Using Elevator Speeches to Develop Research & Communication Skills in Biology

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INTRODUCTION

The process of writing a mock grant proposal has been incorporated into biology courses as a means of developing discipline-specific skills such as accessing the primary literature, generating hypotheses, and writing scientifically (1–5). An original grant proposal is a centerpiece of our required Biology Capstone course, which also focuses on mastery of written and oral science communication competencies described in Vision and Change: A Call to Action (6). Students are asked to generate a research proposal based on their undergraduate research experience or interests. Most Capstone students have good research experience, but even so, some aspects of the grant proposal are new and challenging. These include grounding the proposed research in previous work and choosing an appropriate methodology for the research design. In order to facilitate the development of these skills and provide practice in science communication, I require students to give a short, informal presentation (elevator speech) at three points in the research proposal process. The elevator speeches serve as a formative assessment of progress on the development of the research proposal, an opportunity for low-stakes feedback, and a chance to develop competency in science communication through the effective process of guided practice coupled with targeted feedback (7).

PROCEDURE

Early in the proposal process, I ask students to generate two 60- to 90-second presentations: one on preliminary data that serves as the basis for a novel research question and one on a key experimental method. Writing an elevator speech requires students to analyze and interpret the information that they have gathered, decide what aspects are the most pertinent, and summarize those points very succinctly and clearly. The third and most critical elevator speech is the proposal pitch, which describes the direction of the project. However, before students can pitch a research proposal idea, they need to survey the literature, identify a gap in the literature, and decide on a possible approach to fill that gap.

Before the first elevator speech, we discuss the elements of a good oral presentation, with particular focus on (a) presentation structure—moving from the general context of the research to the specifics—and (b) appropriate audience targeting. These two aspects of the speech are interrelated, as presenters may want to jump immediately into the details of the research without providing sufficient background, regardless of audience knowledge. This is especially tempting given the extreme time limit imposed by the elevator speech format.

We also discuss the importance of peer feedback, both formal and informal, in the scientific process. Students are already familiar with the concept of peer-reviewed journal articles, but are less familiar with the informal feedback that colleagues share at many stages of a project. Throughout the Capstone course, they are invited to enter into that collegial process of giving and receiving constructive, actionable feedback in order to improve the final product.

After this introduction and some exercises to analyze primary papers, each student presents their elevator speech to the peer group and solicits feedback from this audience on clarity and take-away message. This is an opportunity to assess the level of background necessary to communicate clearly with biologists specializing in different research areas, to tease out the most important points to communicate the intended message, and to ask for additional instructor assistance, if necessary, before attempting a formal presentation.

Speech 1: Preliminary data and research question

Anchoring the proposal in existing data is critical for a quality proposal. Capstone students sometimes have data that they have generated in their own research, which serves as a good starting point. If that is not the case, they may use data from the peer-reviewed literature. Students each present a single slide showing a data figure. Within the short time frame of an elevator speech, the presenter explains the illustrated data and articulates how those results lead to a new research question that s/he would like to explore.
Speech 2: Key experimental method

Once students have revised their research questions based on feedback from their peers and instructor, they begin considering possible experimental approaches. At this point, each student presents a single slide illustrating a method that they might use to answer their proposed research question. In 60 to 90 seconds, the presenter describes how the method is applied, what type of data is obtained, and how it will be useful in the proposed study.

Speech 3: Proposal pitch

After conducting a literature search and presenting elevator speeches on preliminary data and methodology, students have a more refined idea of what their full proposals will address. At this point, the students prepare 60- to 90-second pitches of their research proposal without any slides. The goal is to communicate the novelty, significance, and feasibility of the proposed study to a biology-literate audience, keeping in mind variations in familiarity with the specific research topic and methodology.

Feedback process

For each of the assigned elevator speeches there is a three-part feedback process. Immediately following the presentation, audience members have an opportunity to ask questions and share ideas. Then, peers write a brief anonymous review. For the data and method speeches, the reviewer identifies one strength of the presentation and gives one suggestion for improvement. For the proposal pitch, the peer feedback includes a synopsis of the proposal and an analysis of its significance. This allows the presenter to gauge how well the main points were communicated to audience members. Finally, the instructor gives individualized feedback to each student in the form of written comments on the presentations. Presenters can use the peer and instructor feedback to refine their ideas for the research proposal at each step. The peer feedback is formative and is not graded directly; instead, students, who are close to graduation, are encouraged throughout the semester to collaborate as fellow scientists and colleagues, as they will be doing in the world beyond their classroom very soon.

Safety issues

There are no safety issues associated with this procedure.

CONCLUSION

Elevator speeches are frequently singled out by students as one of the most valuable aspects of the course. I have also observed that students change direction on their proposals earlier and more often than they did in previous years, before I started assigning elevator speeches. Boiling down complicated ideas to a succinct, clear, and compelling presentation is very challenging. In doing so, students can better identify and correct any flaws in their arguments.

This approach is also applicable to different course levels, sizes, and formats. Capstone classes are small (~20 students), but in classes of 40 to 50 students in which individual presentations would be time-prohibitive, students can present individual speeches within small groups. For very large courses, speeches could also be videotaped and reviewed outside of class. In a first-year microbiology course, I have used elevator speeches to give students an opportunity to practice science communication to different types of audiences. The whole class works on a common topic, but individual groups are assigned different audiences such as middle-school students, high-school students, the general public, and scientists. Each group creates an elevator speech that describes the topic in appropriate language and explains why it might be of interest to the assigned audience. The speeches are presented to the whole class, and the unique approaches for different audiences are then compared and contrasted.

Elevator pitches have previously been studied as a way to improve graduate student communication in business and pharmaceutical sciences (8, 9). And in recent years, a number of scientific societies have established elevator-pitch contests for graduate students and trainees, to help them hone their research messages (e.g., the American Society for Cell Biology: http://www.ascb.org/tag/elevator-speech-contest/, and the American Society of Plant Biologists: https://blog.aspbo.org/plant-biologists-pitch-their-science/). In the Nature article chronicling her hectic and unexpected year in the public spotlight, CRISPR pioneer Jennifer Doudna lamented that she did not have sufficient expertise in communicating science to the public and advocated for better training for future scientists, including guidance on how to craft a research elevator pitch (10). Providing undergraduate biology students opportunities to practice elevator speeches with timely feedback might be a good place to start.

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