable solutions. The Research Professor of Tomato Horticulture said, “Our planet is fully interconnected. Agriculture can’t escape the environment. We are *in* the environment, and we *are* the environment.”

Discussion about livestock health and genetics centered on taking a big picture view to conserve animals, soil, and promote health:

> Graduate 5: Can you talk about, I guess, some of the challenges or the exciting parts about working with so many different people from different backgrounds?
>
> Doctoral Student in Animal Science: Yeah, in this industry specifically, is very multidisciplinary. We work with a lot of people in different segments, research with physiologists, we work with geneticists, computer scientists, molecular biologists to try and incorporate all of these aspects of dairy science to make our program more efficient.

Graduate 9 asked the food science guest expert what the biggest challenges were the faced in their work. The Director of the Canadian Research Institute explained there is a need to better connect systems for societal change. They said:

> You look at the rest of the world where most of the world doesn't have access to safe food. So, how can my research really have a lasting impact in terms of improving that? Now, I don't think that, you know, publishing research in peer reviewed journals is really

> a main way. So, I've really been trying to work with government agencies to affect policy change based on research that I'm doing.

The One Health initiative emerged in multiple conversations as an example of an integrated systems level approach to addressing animal, plant, and human issues. After listening to the Interim Vice President of Research discuss relationships among agriculture, food safety, communities, and the environment, Graduate 1 connected the administrator's comments to earlier conversations she had with other Canadian experts about One Health. She asked him to explain that connection, prompting a discussion of the interdependence of human, animal, and environmental health. Following the administrator's explanation, Graduate 1 synthesized what she had heard and said, "The people need to be healthy. The environment needs to be healthy. The animals need to be healthy.... agriculture, food systems, veterinary medicine, all of these things, and they're connecting, even though they're different things." Graduate 1 then asked how current research was addressing these interconnected challenges, leading the expert to discuss antimicrobial resistance across animal agriculture and human medicine.

RO1: Describe Canadian ANR experts' perceptions of dialoguing in cross-cultural, student-produced science podcasts.

Expert guests' descriptive responses were generally positive across the post-participation survey constructs, with item means ranging from 3.67 to 5.00 on a 5-point scale (see Table 3). Because only five to six experts responded to individual items, these values characterize respondents within this bounded case and should not be interpreted as estimates of a broader population.

Communication Clarity and Responsiveness

The highest-rated item across the entire instrument was the *quality of communication*, which received a perfect mean score (M = 5.00, SD = 0.00), indicating complete agreement among all respondents. Ratings for *communication amount* (M = 4.67, SD = 0.82) and *timeliness* (M = 4.67, SD = 0.52) were also high, suggesting that participants felt consistently supported and informed throughout the collaboration. Open-ended question responses also indicated podcast guests appreciated student producers' podcast coordination. An expert wrote, "[Student] was very professional and took care of all of the technical requirements. She also did a very good job of prepping me for the podcast in terms of letting me know the questions that would be asked and doing a short pre-interview with me." However, slightly lower quantitative ratings were observed for the extent to which *pre-meeting questions and concerns were addressed* (M = 4.50, SD = 0.84), indicating a potential area for minor improvement.

