

Statement

We have observed that many of our students are unable to critically analyze scientific and mathematical sources particularly when they are presented in the form of an internet site or popular news article. We propose to teach students how to read and critique articles on “hot topics” in science and mathematics by recognizing subjectivity and verifying the value of the evidence presented. Our approach will be two-fold. First, we intend to model how we as experts analyze and evaluate sources in the form of sample critiques. Secondly we will develop an assessment technique that can be used to measure this type of “scientific literacy”.

Plan

We first plan to establish a baseline of scientific literacy skills by administering a pre-test in which the student will be given an article and asked several questions designed to ascertain elucidate their level of subjective interpretation and skepticism. We also intend to give an unrelated survey, which will allow us to determine the level of scientific and mathematical knowledge each student possesses as we expect their critical thinking skills will correlate to their basic knowledge level. Throughout the course we will have in class activities and out-of-class assignments that will teach the student the skills necessary to critically analyze sources, content and methods. At the completion of the course we will repeat both assessments in order to measure improvement.

Strategies

We intend to pursue this project by employing the following strategic goals.

- Perform a literature search in the area of assessing critical thinking in the sciences.
- Develop activities and assignments aimed at improving scientific literacy.
- Develop a collection of scholarly and popular science articles with assessment questions for use in the project.
- Develop a rubric to quantify student responses.

Contribution to the Scientific Community

The contributions to the academic community are numerous. From the course material alone we will be producing informed citizens able to demonstrate skepticisms when reading news articles or other scientific material. The collection of articles with corresponding questions will be a valuable resource for fellow faculty.

Dissemination

We intend to develop online course assessment portfolio, which will make the materials freely available and widely disseminated. We intend to further disseminate our results by presenting them to mathematical, chemical and other scientific academicians in the form of papers and/or public presentations.

Integration

The courses in which we intend to use as a laboratory for these techniques are core classes typically populated by non-science majors (Mathematical Modeling and the Necessities of Life IDST course). We expect the results of our study to provide us with insight into the biases of our students towards the sciences. Such information will be invaluable when designing future courses, classroom activities and assessment techniques for this population.