Using ASM Podcasts to Excite Undergraduate Students about Current Microbiological Research

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INTRODUCTION

It is important to expose undergraduate students in the biological sciences to current research. An excellent way to do this is through reading and analyzing primary science literature. However, students often struggle to grasp the big picture or take home the message of a paper because they get distracted by the details of the materials and methods, and/or statistical analysis. This frequently leads to frustration and insecurity on the part of the students and can ultimately turn them off of science and research in general (12). Many ways have been proposed to introduce students to scientific literature and research (1, 4, 5, 7, 9). One effective way is the CREATE (Consider, Read, Elucidate hypotheses, Analyze and interpret data, Think of the next Experiment) model (5, 7), but that has demonstrated mixed results in increasing students’ critical thinking skills (11). Additionally, the CREATE model requires several weeks (usually 6 to 15) of in-class instruction focused on primary literature. This is not feasible in many microbiology classrooms. The goal of the activity presented in this paper is to combine homework/classwork with technology to reinforce the learning outcomes that are gained through analyzing primary literature.

The use of innovative technology in higher education has been increasing in order to engage students both in and out of the classroom. Technology can be effective or distracting in the science classroom depending on how it is implemented. Podcasting is one technology that has been widely employed and demonstrated to be an effective aid to meet the learning outcomes of a course (2, 6, 8). Currently most podcasts are reiterations of lecture material presented by the instructor that are used as supplementary study aids (3, 6, 10). However, podcasts can be used in more varied and interesting ways to increase student engagement, and can be used more specifically to introduce current biological research to students.

PROCEDURE

Instructor preparation

Prior to giving the students the assignment, instructors are required to spend some time familiarizing themselves with the TWiM, TWiP, and TWiV podcasts to determine which podcast most suits the needs of their course and course objectives. The podcasts can be accessed via the MicrobeWorld website (www.microbeworld.org) or iTunes. The easiest way to search the podcasts and their contents is through the MicrobeWorld website. Here the podcasts are listed in chronological order with access to the podcasts, keywords, descriptions, and links to articles/abstracts. After finding an appropriate podcast, instructors must obtain the corresponding journal article either from the podcast links or their library. This may take some time depending on the library holdings of the instructor’s institution.

The assignment

Students are given the pre-selected journal article on a current topic in microbiology and asked to review the
article by answering a series of prompt questions (Appendix 1) as an individual exercise to be completed for homework. Additionally, students are instructed to write down all the things they found confusing or could not understand within the article. Students are given one week to complete this homework assignment. When students hand in their written assignment, they receive information on the corresponding podcast and how to access it via iTunes or MicrobeWorld. A series of guided questions are also handed out and students have one week to listen to the podcast and answer the guided questions (Appendix 2).

After the allotted time period, students are asked to come to class prepared to discuss the paper and the podcast. Students are placed in groups and given a section of the paper to discuss. Sections that are typically assigned to groups include: Title, Abstract, and Keywords; Introduction; Materials and Methods; Results; and Discussion. Students discuss the purpose of the paper, the important techniques employed in the article, the most important results, and the impact the research will have on microbiology and society. Time is also spent to discuss the podcast (approximately 20 minutes). More specifically, the students are asked if and how the podcast aided in their understanding of the paper, what their thoughts are on the presenters, and how the presenters conversed and related to one another. Lastly, the discussion concludes with student input on what future studies should be conducted.

CONCLUSION

This activity was conducted twice within a 15-week semester for a microbiology course with Biology majors ranging from the sophomore level to the senior level. Senior students had much more experience reading and analyzing primary literature, and students at the sophomore level felt the podcast helped put them on an even playing field with the seniors. Generally, all students commented that they enjoyed the podcasts, and it helped them to determine the primary goal of the study. They also felt it helped to demystify scientists and research articles. Students indicated that the playful dialogue of the presenters helped them see that scientists are “regular” people. Lastly, the podcasts really helped students focus on the “big picture” of the research article. Although this activity was used in a traditional majors Microbiology course, it could easily be adapted for any of the following courses: General Biology, Virology, Parasitology, Genetics, or Molecular Biology. In fact, this exercise can be adapted in many ways to fit the learning objectives of the instructor and some potential follow-up activities are presented in Appendix 3.

SUPPLEMENTAL MATERIALS

Appendix 1: Journal review assignments
Appendix 2: Podcast guided questions
Appendix 3: Follow-up exercises

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REFERENCES