The Journal of Undergraduate Neuroscience Education (JUNE), Winter 2022, 20(2):A120-A145

ARTICLE
Podcasting Neuroscience: A Science Communication Assignment

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Effective science communication has been identified as one of the core competencies of neuroscience education as articulated at the 2017 FUN Workshop. Yet most undergraduate students do not receive explicit instruction on how to effectively communicate science to a diversity of audiences. Instead, communication assignments typically help students become proficient at sharing scientific information with other scientists through research articles, poster presentations or oral presentations. This presents a missed opportunity to instruct students on the complexities of communicating to the general public, the importance of which has come into sharp focus during the COVID-19 pandemic. Translating research findings so they can be understood by a non-specialist audience requires practice and deep learning and can act as a powerful teaching tool to help students build science literacy skills.

Here I share the blueprint to a broadly-oriented science communication assignment built to address the core competencies of neuroscience education. The assignment acts as the final project for a 400-level neuropharmacology course at a small public liberal arts university. Students work in small groups to identify a topic of interest and research, script, and record an audio podcast geared towards a general audience. The assignment is scaffolded to allow students to work towards the final submission in small steps and to receive feedback from the instructor and their peers. These feedback steps pair with opportunities to revise their work to further develop students' communication skills. Initial feedback from students suggests the assignment promoted deeper learning and higher engagement with course content.

Key words: student-generated podcast; learner-generated podcast, science communication; primary literature; neuroscience pedagogy; Neuropharmacology

Discussions within the neuroscience education community at the 2017 Faculty for Undergraduate Neuroscience (FUN) Workshop led to the latest articulation of recommended core competencies for undergraduate neuroscience programs (Wiertelak et al., 2018). Centered on science literacy, the core competencies include (1) critical and integrative thinking, (2) communication skills (writing, oral, visual), (3) ability to articulate the interdisciplinary and interdependent nature of neuroscience, (4) quantitative reasoning, (5) experimental design, and (6) appreciation for how neuroscience can contribute to global solutions (Ramirez, 2020). The goal of these recommendations was to identify skills that would best prepare neuroscience graduates to be successful in biomedical careers and be informed citizens.

These competencies are even more important in the context of the COVID-19 pandemic. During March 2020, as the United States was beginning to understand the extent of the danger posed by COVID-19, scientists and scholars found themselves tasked with explaining what was going on to a panicked populace. Scientists are adept at science communication, though the typical audience for their work is other scientists, not the general public (Brownell et al., 2013b). We did not need merely a link to a peer-reviewed article at this time. We needed scientists to translate information for a general audience while maintaining the accuracy and nuance of the science. The "flatten the curve" graphics circulated online during March 2020 showcased the power of creative science communication to share complex ideas with a general audience (Wilson, 2020). The pandemic has also highlighted the importance of scientific literacy for the public. Lawmakers and individual citizens alike continue to make choices that can have profound effects on the health and well-being of those around them. Being able to make these decisions based on a good understanding of current scientific evidence regarding COVID-19 transmission could literally save lives (CDC, 2021). Given the context, it is imperative that we as instructors engage students in learning activities that help them build greater science literacy, communication, and critical thinking skills.

Despite the importance of science communication and its emergence as a field of study and practice, few undergraduate students receive instruction in or opportunities to practice science communication for a general audience as part of their coursework (Bankston and McDowell, 2018; Brownell et al., 2013a, 2013b; L. D. Mercer-Mapstone and Kuchel, 2016; L. Mercer-Mapstone and Kuchel, 2015). Instead, faculty often choose scientist-oriented assignments that help students learn to effectively communicate with other scientists through scholarly writing or presentations (Meitzen, 2015; Pugh-Bernard and Kenyon, 2020). These forms of scientific communication depend on the use of specialized terminology that acts as a jargon-barrier, making it harder for a non-specialist audience to easily understand what is being shared. By relying on posters, articles, or oral presentations, we are missing an opportunity to help students become better science communicators—a skill that would help them in their future careers and in their everyday lives. Another drawback of scientist-oriented assignments is that they do not require students to gain a deep understanding of their topic, since students can reuse complex terminology they have encountered in published articles to complete their projects, and we as instructors may not be able to assess whether the

students understand what that terminology really means. As such, students may be able to score well on their assignment submission without having to engage in deep learning.

To address these concerns, I decided to develop a broadly-oriented science communication assignment that tasks students with communicating with a general audience. Though the neuroscience core competencies are written at a programmatic level, they can also provide a framework to develop a high-impact science literacy assignment within a single course. Krajcik and Sutherland (2010) suggest five instructional strategies to help students develop science literacy skills and adopt characteristics of life-long learners: (1) Linking new ideas to prior knowledge and experiences, (2) Anchoring learning in questions that are meaningful in the lives of students, (3) Connecting multiple representations (making sense of models, diagrams, graphs), (4) Providing students opportunities to actively apply ideas to novel contexts, and (5) Supporting students' engagement with the discourse of science by constructing explanations and arguments. Here I share the blueprint for a podcast assignment in which I used Krajcik and Sutherland's strategies to provide the "how" for integrating the neuroscience core competencies into a broadly-oriented science communication assignment.

A podcast (a portmanteau created by combining the words *i*Pod and broad*cast*) is a digital audio or video file, often a part of a themed series, that can be downloaded to a personal computing device (Hargis et al., 2008). I chose this medium for the assignment because of my personal experiences with science podcasts, in particular, Radiolab (Abumrad and Krulwich, 2002–present), which I did in fact listen to on an iPod. I wanted my students to engage in the type of deep, interdisciplinary science storytelling that is typical of Radiolab episodes. Their reporting almost always strikes the perfect balance between scientific accuracy and audience-appropriate presentation, something that is rather difficult to do successfully (Brownell et al., 2013b; Vidal, 2020). Though faculty are increasingly using podcasts to share course content with students (termed coursecasting), few task students with creating their own podcasts as a learning activity in undergraduate STEM courses (Alpay and Gulati, 2010; Bartle et al., 2011; Nie et al., 2008; Pegrum et al., 2015), and at the time of this writing, there are no reports of a neuroscience podcasting assignment in the literature. Based on current research across disciplines, creative podcasting assignments can lead to deeper learning of course content (Dale and Povey, 2009; Kemp et al., 2012; Lee et al., 2008; L. D. Mercer-Mapstone and Kuchel, 2016; Moryl, 2016; Pegrum et al., 2015; Taylor and Blevins, 2020), gains in critical thinking (Dale, 2007; Harris, 2019) and communication skills (Alpay and Gulati, 2010; Byrne, 2016; Kemp et al., 2012; Klein, 2020; Mathany and Dodd, 2018), higher student engagement and greater student satisfaction (Byrne, 2016; Dale and Povey, 2009; Kemp et al., 2013; Bartle et al., 2011; Nie et al., 2008; Wakefield et al., 2011).

My goal for the podcast assignment was to gain insight into how well my students understood course content and the scientific articles they were reading, help students build connections between disciplines, and provide students with an opportunity to learn more about effective science communication across different types of audiences. As structured, the podcast project is completed in small groups over the course of a full semester by following a scaffolded assignment structure. The advantages of this approach include building science literacy skills, engaging in structured collaborative work, developing new types of science communication skills, gaining a deeper understanding of scientific topics, giving students agency in their coursework by allowing them to pick their own topics based on what is meaningful to them, and giving students a chance to be creative—something STEM majors typically do not encounter in their coursework. Initial comments from students suggest that they responded positively to the podcast assignment, admitting that while it may be challenging, the assignment promoted deeper learning, built communication skills, and was fun and worth the effort. Below, I outline the mechanics of the podcast assignment, as well as suggestions for implementation.

COURSE INVOLVED

I developed the podcast assignment for a 400-level Neuropharmacology elective course. This class is open to all students at UNC Asheville and is offered as a 300-400 level elective for neuroscience minors. The course prerequisites include fundamentals of neuroscience, and introductory cell and molecular biology. Students enrolled in the course are of junior and senior class standing and are majoring in Biology, Chemistry, Psychology, or Health and Wellness Promotion, and the typical class size is 14-16 students. The learning outcomes for the class are as follows: After completing this course, students will be able to

- Summarize the principles of electrical and chemical signaling in the nervous system.
- Describe the chemical functions of major neurotransmitter systems.
- Explain the factors that determine drug action and addiction.
- Contrast the effects of recreational and therapeutic drugs on the chemical functions of neural systems.
- Critically evaluate the rationale, hypothesis, research design, sources of error and variability, and significance of findings of original scientific research.
- Create science communication media to share informed opinions about the cellular and molecular mechanisms of drug effects with a broad audience.

This class is also designated as a Diversity Intensive (DI) course at UNC Asheville. Diversity Intensive courses are part of the liberal arts core, and all students are required to take one DI course during their undergraduate career. The aim of DI courses is to highlight "the centrality of diversity and complexity of difference in contemporary life" (Diversity Intensives, 2022. Through these courses, students and faculty examine their own beliefs and experiences, as well as those of others, to create transformative experiences. The podcast project is designed to also meet the learning outcomes identified by the DI Committee (detailed in Appendix 1).

The course is designed to give students an overview of principles of neuropharmacology, an understanding of the social and historical context that has shaped current views and laws relating to drug use, details about how major neurotransmitter systems typically function in our brains, followed by a detailed discussion of a select number of prescription and recreational drugs. Due to time limitations, we only examine a small number of drugs within the classroom. To broaden students' learning, and evaluate their mastery of course content, I chose the podcast project as the major assignment for this course (see Appendix 2 for the full list of course assessments).

PODCAST ASSIGNMENT OVERVIEW

Students are first introduced to the podcast project through a description in the syllabus. This short explanation reads, "As a team, delve into the current understanding of a drug we don't cover in class and showcase your science communication skills by creating a podcast for a general audience." Students receive a longer set of assignment instructions (see Appendix 3) through documents posted on the course learning management site (Moodle).

For this project, students work in groups of 3-4 students to create a 25-30 minute science communication audio podcast based on a drug of their choice (recreational or therapeutic). By choosing a drug of their interest that is not covered in depth in the course, students can anchor their learning in a question that is meaningful to their lives (Krajcik and Sutherland, 2010). Students are asked to pick a recent article (published within the last 5 years) to act as the "focus paper" for their project. This focus paper grounds the students' project, and gives their literature search a clear direction. Students are likely to pick an article that investigates a drug with which they already have some familiarity. As such, this project allows students to link new ideas to prior knowledge and experiences to build science literacy skills (Krajcik and Sutherland, 2010).

Students' podcasts must include discussions about the mechanism of action and dependence for the chosen drug, the findings in the focus paper, and the broader social, historical, and political contexts that influence how the drug is perceived and used. Students are given creative freedom with the format of the podcast and are encouraged to think about the best ways to frame and tell their particular story. This structure provides students with opportunities to actively apply ideas learned in their literature search to the novel context while using storytelling to develop a science podcast (Krajcik and Sutherland, 2010). Furthermore, the project engages students with the discourse of science, as they must construct arguments and explanations to bring together what they have learned and share it with a broad audience (Krajcik and Sutherland, 2010).