Table 3

Podcast Expert Guests' Partnership Feedback

Construct and Items	*n*	*M*	*SD*
Communication Clarity and Responsiveness		**4.71**	**0.33**
The quality of communication between me and the student podcast producer was adequate.	6	5.00	0.00
The amount of communication between me and the student podcast producer was adequate.	6	4.67	0.82
Communication between me and the student podcast producer was timely.	6	4.67	0.52
The questions and concerns I had during the pre-meeting session were adequately discussed.	6	4.50	0.84
Collaborative Process Quality		**4.61**	**0.34**
I am satisfied with the process of working with the student podcast producer.	6	4.83	0.41
The student podcast producer and I developed shared goals and expectations.	6	4.67	0.52
I believe the work facilitated by Streaming Science is valuable.	6	4.67	0.52
I would collaborate with Streaming Science again on other projects.	6	4.50	0.55
I am satisfied with the final podcast episode.	5	4.40	0.89
Perceived Competence and Credibility		**4.50**	**0.57**
The student podcast producer was confident, knowledgeable, and guided the conversation well.	6	4.83	0.41
The audio quality was professional, clear, and easy to follow.	5	4.60	0.89
The podcast accurately explains my work.	6	4.33	0.82
The podcast editing is smooth.	5	4.20	0.84
Perceived Message Effectiveness		**4.10**	**0.24**
The podcast will increase awareness of the University of Guelph.	6	4.83	0.41
Listeners will be engaged with the content.	6	4.00	0.00
Listeners will enjoy the podcast content.	6	4.00	0.63
The podcast will increase awareness of ANR solutions.	6	3.83	0.98
The podcast accurately explains sustainability in ANR.	6	3.67	0.52

Collaborative Process Quality

The highest-rated item in this construct was *satisfaction with working with the student podcast producer* (*M* = 4.83, *SD* = 0.41), reflecting a highly positive partnership experience. Participants agreed that they *developed shared goals and expectations* (*M* = 4.67, *SD* = 0.52) and perceived the *Steaming Science program as valuable* (*M* = 4.67, *SD* = 0.52). *Willingness to collaborate again* was also high (*M* = 4.50, *SD* = 0.55), suggesting strong potential for sustained partnerships. A podcast guest described, "[Student] was a dream person to work with. She was well organized, gave me questions to ponder for the podcast; She is passionate, knowledgeable and kind. She set me at ease." Contrastingly, *satisfaction with the final podcast episode* was

slightly lower and had more variability (*M* = 4.40, *SD* = 0.89), indicating experiences with the final product were somewhat mixed.

Perceived Competence and Credibility

The item assessing whether students were *confident, knowledgeable, and effectively guided the conversation* received a high mean score (*M* = 4.83, *SD* = 0.41), suggesting strong perceptions of student preparedness and professionalism. Technical aspects of the podcast were also rated positively, including *audio quality* (*M* = 4.60, *SD* = 0.89) and *editing smoothness* (*M* = 4.20, *SD* = 0.84). Participants also agreed that the podcast *accurately represented their work* (*M* = 4.33, *SD* = 0.82). Slightly lower ratings for editing indicate potential opportunities for improving post-production consistency (*M* = 4.20, *SD* = 0.84). A guest explained, "I went through the entire draft podcast, and gave some feedback on ways to shorten the podcast. Not a hard thing to do, just took some time." Another mentioned they felt their podcast was too long and should have been edited into two parts.

Perceived Message Effectiveness

Perceptions of message effectiveness were generally positive but comparatively lower than other constructs. The highest-rated item in this category was the podcast's ability to *increase awareness of the university* (*M* = 4.83, *SD* = 0.41), indicating strong perceived institutional visibility. Participants also believed that *listeners would be engaged* (*M* = 4.00, *SD* = 0.00) and *enjoy the content* (*M* = 4.00, *SD* = 0.63). The lowest-rated items across the entire instrument were related to broader educational impact, including *increasing awareness of ANR solutions* (*M* = 3.83, *SD* = 0.98) and accurately explaining *sustainability concepts* (*M* = 3.67, *SD* = 0.52). These findings suggest that while the podcasts were engaging and professionally produced, there may be opportunities to strengthen their depth of content or clarity around complex scientific topics. Additionally, some podcast guests mentioned student producers did not share files correctly, and they could not listen to a rough draft of the podcast to source check the messaging, before it was published for public audiences.

