Promoting Science Literacy by Reforming General Education Science Courses

Remedying the American public’s lack of science literacy requires reform of science education. Studies show that improved science learning outcomes are achieved primarily by an entire department or college adopting radical changes in course structure and teaching style that foster active inquiry. However, lack of institutional support has typically prevented university faculty from changing pedagogy in their courses. We propose to effect institutional change in undergraduate science education at the University of Oregon (UO) through a collective of faculty across four science and several nonscience departments. The program developed from grass-roots interest among research-active faculty and has broad support: Heads of the four science departments, Dean of the College of Arts and Sciences, Dean of the Graduate School, Provost, and President.

We propose to establish a multi-departmental Science Literacy Program (SLP) that will reform teaching of UO introductory science courses. The SLP advances development of three constituencies: non-science majors, undergraduate and graduate science majors, and faculty. Our proposal is innovative in that it targets general education science courses for non-science majors (“science literacy courses”), whereas many other reform efforts have been aimed at courses for science majors. SLP courses will enable non-science students to understand the importance of science in their lives, provide them with skills to navigate in a scientific and technical world, and empower them to consider scientific approaches to societal issues. Another innovative aspect is that undergraduate and graduate science students participate as SLP Fellows who will co-instruct science literacy courses with faculty. SLP Fellows will be trained in modern teaching techniques and will help design and teach new interdisciplinary science literacy courses. This experience will enhance their communication skills and help ensure that the next generation of science educators are facile with modern teaching techniques. We will also take steps to establish a Certificate of Science Literacy Teaching that science students can earn by participating in new science education research courses we will develop. SLP faculty will learn new skills by attending workshops in new teaching techniques, helping to mentor students and other faculty in these techniques, and attending meetings to disseminate results of our program.

The SLP will be directed by Judith Eisen, Professor of Biology, and co-directed by Michael Raymer, Professor of Physics. The SLP will hire a PhD-level Coordinator who will be involved in faculty development, coordinating SLP operations, SLP administration, and disseminating SLP results. Space will be made available for the SLP Coordinator’s office. We will appoint an Advisory Committee to help oversee selection of SLP students and faculty as well as strategy and budget issues. Several members of this committee are nationally-known science education research experts who pioneered programs at UO. We will also establish a Board of external science education research experts who will review the program annually.

Our proposal offers challenges and opportunities in science education research, as each aspect of our SLP will require both ongoing and summative evaluation. We will work with in-house and external evaluators to develop and validate effective tools to assess whether our new courses are making non-science students more science literate, whether SLP fellows are becoming better science communicators, and whether the new pedagogical techniques SLP faculty incorporate into their courses are working as anticipated. Results of our program will be disseminated at professional meetings, through publications, and via a new website we will establish.