

Biology in Popular Culture Final Report

May 7, 2008

Name of Person(s) Submitting Report: Paula B. Lessem, Ph.D., Maren B. Reiner, M.S.
E-mail: plessem@richmond.edu; mreiner@richmond.edu
Phone: Lessem – 804.287.6691 Reiner – 804.289.8954
Institution: University of Richmond
Title of Project: Biology in Popular Culture – A course for non-science majors
Date(s) of Project: Course offered Spring term 2008 (enrollment 80), Sp)
Amount Awarded: \$3500.00

Original Goals and Objectives: Non-science majors need to be informed about basic scientific principles because now and throughout adulthood they will be exposed to the scientific advances and knowledge that can become controversial by the attention of the popular press and involvement of religious groups and politicians. In this course, we will develop and improve the skills that are important in critical evaluation of the information presented in media. These students will ultimately be able to distinguish scientific from pseudo-scientific information thereby enabling them to make informed decisions. During this course, the students will confront cutting edge biological developments and knowledge in three content areas: recombinant DNA, natural selection, and stem cells.

Revised Goals and Objectives: In an effort to effectively deliver the material and stimulate student interest, different strategies were planned to supplement the lecture/laboratory format of this course. In order to encourage class discussion the class size was capped at 27. An interactive learning component was added to this course where students presented various topics in different forums. Examples of this included:

- Bioethics: students presented to the entire class
- Eugenics: the class was broken up into 3 small groups to foster greater discussion

- Genetically modified organisms (GMO): the class represented a board of directors that was going to fund one project. Students had to “make their case” providing scientific data, utility of their GMO, and a marketing prospectus. At the end of the session there was a secret ballot where students voted for the GMO they would support.
- Novel gene: The class was a funding agency that would provide resources for one project. The students provided scientific data and case studies. Once again, at the end of the session there was a secret ballot where students voted for the gene project they would fund.
- Town Hall Meeting: The scenario presented was that a biotechnology company that performed embryonic stem cell research wanted to set up a laboratory in their town. This fictional town was in rural mid-America where many jobs had been lost over the last decade. As a town, thinking and discussing all the possible benefits (jobs, revenue, and influx of new people) with the possible risks (ethical considerations) the group had to come to a consensus as to whether or not they would advocate for this company. Each student had a role to play. Examples of some of the roles included (not exhaustive) bench scientists, venture capitalists, physicians; people afflicted with neurodegenerative diseases, members of the ministry and town members.

To illustrate real-world connections of this material, a “Speakers Series” was implemented. Four speakers were brought to campus to demonstrate application of this material. The four speakers addressed the following topics:

- The roles of genes in addictive behavior in drug dependence – this concept is addressed in “Next” by Michael Crichton, required reading for this course.
- A genetic counselor discussing (in broad strokes) the types of issues she deals with on a continuing basis illustrating the utility of genetic testing
- The Director of the andrology and *in-vitro* fertilization center in Richmond, VA discussing the process of egg harvesting, *in-vitro* fertilization, and ethical constraints.
- Two field agents of the FBI discussing collection of evidence.

Further real-worlds connections were illustrated in the laboratory component of the course. Approximately 25% of the students opted to do their final laboratory project targeted to Richmond City Middle School students. The scripts and scenarios were student written and directed.

Goals and objectives met: A smaller class size was a significant improvement in fostering class discussion. Though all three sections responded differently, there was more interaction this semester compared to past semesters (class size ranged from 40 – 50). The interactive pieces worked well. It was a break from straight lectures and gave ownership of some of the class to the students. In this venue, students could demonstrate their creativity. The town hall meetings were very successful with all three sections generating lively discussions. For the speaker series, the student response to these presentations was overwhelmingly positive. They were engaged and asked questions. Interestingly, there was no real consensus among the 80 students. Each speaker was indicated as the favorite by a sizeable cohort of the students. Finally, the interaction with the middle school students was overwhelmingly positive. This was so successful that a

more defined and comprehensive association between UR and this middle school will be designed this June.

Evaluation and Assessment: Due to time constraints there was no pre-course evaluation done. The exit surveys are not available at this time. Anecdotally, students were engaged. I received many emails highlighting news articles directly related to course material. One student suggested inclusion of the movie GAATACA as one of the final classes.

Redesign and Improvement: Before this course is offered again, a pre- and post assessment document will be designed. To assist the students with resources that are topic specific, a virtual text (a collection of web sites that are appropriate) will be required. In addition, a different text (“The Strongest Boy in the World” by Philip R. Reilly) may be utilized that is a collection of content specific applications of genetic engineering.

Dissemination efforts:

On-campus: This course was publicized by word of mouth by students who were enrolled in past classes, the teaching assistants who helped in the laboratory, and biology majors who had learned about the material being covered. We have discussed this course with colleagues both in our department and in other disciplines. This class had 80 seats and filled quickly.

Nationally: Association of Biology Laboratory Educators (ABLE): An application to present a major-workshop at the ABLE 2008 meeting at the University of Toronto- Mississauga, been accepted. The major-workshop is entitled “Use of Bioinformatics to Investigate β -Lactamase, a Mediator of β -Lactam Antibiotic Resistance.” Subsequent to the workshop, this will be published in the Proceedings of the Association of Biology

Laboratory Educators. Funds to attend this meeting have been supplied by the PETE program at UR as well as at Arts and Sciences Deans office.

Next steps: A version of this course will be offered this summer in a Scholars Program at UR. The participants are selected high school students who earn UR credit for the course. It is anticipated that this course will be offered next Spring (2009).

Financial accounting:

Edvotek gel documentation center	\$4250.00
----------------------------------	-----------

Permission to ACS. We give permission to the Associated Colleges of the South to post our original proposal and the results of this work on the ACS Science Reform website.