

EMBEDDING EFFECTIVE SCIENCE COMMUNICATION PRACTICES INTO UNDERGRADUATE EDUCATION. I. S. Curren¹ and D. C. Jewitt¹ University of California Los Angeles, 595 Charles Young Drive East, Los Angeles, CA 90095-1567, iscurren@epss.ucla.edu.

Background: Education and Public Outreach (E/PO) are crucial aspects of programs aimed at increasing scientific literacy and inspiring the next generation of scientists. In addition, E/PO serves as a way for scientist to “give back” to the community, cultivate future scientists, and attract the interest of broader audiences including the media, politicians, and philanthropists. Although the benefits of E/PO are obvious, there are several problems associated with many programs.

The most obvious issue associated with E/PO programs are that effective outreach requires a significant amount of effort that is often largely unsupported by many universities, institutes and programs. This results in an over commitment of few individuals and lack of involvement for scientists whose primary objective is research.

The second problem with E/PO lies in the fact that teaching and outreach practices are not often part of a budding scientist’s curriculum. Although NASA’s SMD states that one of the primary goals of the E/PO program is to “share the story, the science, and the adventure of NASA’s scientific explorations...through stimulating and informative activities and experiences created by experts, delivered effectively and efficiently to learners of many backgrounds,” [1] its scientists and engineers are rarely trained to be effective science communicators.

The UCLA Department of Earth, Planetary, and Space Sciences (EPSS) Outreach Committee has designed an innovative new undergraduate course that will attempt to solve these problems by introducing effective science communication practices from an early point in the students’ careers. By embedding science communication information and practices in undergraduate education, we hope to equip the next generation of scientists, educators, and science enthusiasts with the tools to succeed at E/PO activities.

EPSS: GO: The new course designed for the purposes of teaching good E/PO practices is titled “Earth, Planetary, and Space Sciences: Geosciences Outreach,” or EPSS: GO. With obvious emphasis on geosciences outreach practices, we hope to accomplish several goals:

- Meet a need for by providing a focal point and credit for students already interested in public communication of science;

- Raise the profile of scientific E/PO programs in the eyes of students in the university setting;
- Formalize class metrics of success via grading and performance assessment;
- Develop students’ ability to effectively communicate science during UCLA E/PO events and in their careers after their degree is completed.

The class is envisioned as highly interactive, and will include components of learning effective outreach strategies (e.g., using effective visuals and jargon-free science language for writing and speaking, projecting personality to a group of listeners), learning about different outlets for science outreach (e.g., E/PO programs, the media), exploring the public’s perception of science, learning how to use existing demonstrations and equipment in EPSS (e.g., UCLA Planetarium, solar telescopes, UCLA Meteorite Gallery), performing actual outreach activities planned by the department as part of their grade, and developing their own new demonstration, activity, or science communication project.

Inclusion of these activities in the course will not only increase the students’ science communication proficiency, but will also improve their own understanding of the subject matter being presented. Model-based learning, or learning-by-doing, has been advocated as extremely beneficial [2], and subsequently may enhance students’ ability to think critically toward other problems [3] and has been adopted by the National Research Council in its Next Generation Science Standards [4].

Discussion: By introducing a science communication course into the undergraduate curriculum at UCLA, we hope to solve two of the primary problems that affect E/PO programs. First, a graded course will provide the E/PO program with students capable of providing effective outreach throughout the academic year. Second, the class will aim to produce a new type of scientist – one who is taught in a culture where E/PO is second nature and paramount to science contributions.

Furthermore, the proposed course would provide students with the tools necessary to combat science illiteracy, regardless of the career they choose. According to a 2012 survey performed by the National Center for Education Statistics, the United States ranks as 23rd in science and 30th in mathematics literacy out of 65

OECD countries [5]. With the current state of communications and social technology (e.g., Twitter), it is imperative that scientists are able to effectively communicate and “keep up” with opinion-based or pseudo-scientific material. By instilling good science communication practices into undergraduate students, we hope to improve the deficit of effectively communicated robust science in the public eye.

The course is set to go into effect in Fall 2015 and, via a survey of UCLA undergraduates in EPSS and Astronomy, has already proven to be a welcome and highly anticipated course. We will begin to produce useful metrics almost immediately and will incorporate these into improving the course in the future.

References: [1] National Aeronautics and Space Administration (NASA) Education and Public Outreach Strategy. Retrieved from <http://science.nasa.gov/researchers/education-public-outreach/strategy/>. [2] Campbell T. et al. (2012) *Int. J. Sci. Ed.*, 34, 2393-2419. [3] Chan K. Y. K. et al. (2012) *Am. Bio. Teach.*, 74, 26-33. [4] National Research Council (2012) *Nat'l. Acad. Press*, D.C. [5] Selected Findings from PISA 2012. Retrieved from http://nces.ed.gov/surveys/pisa/pisa2012/pisa2012highlights_1.asp.



Figure 1. Community students practice Lenz's Law demo for an EPSS outreach event.



Figure 2. A local area school visits UCLA in an event run entirely by undergraduate and graduate outreach volunteers.