The assignment instructions provide a rationale for the project to help students understand why they are being asked to do this unfamiliar and seemingly time-intensive assignment. The purpose of the project is to practice communicating science to a variety of audiences and to analyze the complex intersection of factors that can influence drug use and abuse. To successfully complete this project, students must construct connections between neuropharmacological research, current events, and the social and historical context within which drug laws have developed and been implemented. They have to apply the information learned during the lectures to make sense of the current research they are examining. They also apply the primary literature reading skills they learn through the course journal club assignments (similar to the C.R.E.A.T.E. model, reviewed in Pugh-Bernard and Kenyon, 2020) to effectively navigate the literature. I share these connections between the other course content and the podcast project with students to help them understand why this assignment is a good fit for the course.

The aim of this project is not to train students as science journalists, but rather to have them act as research scientists sharing information with a non-expert audience. To achieve this, students first must become content experts on their chosen topic and the structure of the assignment is designed to facilitate their transition from novice to expert. The project is 27.5% of the course grade and is woven through the content and schedule of the course, making it an integral part of the course outcomes. This allows for formal training in science communication to be at the center of the learning experience, an option not usually available to neuroscience undergraduates (Brownell et al., 2013b).

The assignment instructions include science communication strategies to help students think about how best to construct their podcast content. First, I highlight the importance of knowing your audience. For this podcast, the audience is anyone who enjoys podcasts—the listener could have limited scientific background or extensive knowledge in the subject. Students should consider the best language and style to fit such a mixed audience. Second, I highlight the importance of tone—the tone of a good podcast episode is engaging and inspires continued curiosity in the listener, prompting them to stay tuned till the end of the episode. This podcast is not meant to be a simple reporting of the science discussed in the articles. Rather, students should weave a narrative based on their research to create a suitable tone for this assignment. In this way, students have to engage in deep research, active literature review, and creative reporting to create a compelling podcast. Combining these strategies allows students to build appropriate content for their podcasts. The content is shaped by (1) the purpose of students' work, which is to discuss a particular drug and how it affects human users from multiple perspectives, (2) their tone, which should be engaging and inspire curiosity, and (3) their audience, who may range from science novices to science experts and have different levels of knowledge about the topic.

I also share examples of successful podcasts with the students, including a Radiolab episode titled "The Fix" (released December 18, 2015), which focuses on drug addiction and a potential treatment for cravings—baclofen, as well as link to my podcast website (Kaur, 2021; clubkaur.com). The Club Kaur podcast series features work created by students through this assignment in previous years. The podcast is available for streaming on several podcast aggregator sites and is supported by the website, where each episode has a dedicated show notes page. I designed the show notes page to share the research used

to create each podcast episode, and students creating podcasts for this assignment also generate supplementary materials that match the show notes. As such, a link to the website serves to provide students with several successful samples for multiple parts of their project.

Developing Assignment Scaffolding

To support student success in an unfamiliar and complex project, I scaffolded the podcast project into multiple lower-stakes steps, providing students with a roadmap to plan their work for the assignment (Figure 1) (van de Pol et al., 2010). As mentioned, this project is worth 27.5% of the course grade, which is 110 points (Appendix 1). However, each individual step of the scaffold is worth no more than 20 points, reducing the impact of a single misstep by a student team on their overall course grade. The scaffold also provides accountability to students, ensuring that they are consistently working on the major project for the course. Each step allows students to gain important skills and develop content for the podcast (Table 1), which makes subsequent steps of the project easier. The assignment plan is outlined for students in the syllabus with names and deadlines of individual steps, and detailed instructions for each step are shared in the assignment instructions document (Appendix 3), and through the course Moodle page.

This assignment scaffold was designed to mimic the typical workflow needed to create a research-based podcast, which shares some features with a literature review. First, students need to pick a topic they would like to explore. Second, they need to undertake a literature search to identify sources that would provide content for their podcast. Third, they would need to read an identified short list of sources, develop an understanding of the shared findings, and find points of intersection and contrast. Fourth, they would need to construct a storyboard or script using audience-appropriate language and storytelling techniques to bring together their research findings into a cohesive story. The podcast content-generating steps are shown in maroon in Figure 1. An additional factor in the design of the scaffold was the importance of group work. This assignment requires small groups of students to work closely together throughout the semester to create the podcast. As such, I wanted to include elements in the assignment scaffold that would support effective group work. These elements are highlighted in grey in Figure 1. Together, the above considerations yielded the scaffolding plan for this assignment.

Supporting Effective Group Work

To further facilitate effective teamwork, students are required to complete all collaborative writing for the project using shared Google Documents. Students working in ineffective teams often feel the anxiety of having to carry the whole project because the team is graded as a unit based on a static submitted assignment. Google Docs includes a revision history that is available to anyone added to the document as an editing collaborator, which allows for students' individual contributions to be visible. I ask students to add me as an editing collaborator on their documents, so I can access the revision history as I provide feedback. They can then submit a link to this document via a Moodle Assignment portal so I can easily access their submissions. This workflow makes the

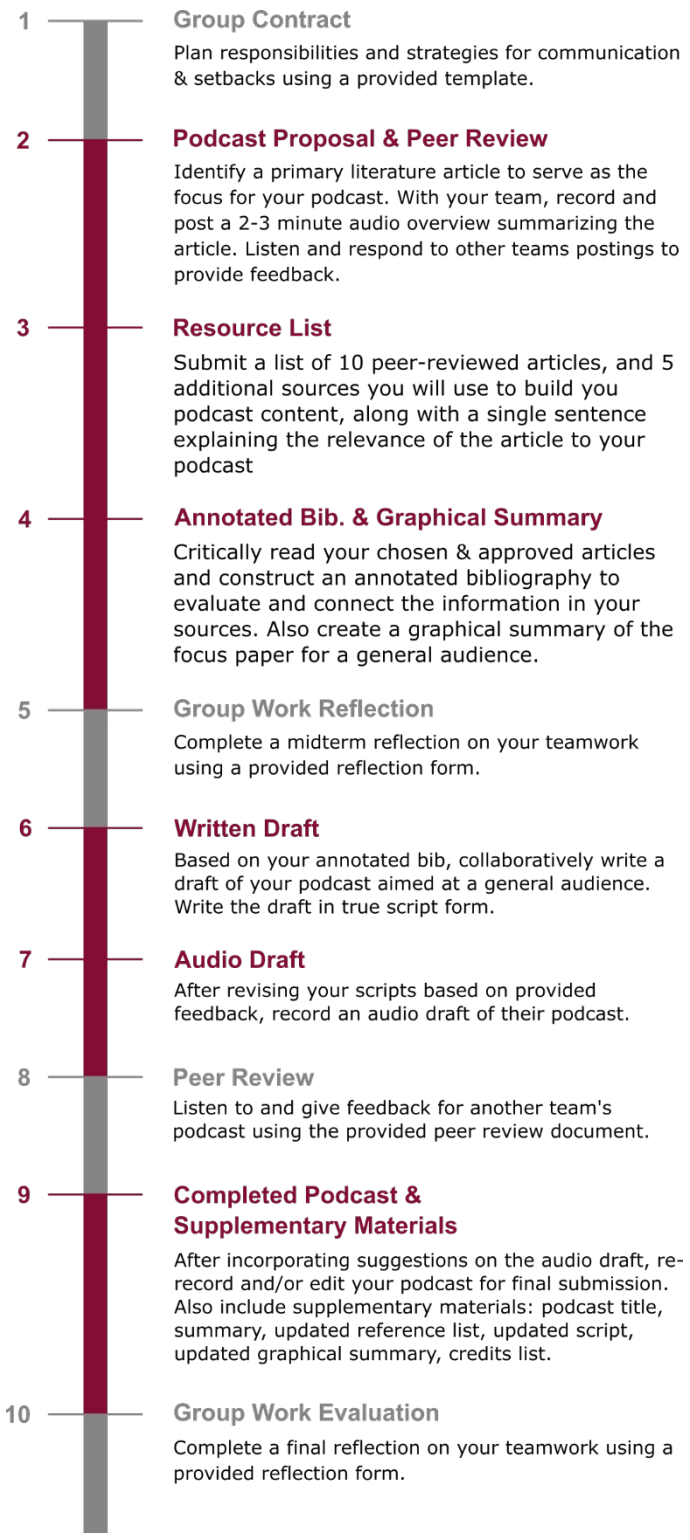

Figure 1. Podcast project scaffolding overview as written for students. The scaffolding steps designed to support students' collaboration are shown in grey and those designed to help students build content for their podcast are shown in maroon.

collaboration process more explicit, increases accountability, and allows me to provide further assistance to teams that are experiencing difficulties.

ASSIGNMENT MECHANICS

Each scaffold-step of the podcast assignment is due 2-3 weeks apart, providing enough time for me to give students feedback, and for them to incorporate that feedback ahead of the next project deadline. Students can revise and resubmit their assignments in this course, giving them the opportunity to refine their project at every step. In addition to the text-heavy instructions, information about each step is also shared with students in the form of a checklist (for example, see Appendix 4). The checklist includes required items as well as a list of optional steps students can take to complete the assignment in question. These optional steps are designed to clarify ways in which students can seek help, either from the instructor, peers, posted samples, or through campus academic support services. As such, the assignment checklists act as a means to foster student success.

To further support students in this project, I provide a timeline for completing each step of the scaffold through the syllabus. I suggest students start work on an upcoming scaffold-step 2 weeks before the due date, which helps students understand how to manage their time and balance the lecture-based learning and project work for the course.

The assignments are evaluated based on step-specific rubrics, that are also shared with the students (for example, see Appendix 4). The rubrics and checklists for each step are shared as a combined document to guide students as they complete their work. The assignment instructions, and all checklists, rubrics, and supporting materials are posted in a single Moodle Book at the start of the semester. The contents of the Moodle Book are organized by scaffold-steps for easy navigation (Appendix 5). The rationale, contents, expected learning gains, and assessment for each step are described below.

Group Selection

During typical face-to-face classes, students pick their own groups through conversations before or after class meetings during the first week of the semester. In an online setting in Fall 2020, this system did not seem appropriate. Instead, I shared a Google Form with the students in the course, asking them to identify topics they would be interested in for the project. The form asked them to write in their top 3 topic choices and identify preferences for working with any particular classmates. I then compared submitted topic interests and partner choices to create the final podcast teams.

Part 1: Group Contract

The first step students complete for this assignment is a group contract. I chose this as the first step of the scaffold to highlight the importance of group work in this project. Students were provided a group contract template modified with permission from a document shared by Humboldt State University's Center for Excellence in Teaching and Learning (personal communication, 2010; template in Appendix 3).

The contract highlights the importance of understanding individual responsibility in a team project, lays out group rules that cover punctuality, communication, and accountability, and includes an offer from the instructor to support group conflicts if they arise. The next section asks students to make a clear communication plan, assign individual roles to students in the team, and to identify potential solutions to common team problems. Once completed, students have to sign the document and submit it as a team. Though this step does not require students to create content for the podcast, it gives students an opportunity to build project planning, communication, and metacognitive skills (Table 1). Furthermore, it acts as a record of the group work plan that has been agreed upon by each team and can be helpful if conflicts arise.