Conclusions, Discussion, and Recommendations

Findings suggest that the partnership and PjBL experience provided a productive context for collaboration, engagement, and development of public-facing communication products within this case. The finding aligns with the PjBL framework and prior research that demonstrated authentic projects and real-world collaboration can enhance students' interdisciplinary thinking and intercultural communication skills (Erdogan & Bozeman, 2015; High Quality Project Based Learning, 2018). However, logistical, pedagogical, and technical challenges remain important considerations for future iterations especially on a global scale. Results showed the instructor and TA had favorable experiences designing, implementing, and evaluating the international PjBL ANR communication approach and achieved their overall goals to connect U.S.-based students with Canadian experts to dialogue about ANR sustainability to expand their knowledge and communication skills. The result underscores the effectiveness of the dialogic model for science and intercultural communication (Chen, 2005; McKinnon, 2024; Oliveira et al., 2025;

Reincke et al., 2020) and adds empirical evidence of how dialogic communication can be applied in international podcasting courses. Yet, the project did face time constraints for course creation, interview scheduling, and follow-up source-checking steps.

Podcast transcripts confirmed students and experts were able to share diverse experiences, perspectives, and explore ANR sustainability solutions in dialogue together. Conversations explored a variety of topics and big picture global approaches to sustainable ANR solutions to improve human health and the environment. The post-survey results showed that podcast guest experts had favorable experiences collaborating with student producers in terms of communication quality, relational process, and student competence. However, experts had lower ratings for message effectiveness which suggested opportunities to enhance the clarity and impact of scientific content for broader audiences. It is important to strengthen the expert approval process to ensure science podcasts are credible for listeners to have accurate and trustworthy information (Besley et al., 2018; Desmedt et al., 2025; Kelp & Paredes, 2026). Together, these findings suggest that while the participating experts generally perceived the student–expert collaborative experience positively, opportunities remain to strengthen the perceived impact of podcast content on audience understanding and engagement.

From an agricultural development perspective, this study illustrates a capacity-building approach to prepare future ANR communicators to work across professional, disciplinary, institutional, and national boundaries. Podcast conversations addressed soil health, genetics, food safety, climate mitigation, One Health, and research-to-policy connections, demonstrating how communication training can be embedded in discussion of complex agricultural development challenges. The international partnership also reflects the value of sustained institutional and expert collaboration consistent with the study's emphasis on partnerships for SDG 17.

Grounded in PjBL (Erdogan & Bozeman, 2015; Krebs et al., 2021) and dialogic science communication (Lerma-Mayer, 2025), this study's findings indicate several recommendations for practice and research. ANR communication educators should incorporate structured scaffolding, including clear timelines, iterative feedback cycles, and explicit training in translating complex scientific concepts for public audiences, to enhance both student learning and message effectiveness. This recommendation is consistent with previous PjBL scholarship that showed scaffolding and iterative feedback to be key to support student success in developing authentic projects (High Quality Project Based Learning, 2018). Sustaining interdisciplinary and international collaborations remains critical, as dialogic engagement with diverse experts supports systems thinking and co-construction of knowledge. Scientist podcast guest experts are encouraged to adopt audience-centered and narrative-driven communication approaches (Besley et al., 2018; Hall et al., 2019; MacKenzie, 2019; National Academies of Sciences, Engineering, and Medicine, 2017) and to actively collaborate with students throughout production to refine clarity, relevance, and impact (Krebs, 2021; Wood, 2023). Future ANR communication courses should expand the international PjBL podcasting collaboration model to additional global contexts and concepts. Future ANR communication research could further explore podcast episode impacts on listener audiences, including

changes in knowledge, attitudes, and engagement, as well as explore long-term impacts of PjBL communication experiences on student development. Additionally, further teaching and research is needed to refine measurement of message effectiveness and to compare instructional design strategies that best support dialogic, learner-centered science communication in ANR contexts.

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> Dyment, M. A., Loizzo, J., Hilburn, K., & Barnett, C. P. (2025). Sustainable solutions: Case study of an international project-based learning podcasting course to connect U.S.-based students with Canada-based scientists. In *2025 AIAEE conference proceedings: From the highlands to the islands—Bridging community learning and development through extension* (pp. 256-258). Association for International Agricultural and Extension Education. https://www.aiaee.org/2025aiaeeconference

Artificial Intelligence: We used Microsoft 365 CoPilot and ChatGPT powered by OpenAI's GPT-6 model as a qualitative coding check as well as to improve writing clarity.

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