

Improving Critical Thinking Skills through Analysis and Evaluation of Scientific Concepts Presented by the Media

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Abstract

Instructors are always looking for a way to improve their students' ability to think critically. We sometimes forget these skills take time to develop and improve, so it is best to start early in undergraduate education. Many students acquire scientific information from the media, such as online news reports, television, newspapers, etc., but are never encouraged to analyze the information. They passively accept as truth what is reported. This is a missed opportunity for instructors to have students apply their knowledge, analyze content, and then evaluate the information presented by these sources. Short papers (2-3 pages) also allow students to improve their science writing skills. Students were assigned articles that discuss popular topics in microbiology. After reading the articles, they identified the main idea(s), determined three important facts the author used to support the main idea(s), determined whether the concepts and/or data were represented accurately for non-scientists, and decided if the information was relevant to them. Papers were graded using a rubric. There was a short classroom discussion of the article upon completion. Overall the assignment was effective in accomplishing its objectives. In the future, video clips may be substituted for articles.

Assignment

Students will write four essays that will be submitted electronically through Blackboard (no paper submissions). Grades will be assigned based on content, accuracy, meeting the assignment objectives, understanding concepts, and spelling/grammar (rubric below). Each essay is 15 points.

	5	4	3	2	0
Assignment Objectives	Essay met all the objectives		Essay met some objectives		Essay met no objectives
Content of essay	Organization of essay was excellent	Organization of essay was good	Organization of essay was satisfactory		Organization of essay was poor
Accuracy	0 factual errors	1 factual error	2 factual errors	3 factual errors	4+ factual errors
Understanding concepts	Entry demonstrates mastery of concepts	Entry demonstrates above average understanding of concepts	Entry demonstrates satisfactory understanding of concepts		Entry demonstrates poor understanding of concepts
Spelling & Grammar	0-3 errors in spelling or grammar use	4-5 errors in spelling or grammar use	6-7 errors in spelling or grammar use	8-9 errors in spelling or grammar use	10+ errors in spelling or grammar use

Students may need to research before writing the essays – the textbook is not always sufficient. Students will cite their sources throughout the essay using APA format. The OWL at Purdue <http://owl.english.purdue.edu/owl/resource/560/01/> is a valuable resource for proper use of APA format. Non-science sources such as Wikipedia are unacceptable as cited sources. Students are not discouraged from using these sources to get background information, but do not use non-science sources for final citations. Please feel free to discuss your sources with the instructor if uncertain.

Articles will be placed on reserve in the Lewis University library. Students will read one article for each essay. They are:

Paper 1: Schute, N. (2007, May 28). Better Safe than Sorry. *U.S. News & World Report*, vol. 142

Paper 2: Taubes, G. (2008). The Bacteria Fight Back. *Science*, 321, 356-361

Paper 3: Raloff, J. (2008, March). Nurturing Our Microbes. *Science News*, 173, 138-140

Paper 4: Stein, R. (2008, March). Why We're Sicker. *The Washington Post National Weekly Edition*, pp. 11

The essays must answer these questions:

- ✓ What is the main idea of the article?
- ✓ What are 3 important facts the author uses to support the main idea?
- ✓ What are new terms or concepts for you in the article?
- ✓ Are the concepts and/or data represented accurately for the non-scientist?
- ✓ Is the information relevant to you? Explain.

What did the STUDENTS think of the assignments?

Did you find the topics for the mini-papers ENGAGING (interesting)?

	N=21
a. Boring!	0
b. Between a & c	14.3%
c. Okay	33.3%
d. Between c & e	42.9%
e. Incredibly engaging (interesting)	9.5%

Did you find the topics for the mini-papers RELEVANT to the course material?

	N=21
a. Not really	0
b. Between a & c	0
c. Somewhat	28.6%
d. Between c & e	47.6%
e. Very relevant	23.8%

Did you find the topics for the mini-papers RELEVANT to what you hear and read in the news about microbiology?

	N=21
a. Not really	0
b. Between a & c	0
c. Somewhat	4.8%
d. Between c & e	38.1%
e. Very relevant	14.3%
f. I really don't pay attention to the news!	42.8%

If you selected "f", did the assignments make you more willing to pay attention to science in the news?

	N=9
a. Yes	44.4%
b. Possibly	55.6%
c. No	0

Did the articles make you **think**?

	N=21
a. Definitely!	52.4%
b. Somewhat	47.6%
c. Not really	0

Did you feel the grading rubric was fair for the mini-papers?

	N=20
a. Yes	100%
b. No	0

Student Comments (without edits):

There is a lot of new things out there happening and I really should find time to pay attention.

I found myself applying previous knowledge to the topics and also conducting further research.

I ended up thinking about the care I put into what I eat, how it's prepared and handled. They made me a little germaphobic along with the actual course.

They allowed for in class topics to be related to real life examples.

At first I thought they would just be busy work, but I actually ended up liking their topics.

If I do happen to hear something on the news about science, I am more apt to listen because I can understand what is going on a little better.