This step of the assignment is due during the second week of the semester. It is worth 5 points and is graded as complete or incomplete. I read each contract and reach out to teams that may not have clarified sections of the contract, but otherwise do not engage in critiquing their choices.

Part 2: Podcast Proposal

To begin the project, students identify a recent primary literature article (no more than 5 years old) that focuses on a neuro-drug of interest. I recommend that students use a research article rather than a review article for their focus since the project description is designed for a focus paper reporting new findings. I share a link with an example paper that would make for an interesting podcast to guide students' focus paper choices. To give students insight into the ongoing projects across the class, I ask them to share their chosen paper on a discussion forum.

Additionally, I use this early step of the project to get students comfortable with audio recording in a low-stakes setting. Rather than a written proposal, I task students with creating a short 2-3 minute recording describing their interest in the chosen article, and why they think it would make a compelling podcast story. By including the last element of the prompt, I am able to get students to think about storytelling in science communication from the onset of the project, which is helpful during the scriptwriting phase. Students then must listen to the proposal shared by other teams and offer feedback, creating an opportunity for peer review. After completing this step, students have generated the topic and focus paper for the podcast, an interest-based hook for framing the podcast story, and developed experience in audio recording and peer review, skills they will need later in the project.

The proposal is also due during the second week of the semester and is worth 10 points. The specific grading criteria for this step are listed in Table 2. I assess and respond to each post to approve the selected topic and paper, and share any interesting sources I have come across, or point students to existing Club Kaur podcast episodes on their chosen topic so they can identify novel points of interest for their project.

Part 3: Resource List

Once their focus paper has been approved, teams must next build a list of potential sources for their podcast. Students

Assignment	Content	Skills
Group Contract	None	• Project planning • Communication between collaborators • Metacognition
Podcast Proposal	• Topic • Focus paper • Interest based hook for framing podcast	• Recording audio as a team • Peer-review
Resource List	• Sources for scientific content of podcast • Sources for interdisciplinary context • Summary sentences that can act as an outline for podcast script	• Searching research databases • Identifying relevant literature based on chosen topic • Differentiating peer-reviewed primary literature from other types of sources • Identifying reliable non-scientific sources • Citation formatting
Annotated Bibliography	• Sources for scientific content of podcast • Detailed summary of sources useful for script writing	• Critically reading primary literature • Summarizing scientific content • Scholarly writing • Identifying connections across publications • Value of Revision
Graphical Summary	• Supplementary Podcast Material	• Effective graphical representation of data • Communication to a general audience
Group Work Reflection	None	• Metacognition
Written Draft	• Script for podcast episode	• Writing engaging scientific content for a general audience • Value of Revision
Audio Draft	• Potential audio recording for podcast episode	• Recording audio as a team
Peer Review	None	• Peer-review
Completed Podcast and Materials	• Final podcast submission • Supplementary Podcast Materials	• Editing audio recording • Writing engaging scientific content for a general audience
Group Work Evaluation	None	• Metacognition

Table 1. Content and skills acquired by completing individual scaffolding steps of the podcast project.

submit a list of at least 10 peer-reviewed sources to inform the scientific content of their project, and at least 5 additional sources that will help them place the science within abroader social, historical, and political context. This initial search can help reduce the intimidation students may feel about approaching primary literature by breaking the task down into smaller steps. For this list, students simply find sources and read their abstracts to determine if they might be a good fit for the project. The submission is meant to be a working list, so students can continue to add or delete sources as they proceed further into the project.

As part of their submission, students must include a single sentence explaining the potential value of each source to their podcast story. This ensures that students read the abstracts of each source deeply and consider how the different articles would work together to add new information to their project. After completing this step, students have generated a list of sources for their podcast and developed several scientific literacy skills (Table 1).

The resource list is due during week 4 of the semester and is worth 5 points. This step gives me the opportunity to help students identify appropriate resources that have sufficient breadth to serve as their primary content source for their podcast. To assess this step, I verify the reliability of citations by checking the publication sources and date of publication and determine the scope of the studies through

Week Due	Assignment	Points	Grading Criteria
2	Group Contract	5	Graded as complete/incomplete
2	Podcast Proposal	10	• *Focus Paper* (2 points): Chosen Paper meets all requirements. • *Format* (1 point): Citation and link provided in prescribed format. • *Audio summary* (3 points): Provides clear and concise answer to why paper was chosen, and why the topic will make a compelling story. • *Peer-review* (4 points): Clear and thorough posting providing constructive suggestions for improvement.
4	Resource List	5	• *Citations* (2 points): Required number of relevant citations included. • *Explanation* (2 points): Single sentence explanation for how each resource will help tell their story. • *Format* (1 point): Clear writing and citations with required format.
6	Annotated Bibliography	15	• *Citations* (2 points): Required number of relevant citations in required format included. • *Content* (3 points): Research hypothesis and primary findings of each paper clearly explained, studied population and important methods identified. • *Validity* (4 points): Validity of each study is critically examined, with focus on methods, population, and data analysis. • *Connections* (4 points): How findings in each research article add to or contradict each other is clearly explained. How each article adds to the podcast story is articulated. • *Writing Quality* (2 points): Writing is clear, articulate, and grammatically correct.
6	Graphical Summary	5	• *Content* 3 points): Hypothesis and main findings of the focus paper are clearly written. No unnecessary jargon is used. • *Aesthetics* (2 points): Graphical summary is balanced, easy to read, and uses accessible color combinations.
6	Group Work Reflection	5	Graded as complete/incomplete
9	Podcast Written Draft	20	• *Introduction* (2 points): Podcast hosts are identified by name, class standing, and major. Introduction is catchy and clever. It provides relevant information and establishes a clear purpose engaging the listener immediately. • *Focus Paper Summary* (2 points): A concise and complete summary of the focus paper is included. • *Historical Context* (2 points): The historical context of the drug - when it was first made/discovered, its primary use, any changes in its use or perception thereof over time, are clearly explained. • *Mechanisms* (3 points): The current understanding of the mechanism of action and dependence of the drug are discussed in depth. • *Focus Paper Contribution* (2 points): A clear discussion of how your chosen paper adds to our understanding of the drug is included. • *Factors* (3 points): Biological and social systems influencing the incidence of drug use or abuse are critically and intersectionally discussed. • *Drug Scheduling* (2 points): Current drug scheduling is mentioned. Scientific evidence to support this scheduling is analyzed. • *Format* (3 points): The script follows an engaging format. The chosen tone, content, and language are well suited for a general audience. Storytelling techniques are used to effectively frame the content. • *Writing Quality* (1 point): Writing is clear, articulate, and grammatically correct.
12	Podcast Audio Draft	10	• *Written Draft Feedback* (3 points): All suggested changes from the written draft have been incorporated before audio recording. • *Delivery* (3 points): Podcast hosts sound well-rehearsed and have a smooth delivery in a conversational style. Conversation is paced well and has a rhythm that keeps the audience listening.

			• *Length* (2 points): Podcast is 25-30 minutes long. • *Format* (2 points): The script follows an engaging format. The chosen tone, content, and language are well suited for a general audience. Storytelling techniques are used to effectively frame the content.
13	Peer Review	10	• *Content* (8 points): All sections of the peer review are thoughtfully completed. Strengths and sources for improvement are clearly stated. • *Quality* (2 points): Writing is clear, articulate, and grammatically correct.
16	Completed Podcast and Materials	20	• *Audio Draft Feedback* (3 points): All suggested changes from the audio draft have been incorporated before finalizing recording. • *Content* (4 points): All elements of required content are included. Connections between the elements are clearly articulated. • *Quality* (5 points): Podcast host sounds well-rehearsed. There are no editing errors or extraneous background sound. Podcast is between 25-30 minutes long. • *Format* (2 points): The podcast follows an engaging format. The chosen tone, content, and language are well suited for a general audience. Storytelling techniques are used to effectively frame the content. • *Title and Summary* (2 points): Podcast title is catchy, and summary can successfully interest potential listeners. • *Supplementary Materials* (4 points): Submitted script matches the content of the podcast precisely. Bibliography of sources used to construct the podcast and additional readings are submitted with correct format. Graphical summary captures the main points of the focus paper and is suited to a general audience. Graphical summary is submitted as a high-resolution file. Relevant credits are included.
16	Group Work Evaluation	5	Graded as complete/incomplete

Table 2. Assessment criteria and point values for each step for the podcast project. Rubrics detailing grading criteria were shared with students with descriptions for proficient, partially proficient, and unsatisfactory work. Rubric subheadings are denoted by italics, followed by the maximum point value for that section, and the description for "proficient" work.

their title and/or abstract. I suggest students replace citations if they are not peer-reviewed (for those marked as scholarly sources), or if their content does not match the podcast topic. Students are encouraged to include citations with the article title and full text links to make the assessment more efficient

Part 4: Annotated Bibliography and Graphical Summary

Next, students expand on their approved resource list to create an annotated bibliography. Their annotations should include two short paragraphs, one that summarizes the content of the article and evaluates its validity, and another that discusses the source's connection both to other citations in their bibliography and to their project. Students are provided a list of prompts to help them consider the credibility and validity of their sources (Appendix 3), and with a sample entry for an annotated bibliography.

The annotated bibliography is written using scholarly language, allowing students to first communicate their understanding of their research to other scientists, a process that is typically more familiar to them (Brownell et al., 2013b). Since students are already acquainted with their reference list, they can focus more on the content of each article and deepen their critical reading and thinking skills. The specific prompt for the annotated bibliography also gives students a point of focus for reading their selected references, which can help circumvent the typical overwhelm that comes with reading a scientific article. Once complete, the annotated bibliography serves as a launching point for students' scriptwriting, as they already have the content of their podcast outlined through their annotations.

This step also tasks students with creating a graphical summary of their focus paper. Article graphic summaries can act as an effective mechanism to share scientific findings with a broader audience. This step of the project gives students a low-stakes opportunity to practice talking about their primary topic in audience-appropriate language. It also challenges students to develop visual communication skills and connect multiple representations of information (Krajcik and Sutherland, 2010), a valuable skill irrespective of the students' ultimate career goals. To support students in this step, I provide a link to an article titled, "How to Turn Your Journal Article into an Infographic" by the Journal of Marketing Management (2017), as well as links to Canva (https://www.canva.com) and Biorender (https://biorender.com) as options for their graphical summary design. Students submit the graphic as an image file, PDF, or through a direct link to their design. By completing this step, students successfully draft one of the supplementary podcast materials due at the end of the semester.

The annotated bibliography and graphical summary are

due during week 6 of the semester and are worth 20 points together. The higher point value attached to this step signals the amount of time it will take to complete the work, and the importance of this step in the overall scaffolding. The detailed assignment checklist and rubric for this step are shown in Table 2.

When evaluating this step, I copy the grading rubric into the students' submitted document, and offer feedback within the rubric, and as comments and line edits through the rest of their document. Deeply assessing students' summaries of articles does take some time. The annotated bibliographies guide how students discuss their topics in their podcasts. Since I plan to publish students' episodes on my podcast series, I approach this assessment as a fact-checker verifying a reporting story. I read the abstracts of each article to assess the depth of the students' understanding and occasionally read further into the article if I need more clarification. I then offer students feedback through comments on the depth and clarity of their critique, and suggestions of additional topics they might need to explore to round out their podcast story. Though time-consuming, I have found that engaging in an in-depth examination of the annotated bibliographies results in higher quality podcasts as students develop a better understanding of the articles through the feedback and revision process.

My primary focus of assessment for the graphical summary is their use of audience-appropriate language. Often, the first submitted graphical summary relies on discipline-specific jargon used by the authors of the focus paper. While this first draft would be a good graphic to submit with an manuscript, it is not well suited for the task at hand. I highlight the jargon words used by students to help them think through how to rephrase content for their audience, which is the focus of the script they will write later on. I also offer suggestions on using effective visual storytelling techniques to make the students' graphical summaries easier to understand and more impactful.

This is the first step of the scaffold where students take up the revise and resubmit option to clarify and deepen their annotations. Receiving detailed feedback appears to inspire students to dig further into addressing the shortcomings of their submission and write more complete annotations. I have allowed students to revise for partial credit or full regrade, and as expected, the full regrade option motivates more students to do the revisions. Undertaking revisions here also serves students by helping them see the value of revision in improving their work. As a result of that, students are more likely to look forward to receiving feedback to improve later submissions of the project. Since the graphical summary is one of the supplementary materials students will submit, they can use more time to revise that part of the assignment ahead of their final submission.

Part 5: Group Work Reflection

As they complete and submit their annotated bibliography, students engage in a midterm group work reflection using a provided template (link in Appendix 3). Each student completes a confidential reflection where they rate their own performance and contributions to the project, as well as those of other team members. Students also have to reflect on the successes and challenges of the project and their teamwork thus far.

The reflection is worth 5 points and is graded as complete or incomplete. I read these reflections to identify groups that could use support, but do not provide any specific feedback. The primary purpose of this reflection is to hold students accountable to their group contract and promote metacognition and reflection as an ongoing practice.

Part 6: Written Draft

Next, students write a draft of their podcast. While many podcasters work from outlines rather than full drafts when recording their episodes, I have the students write their drafts as true scripts. There are several advantages to this approach. First, it ensures that students organize the content of their podcast in a clear way. Second, this approach requires students to actively think about how they plan to communicate their podcast content to their intended audience. The script is where students are translating their scholarly writing into conversational jargon-free language, which is not an easy switch for students to make. By working on a written draft, students can experiment with different podcast formats at an early stage, so they can make any needed changes before proceeding to the recording step. Third, if students write their drafts as a true script, I am better able to offer them more effective and thorough feedback to strengthen their project. I find that students are far more likely to revise a written script than edit or re-record an audio draft, perhaps because of the perceived time it would take, or the technical knowledge required to edit audio (Kemp et al., 2013). As such, a true script draft serves as the best way to help students create share-worthy content.

Students have creative control over the format of their podcast, so there are no specific page limits for their drafts. Instead, I share that 25 minutes of recorded time typically matches 3500-4000 words depending on the speaking speed of the hosts. This gives students an understanding of the length their drafts should be to give them enough content for the recording. To guide their content choices, I offer the following prompt.

The content of your podcast should include:

- a summary of the paper that forms the foundation of your project
- the historical context of the drug - when it was first made/discovered, its primary use, any changes in its use or perception thereof over time (DI SLO 5)
- the current schedule of the drug
- current understanding of the mechanism of action and dependence of the drug
- what your chosen paper adds to our understanding of this drug
- what types of factors determine if someone may need or seek out this drug? (DI SLO 3, 4)
- how do biological or social systems influence the incidence of use or abuse? (DI SLO 1, 3, 4)
- an analysis to determine if the current scheduling of the drug is scientifically sound (DI SLO 2, 5)
- relevance of this work to the lives of your listeners

Some of the bullet points are designed to meet the diversity intensive student learning outcomes (SLO) (Appendix 1). These parts of the prompt are informed by the 5 non-peer reviewed sources identified by students in earlier steps of the scaffold, and the Drug Use and Abuse content covered during our lectures (Meyer and Quenzer, 2018).

Students are encouraged to rearrange the elements suggested above to best suit their story. The assignment instructions for this step also include reminders for students to consider the purpose, tone, and audience for their podcast, and to use storytelling techniques and emotions to draw the audience into their story. I also remind students that spoken and written language can vary and suggest that they read their drafts out loud to make sure their language is not too formal for an audio podcast.

This step of the scaffold is the most significant. If students are able to meet the requirements shared in the rubrics for the written draft, they are likely to produce a podcast episode that meets the learning goals of the assignment. This step is also one that students struggle with most, as students need to determine how best to organize their research into a coherent story, how to develop a hook to drive the listener's interest, and how to talk about neuropharmacology without using discipline-specific terms that we spend most of the semester learning. This shift in audience can be jarring and requires students to approach the writing task from a very different perspective. To support students in this task, I remind them of the Club Kaur website and show notes resources. The show notes pages also include transcripts to the podcast episodes (scripts students had written for their podcast assignments). These transcripts can act as samples for students to see the different ways in which previous students solved the problem of communicating science without specialized terms. Students typically go through 2-3 rounds of revision with their written drafts ahead of their recording. With each revision, the quality of their script as defined by the rubric improves, helping students understand the value of receiving feedback and undertaking revisions.

The written draft is due during week 9 of the semester and is worth 20 points. As expected, the written draft is also the step that requires the most time for constructive feedback. I offer feedback using the rubric as well as using comments throughout their draft documents. In particular, I look for unexplained jargon, any required elements that might be missing, holes in the story that need to be addressed, and the use of conversational transitions and storytelling to create a more authentic podcast feel (Table 2).

Part 7: Audio Draft

Once they are satisfied with their script, students record an audio draft of their podcast. When this course is offered face-to-face, I direct our students to the university Media Design Studio, which includes a staffed audio lab, and self-recording booths available for student use. The Media Design Studio also has computers with audio editing software, and staff available to help students with technology needs. This option was less feasible during the Fall 2020 remote offering of this course, so I adjusted the grading rubrics to place less emphasis on the quality of the audio submitted by students and included recommendations for free software like Audacity and Anchor to help them with recording and editing audio. I shared links to a blog post that explains how to use Audacity to create a podcast, and to the Anchor website, which includes information on how to use Anchor for recording podcast episodes (Appendix 3).

I also share some recording tips with students based on my own experience editing other students' submissions for the Club Kaur series. I suggest students record a few seconds of silence before they start speaking, as this time can be used to identify and remove ambient noise from their audio. I also recommend students repeat an entire sentence if they misspeak in the middle of it. Our natural inclination is to simply repeat the word we misspoke with greater emphasis, which makes the audio much harder to edit while maintaining a natural speaking flow. As a final tip, I suggest students rehearse their scripts ahead of recording, so their conversation sounds more natural and their delivery is smooth. Most Fall 2020 teams used Zoom to record their audio, which was sufficient to meet the requirements of the assignment. Students submit their recording through Google Drive links.

The audio draft is due during week 12 of the semester and is worth 10 points. Students are evaluated on their revisions, their delivery, and the format of the podcast (Table 2). I hoped to bring particular emphasis to the importance of revision by assigning a portion of the grade to it. In fact, if students have engaged in revising their scripts and rehearsed them before recording, they require very little feedback at this stage of the project. I share any suggestions I have by adding comments to students' script documents so I can match comments with specific sections of their podcast.

Part 8: Peer Review

Student teams peer review each other's audio drafts as the next step of the project. I share a peer review template with students that combines the written and audio draft rubrics, so students can comment on other teams' podcast content and delivery. Students are encouraged to complete the reviews thoughtfully and share strengths and suggestions for improvement. I pair teams together for the review, so each individual student only completes one peer review, but each team receives 3-4 peer reviews. This strikes a good balance between work assigned to each student and giving each team multiple opportunities to receive feedback.

Peer reviews are due one week after the audio drafts and are worth 10 points. To give the peer feedback further emphasis, I withhold my own feedback on students' audio drafts till after they have had a chance to look through the feedback from their peers. This still provides each team sufficient time to address feedback they receive from me as well as from other students ahead of their final submission. I grade the peer reviews on a complete/incomplete scale and do not offer students feedback on their peer reviews.

Part 9: Completed Podcast and Supplementary Materials

At the end of the semester, students submit a completed 25-

30 minute audio podcast and supporting materials for the show notes page through Google Drive. This includes an engaging podcast title to allow a potential listener to find their podcast episode and an intriguing summary to move a potential listener to tune in. These elements present students with another opportunity to use their creativity and science communication skills in the project. Students also submit an updated graphical summary, reference list, and script. These items are made available as podcast show notes so listeners can interact with the research discussed in each episode for themselves and to make the podcasts accessible for deaf or hard of hearing audience members. Students also submit any additional readings of interest and credits identifying individuals that provided support during the recording process for the show notes. As part of this final submission, students have the option to complete a waiver permitting me to share their podcasts as future episodes on the Club Kaur series, and I only publish episodes with the creator's consent.

This project scaffolding plan was designed such that students would have little to do on the project at the end of the semester when they are also completing other major projects and getting ready for final examinations. If students have engaged in the project to meet the benchmarks with each scaffold step as defined by the rubric (Table 2), their final tasks only include editing their audio draft to address any sound concerns and writing a short title and summary. Since students have the assignment instructions for the project at the start of the semester, they can plan to prepare their supplementary materials ahead of time. This allows students to approach the end of the project with less stress and greater enthusiasm for completing the project well.

This final submission is worth 20 points and includes "addressing feedback" as one of the grading criteria. As with the audio draft, if students have been engaged with the project through the semester, my only comments to them at this stage are congratulations on creating great podcasts.

Part 10: Group Work Evaluation

As part of the final submission, students complete a group work evaluation using the same template as the midterm reflection. The evaluation is worth 5 points and is graded as complete or incomplete. The final evaluation provides students with another opportunity to engage in metacognition and serves as a record of how each team collaborated over the semester.

Meeting Neuroscience Core Competencies

The core competencies for neuroscience education identified by the faculty at the 2017 FUN Workshop (Ramirez, 2020; Wiertelak et al., 2018), served as a framework for this assignment's current construction. Because the assignment does not involve gathering experimental data, some of the competencies are addressed by having students engage with existing studies as described below.

The first identified core competency is "promoting critical and integrative thinking" (Ramirez, 2020). The podcast project requires students to critically read a body of literature and synthesize the information across articles into a cohesive story. Students have to source information from scientific articles as well as popular media outlets to understand how their focus paper fits into broader social, historical, and scientific contexts. As such, students engage in critical and integrative thinking throughout the podcast creation process.

The second core competency for neuroscience education is "developing communication skills (writing, oral, visual)" (Ramirez, 2020). This assignment provides students a chance to develop competency in a number of communication skills. Students have two significant opportunities to develop writing skills. The first is the construction of the annotated bibliography, which is written in a scholarly format with other scientists as the audience. Students also practice their writing skills during their script drafting, where they engage in communicating science with a more general audience. Students have two opportunities to practice oral communication skills, through their initial proposal recording and their podcast. Finally, students engage in visual communication through creation of the graphical summary of their focus paper, which is written for a non-specialist audience. The design of the assignment enables students to practice a variety of communication skills with an authentic audience, as they know that their podcast episodes could be featured on the Club Kaur podcast series.

The third competency is the ability to "articulate the interdisciplinary and interdependent nature of the neuroscientific enterprise" (Ramirez, 2020). The podcast project is particularly well suited to meet this competency because of the integration of Diversity Intensive learning outcomes into the assignment structure. An important part of this assignment tasks students with understanding the social and political factors that may affect their chosen neuropharmacology topic. This requires students to step outside the neuroscience discipline and understand the myriad factors that intersect with neurobiology to result in addiction. Their final podcasts act as a showcase of their interdisciplinary inquiry.

The fourth and fifth recommendations require students to build competency in quantitative reasoning skills and experimental design. These skills are vital for students' ability to critically analyze articles included in their bibliography. Students must use quantitative reasoning skills to examine the findings shared in research articles and assess their validity and use experimental design skills to determine if the methods used in each study were well suited for the research question at hand. As such, the podcast project allows students to engage in developing these competencies within the confines of a course that does not include a hands-on laboratory experience.

The final identified core competency recommends that the neuroscience curriculum should "promote an appreciation for how the neuroscientific enterprise may contribute to the discovery of solutions to vexing problems confronting society" (Ramirez, 2020). Neuropharmacology is an ideal subdiscipline to support this aim. In their podcasts, students explore a particular drug of interest, researching and communicating its history and use. Through this research, students are able to see how

neuroscientific research has solved and created problems for our society. In particular, students are asked to consider the current designation of their chosen drug in the Schedule of Controlled Substances and whether the designation is appropriate based on the current scientific research on the drug. This means students actively engage in understanding how scientific findings are used to inform policy changes, something that directly addresses core competency.

These core competencies ensure burgeoning neuroscientists have the skills and knowledge necessary to navigate their careers and their lives, yet the podcast format of this assignment adds something more: experience communicating their skills and knowledge to the general public.

OUTCOMES

Podcast Quality

This course has been offered every Fall semester since 2016, resulting in the creation of 30 podcast episodes. The first offering of this course in Fall 2016 had only seven enrolled students. Because of the small class size, I asked each student to make their own 12-15 minute podcast rather than work in teams. All the submissions during this first course were of good quality, meeting the requirements laid out in the rubrics.

Six episodes were created during the Fall 2017 course. Five of the six teams created high quality episodes that met the assignment outcomes and were publishable based on content quality. The remaining podcast episode received 84% on the assignment, but required further elaboration in one section, and so was not added to the episode bank.

In Fall 2018, students created six podcasts, three of which were of high quality based on their content. The remaining three episodes were well constructed but were missing depth in particular sections as defined by the rubric, and as such not suitable for broader dissemination.

All episodes created during Fall 2019 (7) and Fall 2020 (4) followed the presented assignment scaffolding structure. All these episodes met the criteria laid out in the rubrics and were of publishable quality. Across the semesters, student performance on the annotated bibliography and podcast script served as a good indicator of the quality of podcast that would be submitted at the end of the semester, as each step laid the foundation for the subsequent step. Because of this, I have steadily revised the supporting materials available to guide students' work in these steps and increased the depth of my feedback. The Fall 2019 and 2020 cohorts received these supporting interventions, and their impact was evident in the increased quality of the submitted podcasts.

Student Impressions

Students' feedback on the course was gathered each semester through the university student evaluation forms. The Diversity Intensive elements were added to the course in Fall 2019, however the overall structure of course and the podcast assignment was the same across the 5 years this course has been available. In the end of term evaluations, students overwhelmingly shared an appreciation for the podcast assignment. There were no quantitative questions addressing the podcast project on the evaluation form, as this was a university instrument, however students shared their feedback on the assignment through the open response sections of the form. Thus far, 65 students have taken the course, and 52 of them completed the end-of-term evaluations.

There are three open-ended questions on the university survey where students can share their impressions of the course. To identify relevant comments, I read through all student feedback for statements related to the podcast project. The first open-ended question asks students to identify the aspects of the course that they felt were most beneficial to their learning. In response, 18 students identified the podcast project as being one of the most beneficial aspects of the course. The second question asks students to identify strengths of the instructor, or how the instructor supported students' learning. Here, 10 student comments referenced the podcast project in some way. The final open-ended question asks students to identify areas for improvement for the course or the instructor, and only 5 student comments addressed aspects of the podcast project in this section.

Qualitative analysis of comments in response to the first two questions revealed several themes. Students shared that completing the podcast project resulted in deeper learning, with 12 of the identified comments falling into this category. One student reported that the podcast was the most beneficial to their learning because it "*forced us to really dive into the literature to understand something*." Another student comment compared the assignment to an exam, noting that the podcast "*forced me to really break down the material and gain a thorough understanding rather than just memorizing for an exam*." Effective science communication does require a thorough understanding of the content being shared, because students cannot rely on complex terminology to show their grasp of the concepts. One student reflected on how I, as the instructor, supported their learning: "*she helped understand concepts by directing us to master explaining them to a lay audience,"* highlighting the value of general science communication assignments in building content knowledge.

Another theme within the students' feedback was an appreciation for having diverse ways to engage in learning the course content. Students did not have to rely exclusively on being prepared for high-stakes exams as their only means to show their understanding of class material, which reduced their anxiety about the course overall. This reduced stress could mean students were more able to engage in the complex process of deep learning. Student comments also noted that the assignments in the course were "*creative and useful*," and that the coursework was well aligned. One student shared, "*All classwork was beneficial to the understanding of the subject, as well as other forms of scientific discussion*." This showcases the impact of planning the podcast assignment as an integrated part of the course on students' willingness to engage with the task.

Several student comments identified the freedom of topic choice as a motivating element of the project structure. Students shared that they liked the opportunity to dig deeper

into a drug of their choice and "*guide our own learning based on our interests*." Giving students agency to make decisions about their learning has been suggested as a strategy to increase student motivation and engagement (Jones, 2015), and these comments support this idea. Students also welcomed the opportunity to develop oral communication skills. One student who highlighted the podcast as the most beneficial aspect of the course shared "*podcasts gave us a real life application and developed speaking and research skills. The podcast also allowed us to use media - something you don't always get in science classes - and can be beneficial for the future.*" These comments show the value of bringing new media assignments into our classrooms as a means to give students the opportunity to engage in creative work and build skills that enhance their employability.

A final theme that emerged from these comments was the difficulty and value of the assignment. Students shared that the assignments were in fact challenging and required a significant investment of time, however, it was also worth the effort because of the science literacy skills they gained and the enjoyment they got out of the process. One student wrote, "*Assignments like the podcast were difficult, but allowed me to think more critically about topics discussed in class*," while another noted, "*The podcast although time consuming was really fun to do*." As mentioned earlier, the podcast assignment is time-consuming for the instructor as well. However, I agree with the students—it is time well spent and can be quite fun.

The comments referring to the podcast project within the suggestions for improvement for the course or the instructor were found in the Fall 2016 and 2017 course offerings. These comments requested more detailed rubrics for the major course assignments like the podcast project. It was in response to this early feedback that I began to develop rubrics and checklists for each step of the scaffold. Over the years, I have refined them further to more explicitly state the outcomes students are expected to meet. The impact of these expanded assignment instructions is evident, as no student comments in the following semesters (Fall 2018-20) mention the podcast project as something that needs further improvement. In fact, one student from the Fall 2019 offering wrote, "*The podcast project was really engaging and helped me keep on track with how she laid out the project*."

It is worth noting that 2 of the 5 comments in the suggestions for improvement section identified the assignment as helpful. One student said, "*Sometimes I felt that the amount of coursework for this class was overwhelming at times because of all the work I had to do for other classes. However, all of the assignments given were applicable to the course and greatly helped me to get new insights about the material*." This comment shows that students can see the value of a labor-intensive activity if they can see how it supports the overall goals of the course.

These comments are drawn from university evaluation instruments, which did not include questions specifically designed to understand how the podcast project changed student learning, or how it impacted students' science literacy skills. A more detailed assessment of the impact of the podcast assignment on students' learning, attitudes, and ability to meet the core competencies for neuroscience education is underway.

Club Kaur

Providing students with an authentic outlet to share their science communication work has been linked with greater motivation (Brownell et al., 2013b). For this assignment, students were aware that if submitted podcasts were of good quality, they would be shared on the Club Kaur series. Even though I launched Club Kaur in Summer 2019, students enrolled in the course between 2016-18 knew that I intended to share their podcasts publicly, and many signed waivers to allow me to post their work. The students who took Neuropharmacology in Fall 2019 and 2020 were given a link to the Club Kaur website as a supporting resource with several successful examples for their project. Having access to the Club Kaur podcast series gave students a chance to act as an authentic audience, as they could listen to work created by former students and judge the effectiveness of the communication strategies used. Students shared feeling a greater motivation for creating quality podcasts because they knew it would be shared more broadly. One Fall 2020 team even sent an email sharing their plans to re-record their episode after the close of the semester to address sound quality issues because they wanted their episode to be shared.

When I first launched the podcast, I chose to host the episodes through a free SoundCloud account, as I did not have funding for the project. I shared 5 episodes during the original run, and the episodes gathered ~150 listens altogether. When I would share the podcast episodes with colleagues and friends, they would ask if they could find the series through podcast aggregating services like Apple Podcasts or Spotify. Because SoundCloud does not integrate with these applications, I moved the podcast hosting to Castos, a podcast hosting and analytics company (https://castos.com/) in Summer 2020. At the time of this writing, there are 10 episodes available as part of season 1 of Club Kaur. The episodes can be streamed on the Club Kaur website, and through Apple Podcasts, Spotify, Stitcher, and Amazon Music. As of January 8, 2021, Club Kaur episodes have amassed 871 listens/downloads across 13 countries.

I maintain the Club Kaur webpage on a Wordpress site and prepare episodes for publication myself. I use Audacity to edit students' submissions to address issues of sound quality and to add a unique introduction and end credits section. This hands-on time with audio editing has enabled me to become a technical resource for students requiring additional help. I publish new episodes from the archive of student podcast submissions every other Tuesday, with hiatuses for Winter and Summer. Once live, I promote the podcast episodes through the Club Kaur social media platforms on Instagram, Facebook, and Twitter (@clubkaur). I also share the episodes on my private social media accounts to draw more listeners.

SUGGESTIONS FOR IMPLEMENTATION

New media assignments give our students an opportunity to "engage with, create, and represent scientific knowledge"

(Rifkin and Hine, 2016, pp. 13). But such assignments are often not implemented into courses because faculty prioritize teaching scientific content, believing there is not enough time to cover the required course content and engage students in new media-based assignments. Another reason faculty may not implement these types of assignments is lower confidence in their ability to instruct students on the mechanics of a podcast-like assignment (Rifkin and Hine, 2016). I designed this science communication assignment to address these points of reservation. For one, learning course content is at the center of the podcast project. Students must be able to understand the core concepts of neuropharmacology covered in the lectures in order to navigate the content of their chosen sources. Furthermore, I integrated teamwork, communication, and digital skill-building steps into the assignment scaffolding. Through this intentional design, I believe this assignment structure could easily be implemented in any undergraduate neuroscience classroom.

As described here, the podcast project is designed for an upper-division neuroscience course. However, it can be easily adapted for introductory neuroscience courses. We can alter the difficulty of this project by changing 2 details: the length of the final podcast episode, and the number of sources required to form the content of the podcast. By reducing the required citations to 5-7, and reducing the podcast length to 15 minutes, the project would be appropriate for students in 100 or 200 level courses. I would also recommend adding more supporting resources when adapting the assignment for lower-level courses. Students in an introductory neuroscience class would have less preexisting knowledge and experience with finding suitable peer-reviewed sources and reading and interpreting literature. Including occasional "podcast workshop" days in the course calendar to instruct students on these skills would foster greater student success (for example, through a C.R.E.A.T.E. style journal club, see Pugh-Bernard and Kenyon, 2020).

For some courses, dedicating the time needed for this extensive scaffold might be a limiting factor. In this case, the reference list and audio draft steps of the scaffold can be deleted. The reference list step is designed to prevent students from completing in-depth annotations on unsuitable sources, which happened on occasion before this step was added to the project structure. However, a short video resource on identifying appropriate sources for the project could be substituted for a reference list submission without losing any of the primary learning outcomes for the assignment. I ask students to submit audio drafts because I plan to publish their podcast episodes and so want to ensure the episodes meet my content and audio quality requirements. As such, this step could be eliminated without compromising students' learning. I would recommend asking students to provide peer review feedback on the written drafts if no audio draft is being created. That would still allow students to engage in the helpful process of peer review and to draw inspiration from the storytelling methods used by their classmates. Depending on the typical teamwork dynamics amongst students at different universities, the midterm group work reflection could also be removed to make the project scaffolding easier to schedule.

The scaffold shared here uses a student-selected focus paper as the guide for the topic of the podcast. Alternately, students could brainstorm a neuroscience question that they would answer through their podcast or identify a science myth they would like to bust. These types of topic selection prompts would work well for introductory science courses. A word of caution, when students choose science questions as their podcast topic, they often start with questions that are too broad in scope to be effectively addressed in a short podcast with limited citations. If that happens, I work with the podcast teams to help them narrow their question down into something they can reasonably answer within the constraints of the assignment.

I also give students time during class meetings to work on their podcast to further integrate the assignment into the course. I highly recommend this practice, especially because it is often difficult for students to find time outside of class to coordinate group meetings due to competing demands. By reserving class time for group work I can facilitate effective student communication and teamwork. Furthermore, these meetings give students the opportunity to work on their projects with the instructor available for real-time feedback. This can be particularly beneficial during the topic selection phase especially if teams are starting with a question to guide their literature review than a focus paper.

Another way to adapt this assignment would be to task students with creating video podcasts rather than audio only projects (Hawley and Allen, 2018). Creating videos would be particularly useful for courses that include visual communication skills as a student learning outcome. Video podcasts are typically shorter, so an episode length of 7-10 minute would be ideal. To best support students, a video script style template should be shared for the written draft so students can storyboard the visual components of the podcast in tandem with the audio components.

A final suggestion is to engage students by providing them an authentic audience. You could choose to share the final podcasts with just the producing class, with the department, the university, or beyond. Podcast episodes could be hosted through Google Drive or OneDrive and could be shared on a non-public platform like Padlet, or to a more public website for streaming. They could even be shared at undergraduate research symposia if students are reporting on data that they have collected themselves. The simpler processes require less time, effort, and cost, whereas sharing a series on a podcast hosting service requires more resources. Whatever model is chosen, the availability of an actual listener beyond the instructor can motivate students to put more effort into their assignments (Brownell et al., 2013b).

SUMMARY

I was recently chatting with a friend who is a postdoctoral researcher in neuroscience. As part of her application to the Burroughs Wellcome Fund Postdoctoral Enrichment Program, she had to write a lay abstract aimed at a general audience and found the process oddly frustrating. When

describing her experience, she said, "*I think I underestimated how challenging that lay abstract could be and didn't find non-neuroscience people for feedback, which is what I needed to do*." Conversations like this are not uncommon, as scientists move through their education and training with little to no explicit instruction in effective science communication strategies. Yet, these skills are vital to their careers and beyond. Through assignments like the podcast project described here, students can start to build a science communication toolkit as early as their first semester in college (for an example, see Club Kaur season 1 episode 7 [2021).

This project has been a source of inspiration, curiosity, and delight for both me and my students. Moreover, creating podcasts has enabled my students to gain a deeper understanding of the course content, develop critical thinking and science literacy skills, and develop science communication skills in an authentic setting. Students found the podcast assignment creative, engaging, challenging, and meaningful. And I found that students can accomplish great things if they have clear directions, structured scaffolding, and the freedom to pick a topic of their choice.

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Received January 15, 2020; revised March 8, 2021; accepted March 21, 2021.

I extend thanks to Dr. Elizabeth Pascoe, Dr. Dina Gohar, and Mr. Brenan S. Beresford for feedback on this manuscript, the Media Design Lab at UNC Asheville led by Mr. Sasha Hussey for their technical support through the years, and the students in my courses for taking on the project with such enthusiasm and creativity that I had to share their podcasts with the world. Funding for the Club Kaur Wordpress website is provided through UNC Asheville's Digital Learning "Domain of their Own" project.

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APPENDIX 1

Diversity Intensive Component of Podcast Project

The Diversity Intensive course outcomes are:

- Students understand the socially constructed nature of identities.
- Students understand the significance of individuals' differing relationships to power.
- Students understand how individuals, organizations, and institutions create, perpetuate, or challenge inequality.
- Students understand how multiple identities intersect.
- Students are better equipped to reevaluate their ideas about diversity and difference.

The DI aspect of the course was shared with students through the syllabus as follows:
"Neuropharmacology is a Diversity Intensive course, focusing on the meaning and experience of diversity and difference and the implications of living in a diverse society in the context of our course topic. We will examine contemporary concerns related to drug use by humans, particularly substance use disorders and medical treatment of mental health disorders. We will engage in discussions about the biological diversity that predisposes or protects individuals from these disorders. In addition, we will examine how environmental factors, drug policies, and social structures intersect with neurochemistry to render individuals more or less vulnerable to the disorders. We will deconstruct the identity of "addict" and challenge the relationship between "willpower" and relapse by closely examining current scientific research."

APPENDIX 2

Neuropharmacology Course Assignments and Point Values

Students are assessed using 5 categories of assignments. In total, the course is worth 400 points. The categories, descriptions, and specific point values are as follows:

- *Journal Club Literature Discussions* (80 points - 20%):
  4 journal clubs held over the course of the semester. For each, the pre-assignment and in-class discussion are worth half the points.
- *In Class Activities* (60 points - 15%):
  These include active learning exercises completed during class meetings. In Fall 2020, this category was instead titled "Knowledge Checks" with students earning points for completing short questions paired with mini-lecture videos.
- *Recalls* (100 points -25%):
  Short, frequent, quiz-style exercises that require students to practice recalling and applying the course content.
- *Science Communication Podcast* (110 pts – 27.5%):
  Point breakdown by scaffold in Table 2 of main article text.
- *Class Participation* (50 points - 12.5%):
  Points awarded for attendance and engagement during class meetings.

APPENDIX 3
A. Full Assignment Instructions for Podcast Project

NEUR410 Neuropharmacology: Podcast Project
Assignment Instructions

This document contains **detailed assignment instructions** for the podcast project. Abbreviated versions of these instructions are available as step-specific **checklists**. Consult the podcast **rubrics** for grading details.

What?

We will only cover a few drugs as part of the curriculum in class. To expand your learning, you will work in groups of 3-4 to create a science communication podcast. You'll pick a recent article that focuses on a drug of your choice (recreational or prescription). You'll prepare a podcast focusing on the mechanism of action and dependence for your chosen drug, and the findings in the paper you chose. In the podcast, you'll also examine the broader social, historical, and political contexts that influence how this drug is perceived and used. You will be graded primarily on the content of the podcast with a small portion of the grade coming from the aesthetic quality of the podcast. The podcast must be around 25-30 minutes long and may have any format you choose: solo narration, a conversation between two individuals, an embedded interview, some combination thereof, or anything else that you think would be a good format for your work.

Note: *I will ask you to sign releases so that I may post your podcasts for a greater audience outside of UNC Asheville through my podcast series Club Kaur (clubkaur.com). For this reason, I ask that you not sample any popular music in your podcast, since I can't afford the rights to any songs!*

Why?

Purpose: The purpose of this assignment is to practice communicating scientific information to a variety of audiences and analyzing the different factors that influence drug use and abuse.

In other words, your goal is to take a complex, jargon filled scientific conversation, and translate it in your podcast so that almost any audience would be able to appreciate the content.

This project is an opportunity for you to showcase the knowledge and skills you'll develop through our course. To successfully complete this work, you'll use your understanding of Neuropharmacology from course lectures, and the literature reading skills you'll develop through our Journal Clubs. Plus, this podcast will allow you to flex your creative science communication skills, the importance of which has come to stark light during the pandemic.

Some more considerations:
Audience: Your audience is really anyone who enjoys podcasts. So, your listener may have a lot of scientific background or know nothing at all about drug systems. You should plan to use the language and style that you think will best suit this mixed audience.

Tone: The tone of your podcast should be engaging and should inspire curiosity in your listener regarding the topic you have chosen. You should also be critical in your evaluation of the research you've read to construct your podcast, rather than simply reporting out what the authors have stated in their articles.

Use these elements to shape the content of your podcast.

Isn't the content of our podcast just the content of the scientific paper that we have chosen?

Not exactly.

Your content should be shaped by the purpose of your work (to communicate science to a lay audience), the tone of your work (you are engaging in an enthusiastic and interdisciplinary critical discussion of a particular drug and how it affects human users), and your audience (ranging from those who have little to no knowledge about science to those who may be expert scientists in a variety of fields).
In other words, the purpose, tone, and audience of your podcast will dictate how you craft the podcast.
Some questions to consider as you are crafting your podcast script:

1. Is the topic you are covering well-known and often debated?
   If your topic is such that your audience will have pre-formed opinions about it, you may consider providing some persuasive arguments to support your interpretation of the topic.
2. Is the topic narrow in scope?

If the topic does not affect a large section of your audience, you may consider how you can build a case for the relevancy of the topic.

3. Does the topic cover information that is not commonly understood?
   Since you will be discussing information from scientific research articles, you will have to think about how to provide additional information to allow all the members of your audience to understand the topic.
4. Has the topic been subject to widespread misinformation or rumors?
   If your topic has been discussed in popular culture such that you suspect your audience might have some misunderstandings about it, you may want to provide analytic insight into the common misconceptions about your topic.

Want to learn more about effective science communication? Check out expert Greg Foot's YouTube course on Talking Science: An Introduction to Science Communication.

For examples of successful podcasts, check out the *Club Kaur* podcast series, and the *Radiolab* episode "The Fix" (published Dec 2015). A note about *Radiolab*: Don't use this episode as a goal in terms of the production value - Radiolab is beyond amazing and I'm not expecting you to put in the kinds of hours it takes to make that kind of podcast! Rather, use this example as a guide to understanding your audience. *Radiolab* does a great job of taking information from the scientific literature and translating it for a general audience without losing too much of the scientific nuance of the information, which is the goal of your project.

How?

To support your success in this major project, I have broken it down into small steps, allowing you to work towards the goal while receiving help and feedback from me and your classmates. The steps, and corresponding due dates, are listed below. This seems like a lot, but each step is designed to help you gather material and skills to help you complete the project. Refer to your syllabus for a suggested timeline to complete each step. You can find these instructions as checklists with supporting rubrics for each part of the project in the Assignment Instructions Moodle Book on our course page.

All written work should be completed in collaboration on a Google Doc. This allows for a record of the work you've done as a team. Submit your documents before the deadline by sharing a shortcut of your file into our shared assignment submission folder and adding me to the file as an editor. A how-to video for submitting documents will be posted on Moodle.
Please title all your documents LAST NAME Assignment.

Assignment Details

Part 1: Group Contract (due Aug 19, 9PM) - 5 points
You will develop a contract with your podcast group based on a provided framework (Appendix 3.B, below) to plan your work over the course of the semester. You will submit this contract once you've all signed it.

Part 2: Podcast Proposal (due Aug 20, 9PM) - 10 points
To begin, you will identify a recent primary literature article (no more than 5 years old) that focuses on a neuro-drug. An article reporting new findings works better than a review article for this project. For example, this article could make for an interesting podcast (Note: to ensure fairness, this paper is not allowed to act as the focus for any of the groups!).

You'll post a link to the article in a class discussion board, along with a short 2-3 min recording describing your interest in the chosen article, and why you think it will make for a compelling podcast story. You can use any voice recording software (for example: Zoom, a native voice recorder on your operating system, Anchor). You can make any audio edits necessary using the free software Audacity.

To complete this step, listen to your classmates' postings and reply to their post with questions, feedback, or stories of relevance.

Part 3: Resource List (due Sept 3, 9PM) - 5 points
Next, you'll compile a list of at least 10 peer reviewed sources you'll use to build the content of your podcast, along with at least 5 sources that will help you explore the social, historical, and political forces that influence our understanding of your chosen drug. Include a single sentence explaining how you think each resource will help you tell your story.
Note: You don't have to read more than the abstract of articles for this step.

Since this is a working resource list, these sources might change before you complete your project. That's okay! I just want to know that you've started finding appropriate sources.
(using a biomedical journal search engine like NCBI's PubMed -https://www.ncbi.nlm.nih.gov/pubmed/ - is a good way to guarantee you are finding appropriate peer reviewed scientific articles)

***Citation style**:*
The disciplinary referencing style you will use will be the style followed by the Nature Publishing Group, a leading scientific journal. The format for this is as follows:
Author Last Name, First Initial (if fewer than three authors, list each author out. If three or more, only list the first author followed by "*et al.*"). Full article title with only the first word capitalized. *Name of Journal*. Journal Issue number, start page number – end page number (publication year).

For example:
Zhang, J. *et. al*. Parkinson's disease is associated with oxidative damage to cytoplasmic DNA and RNA in substantia nigra neurons. *Am. J. Pathol.* 154, 1423–1429 (1999).

Part 4: Annotated Bibliography and Graphical Summary (due Sept 19, 9PM) - 20 points
Now it's time to fully read those papers! For the next step, you'll create an annotated bibliography based on your chosen sources.
An annotated bibliography is a compilation of sources related to a given subject which includes critical or explanatory information.
These annotations should:

- describe the content and focus of the source
- suggest the source's usefulness to your research,
- evaluate its critical stance, method, conclusions, or reliability,
- and be written for other scientists as your intended audience.

Keep the following in mind as you begin compiling your annotated bibliography:

1. Your bibliography should be **typed**, **single-spaced**, and in the above citation **format**. Follow the format exactly, including italicized items and punctuations to prevent loss of points! You can find citation formatting web pages with a quick Google search.
2. Make sure to include at least **10 scientific literature articles** as sources, and **5 additional sources** for social context.
3. After each source listed, please write **at least two short paragraphs** (~300 words each), one which summarizes its **content** and evaluates its **validity** (you can get more information on this at the writing center and provided rubric), and another that discusses the sources' **connection** both to the other sources you've found and to your own project.

These questions can help you start to think about the credibility of your source for your annotated bibliography:

- *Consider the source*: Is it scholarly? Is it a peer-reviewed article? A book? A web page? Is the source reputable and well regarded? Where do they get their funding? (sometimes a simple Wikipedia search can tell you that)
- *Consider the authors*: What are their qualifications? Have they written on this subject before?
- *Consider the citations within the source*: Are there any? What types of sources are cited? Are a wide variety of journals/sources included? Are a variety of authors cited?
- *Consider the data*: Is there any data presented? Do you agree with the author's interpretation of the data?
- *Consider the field*: Do other authors writing on this topic hold the same views as presented in this source?

Graphical Summary: Along with your annotated bibliography, you'll submit a graphical summary of your primary paper. Your summary should highlight the main findings of the paper in an infographic style and be understandable to a general audience. You can use programs like BioRender, Piktochart or Canva to create this summary.
For more guidance, check out this article: How to turn your journal article into an infographic. You can see some examples here: Elsevier Graphical Abstracts.

Part 5: Group work reflection (also due Sept 19, 9PM) - 5 points
You'll submit a short midterm group work reflection to report on how your team is working together using a provided template. Consult your group contract as you complete the provided form. These reflections will be completed individually and will remain confidential.

Part 6: Podcast Draft (due Oct 12, 9PM) – 20 points
You will create and submit a script-like draft of your podcast before you begin recording. By writing this draft as a true script, you will provide me with information about the aesthetics of your podcast, and whether your podcast will be audience appropriate. This will allow me to give you thorough and helpful feedback on your project. The script can be written in whatever format best suits your podcast. There are no page requirements because the length of the draft will match the length of your podcast, so it should be long enough to be at least 25 minutes when recorded (typically 3500-4000 words).

As you write, keep your audience in mind. Choose language that is accessible and understandable to a general audience. Think about how you can use storytelling techniques and emotions to draw your audience into your podcast. Also, be mindful that spoken and written expression can vary, so read some of your draft aloud before submission to consider if you need to rewrite it in a less formal voice for the purposes of this project. To see examples for this step, check out the podcast transcripts for Club Kaur episodes. Also, check your jargon use by using the De-Jargonizer online tool!

This project is designed to meet the learning outcomes identified by the Diversity Intensive Committee at UNC Asheville. As such, the content of your podcast should include:

- a summary of the paper that forms the foundation of your project
- the historical context of the drug - when it was first made/discovered, its primary use, any changes in its use or perception thereof over time *(DI SLO 5*)*
- the current schedule of the drug
- current understanding of the mechanism of action and dependence of the drug
- what your chosen paper adds to our understanding of this drug
- what types of factors determine if someone may need or seek out this drug? *(DI SLO 3, 4*)*
- how do biological or social systems influence the incidence of use or abuse? *(DI SLO 1, 3, 4*)*
- an analysis to determine if the current scheduling of the drug is scientifically sound *(DI SLO 2, 5*)*
- relevance of this work to the lives of your listeners

You can rearrange these elements to best suit your story.
Remember your purpose, tone, and audience as you create your draft!

*DI SLO: Diversity Intensive Student Learning Outcomes. Learn more about the UNC Asheville Diversity Intensive program.

Part 7: Audio Draft (due Oct 28, 9PM) - 10 points
After incorporating suggestions on your written draft, you will create an audio draft of your podcast. You may choose any recording software you have available, and can use the free software Audacity or Anchor to do any editing and mixing.

Part 8: Peer Review (due Nov 8, 9PM) - 10 points
Audio drafts will be shared with your classmates for peer-review. A rubric will be provided to aid your review process.

Part 9: Completed Podcast and Supplementary Materials (due Nov 20, 9PM) – 20 points
Your completed podcast should have all the content elements described above, and should be free of editing errors, extraneous background noise, and copyright protected audio clips. The recording aesthetics of the podcast will be worth 5 of the total 20 points for this step. If for some reason you are unable to edit or re-record audio to address sound issues, include a short statement explaining why to avoid loss of aesthetics points.

Also include the below supplementary materials, which are used to populate the show notes page for Club Kaur episodes. Visit the show notes page for any episode to see successful examples for these materials, and this article to learn more about podcast show notes and their value.

Supplementary Materials:

1. *Episode title*: An intriguing 2-5 word title that would allow a potential listener to find your podcast episode.
2. *Episode summary*: A short catchy description of your podcast to hook potential audience members. The description does not have to sound academic, think of it as a quick ad for your podcast. You don't have to actually summarize your findings, rather state the primary focus of your podcast in a way that a general audience would want to know more. The description should be no more than 60 words/300 characters.
3. *Final graphical summary*: Using the feedback provided to you, you'll be submitting a final version of your graphical summary for your focus paper.
4. *Updated Script, Bibliography, Additional Readings*: At final submission, you'll be including an updated script that matches your actual recorded podcast (for accessibility); an updated list of the articles you read, along with links to full articles as possible; any additional readings/videos/podcasts/articles you came across that would be of interest to someone wanting to know more about your topic.
5. *Credits*: Names of anyone who helped you in the recording and editing process (beyond simply showing you how to use the equipment/software).
6. *Waiver:* If you are okay with me sharing your podcast, please complete the waiver posted on Moodle and submit it there.

Part 10: Group Work Evaluation (due Nov 20, 9PM) – 5 points
To reflect on your work throughout the semester, each of you will complete and submit a group work evaluation form using a provided template (Appendix 3.C, below

This handout was crafted with help from the below sources:

1. Writing for Success by University of Minnesota, Chapter 6.1: Purpose, Audience, Tone, and Content. http://open.lib.umn.edu/writingforsuccess/chapter/6-1-purpose-audience-tone-and-content/
2. Lumen Learning, English Composition 1, Module One: Context, Audience, and Purpose. https://courses.lumenlearning.com/sanjacinto-englishcomp1/chapter/genre-audience-purpose/
3. Annotated Bibliography Handout from Jessica Pisano, Lecturer, English Department, UNC Asheville.

B. Student Group Contract

Group projects are an effective aid to learning, but to work best, they require that all group members clearly understand their responsibilities to one another. To help your small group succeed, I'm asking you to complete this contract as you start working on your project. If you run into any issues, please reach out to me so I can help your group move forward effectively.

Select a Team Name:

For a smooth and successful experience with your group, please follow the below ground rules:

1. Be on time for all scheduled meetings
2. Complete your share of the work by the agreed-upon deadlines
3. Staying in touch regularly with your group and the instructor, updating them about your progress or if you're running into problems

As a team we also agree to these additional ground rules:

Communication within the group

- Our group agrees to use the following method for our regular communication:
  ❑email ❑Online chat ❑Video meetings (Google Meet or Zoom) ❑Slack ❑Text
  ❑Telephone ❑Shared Google Doc
  ❑Other (clearly define) _____
  Note: because of COVID, it would be best to not depend on face-to-face meetings
- We agree to check these communication sites _____
- We agree to respond to communication within _____ hours
- We agree to complete all group work on a shared Google Doc, which will be submitted to Dr. Kaur

Group Project Planning

- Define the main deadlines for the group project based on the posted instructions
- Develop a plan for meeting each of those deadlines:
  - when you will start the work
  - how you will divide the responsibility to complete and submit the assignment

Individual roles within the group

(distribute the tasks evenly)

- **Record keeper** _____
  - Who was present at meeting/online discussions?
  - What did each person do?
  - What progress was made?
  - What problems arose, and what did the group do to address them?
  - What does the group need from the instructor?
- **Assignment submitter** _____ _____ (This member of our group will be responsible for submitting our assignments, and responding to questions from the instructor that are posed to the group)
- **Meeting convenor** _____ (This member sets the meeting time/place and prepares agenda for focusing the discussion) - synchronously or asynchronously - either format requires deadlines

I agree with and will honor the conditions that we've established together in this group contract:

Print Name 1_____ 2_____ 3_____ 4_____

Signature 1_____ 2_____ 3_____ 4_____

How groups go astray

Discuss these issues in your first meeting and brainstorm solutions

- **Communication breakdowns** (with each other – with instructor)
  - Potential solutions:
- **Missed deadlines**
  - Potential solutions:
- **Complexity of the assignment**
  - Potential solutions:
- **Individual preferences towards group or individual work**
  - Potential solutions:
- **Instructions not clear**
  - Potential solutions:
- **Individual not contributing their share**
  - Potential solutions:
- **Individual(s) dominating the group**
  - Potential solutions:
- **Absence – health, or otherwise**
  - Potential solutions:
- **Cultural differences (shyness, language issues, protocols)**
  - Potential solutions:
- **Inertia – just getting started**
  - Potential solutions:

C. Confidential Group Work Reflection

Please complete the following assessment of your group performance during the podcast project. Completing this reflection thoughtfully and honestly will earn you 5 points. This submission will remain confidential and will not be shared with your teammates.

Qualities Evaluation:
Input your name and the names of your group members below. You can add or delete columns to match the structure of your team. Then, evaluate your and your teammates' contributions to the projects using the prompts in the table. Use the following scale to fill in your ratings:
VSA for very strongly agree, **SA** for strongly agree, **A** for weakly agree, **D** for weakly disagree, **SD** for strongly disagree and **VSD** for very strongly disagree as applicable. If the topic is not applicable to your group, select **NA**.

For example, if all team members actively participated in the planning and working sessions, you would enter VSA for all team members for that quality.

	Yourself: [name]	*Group Member:* [name]	*Group Member:* [name]	*Group Member:* [name]
Actively participated in all planning/work sessions				
Communicated regularly and effectively with team members				
Made significant contributions to the project				
Made extra efforts to acquire the necessary knowledge needed for the project				
Exhibited needed leadership and initiative in helping the team achieve their goal				
Positively influenced the outcome of the group's efforts				
Effectively worked to make everyone in the group feel a part of the team				

Self Reflection:
Elaborate on your experience by answering the questions below:
1. Describe your main contribution(s), considering the entire development and implementation of the project.

2. What could you have done more effectively? Please give details.

3. Describe the main successes of your team in this project. Can you describe any moments when you were really proud of yourself and/or your team?

4. What could your **team** have done more effectively? Please give details.
5. What did you learn from the project?
(Be sure to consider the scientific knowledge you learned and also any skills or insights you may have gained)

6. What were the biggest challenges?

7. How do you think the group work element of this project can be improved to further support your success?

Team Reflection:
Please comment on each team member's overall performance, listing notable strengths and weaknesses.

Group Member 1:

Group Member 2:

Group Member 3:

APPENDIX 4

Example Checklist (*A*) and Rubric (*B*) document shared with students. Each scaffolding step of the project has a similar checklist and rubric document associated with it. All documents were posted for students to access via the Moodle course page.
Complete set of rubrics for each assignment step available by request. Contact corresponding author.

A. Part 4: Checklist for Annotated Bibliography and Graphical Summary (due Sept 19, 9PM) - 20 points

Required:

- ❑ Written in and shared via editable Google Doc shortcut
- ❑ At least 10 relevant citations that are all scientific research articles from peer reviewed journals
- ❑ At least 5 additional citations for relevant social, historical, and/or political context
- ❑ Follow the provided disciplinary reference style (found in the instructions document)
- ❑ Each citation has two explanatory paragraphs
- ❑ Paragraph summarizing content and validity
- ❑ Paragraph discussing the usefulness to your research and the connection of this reference to other articles you read on the topic
- ❑ Single spaced
- ❑ References are alphabetized by last name of first author
- ❑ Submitted to provided Google Folder
- ❑ Graphic summarizing findings of focus paper
- ❑ Graphic is engaging and professional (made with BioRender, Canva, or similar software)

Optional:

- ❑ Use a reference manager to make this source list
- ❑ Read more than the abstract before selecting paper
- ❑ Read provided examples for guidance
- ❑ Have someone other than my group members peer review my submission
- ❑ Go over work with a consultant at the University Writing Center
- ❑ Meet with a reference librarian for help on this assignment
- ❑ Meet with the instructor to discuss this assignment
- ❑ Complete work with enough time to revise and restructure it as necessary before submission

B. Annotated Bibliography and Graphical Summary Grading Rubric

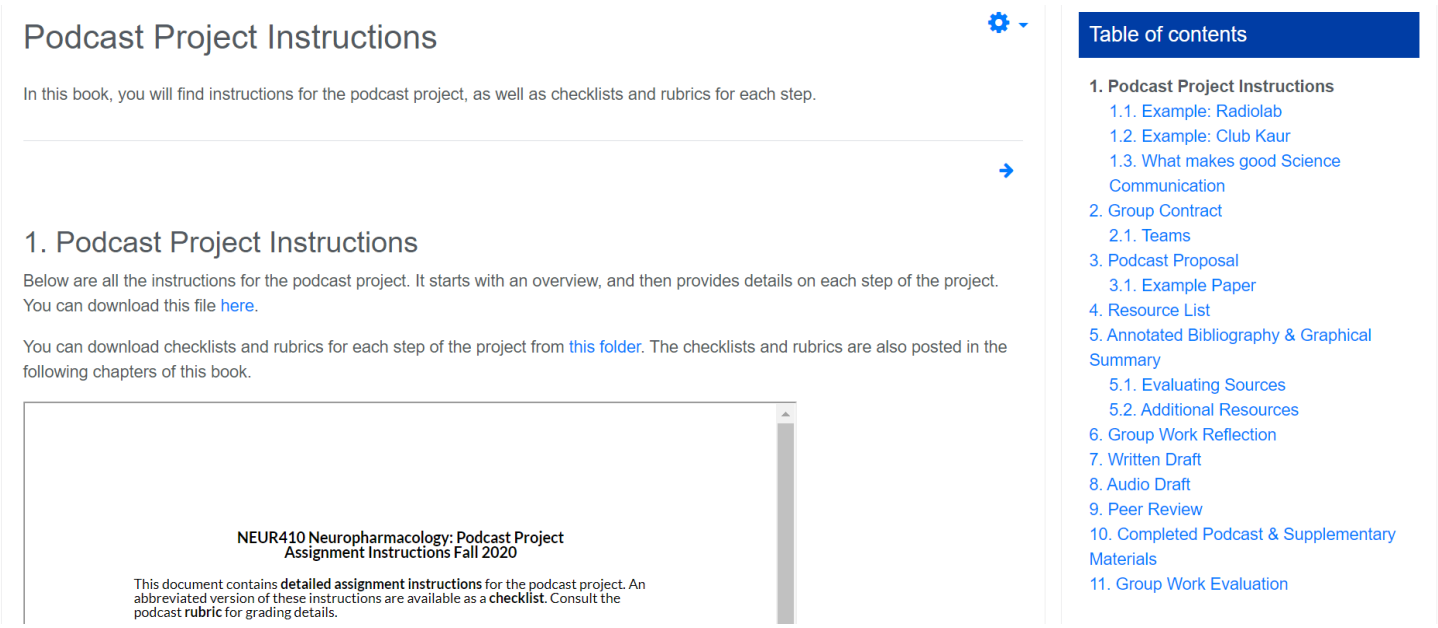
	Proficient	Partially Proficient	Unsatisfactory
Citations (2 pts)	The required number of citations is included. Citations are appropriate, relevant, and in the prescribed format.	>85% of required number of citations is included. Most citations are appropriate and relevant. Citations are in the prescribed format.	<85% of required number of citations is included. Multiple citations are unsuitable. Citations are not in the prescribed format.
Content (3 pts)	The research hypothesis and primary findings of each paper are explained clearly. The studied population and important methods are identified.	The research hypothesis and primary findings of each paper are stated without explanation. The studied population or important methods are not identified.	Papers are insufficiently summarized with sections missing.
Validity (4 pts)	The validity of each study is critically examined, with focus on methods, population, and data analysis.	The validity of each study is examined, with one of the focus sections missing.	The validity is not critically examined beyond source of the study.

Connections (4 pts)	How findings in each research article add to or contradict each other is clearly explained. How each article adds to the podcast story is articulated.	Most connections between articles have been articulated. The usefulness of most articles has been stated.	Connections between selected articles have not been provided. The usefulness of each article to the podcast project is not explained.
Graphical Summary Content (3 pts)	Hypothesis and main findings of the focus paper are clearly written. No unnecessary jargon is used.	Hypothesis and main findings are stated. Some unnecessary jargon is used.	Hypothesis and main findings are unclear. Too much jargon is used.
Graphical Summary Aesthetics (2 pts)	Graphical summary is balanced, easy to read, and uses accessible color combinations.	Graphical summary has some issues with readability and accessibility.	Graphical summary is not visually appealing. Color combinations chosen are not accessible.
Writing Quality (2 pts)	Writing is clear, articulate, and grammatically correct.	Writing contains minor errors which do not affect readability.	Writing contains several errors and needs revision.

APPENDIX 5

Assignment Instructions Moodle Book Structure

This Moodle Book structure is used to share all parts of the assignment instructions, step specific rubrics and checklists, and additional supporting information.



Podcast Project Instructions

In this book, you will find instructions for the podcast project, as well as checklists and rubrics for each step.

1. Podcast Project Instructions

Below are all the instructions for the podcast project. It starts with an overview, and then provides details on each step of the project. You can download this file here.

You can download checklists and rubrics for each step of the project from this folder. The checklists and rubrics are also posted in the following chapters of this book.

NEUR410 Neuropharmacology: Podcast Project Assignment Instructions Fall 2020

This document contains **detailed assignment instructions** for the podcast project. An abbreviated version of these instructions are available as a **checklist**. Consult the podcast **rubric** for grading details.

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