Project eCSite Unit: Understanding and Verifying Health Research

Content Areas: computer science, science & technology, health, research

Grade Level: Secondary (9 - 12)

Computational Thinking Connection: This unit teaches students about research, how it is published and popularized, how it is funded, and how to verify the claims made in popular press sources with respect to the cited research.

Prerequisite Knowledge: None.

Time Required: 2 classes

Related Lessons / Activities:

1. Project is introduced by explaining the simple picture of how science is published and popularized.
2. An example is used where a NYT Health Section summary is used to find the original research and compare to the popular press summary.
3. Students have a homework assignment where they must find an article, look up the sources, and compare the findings of the research to the description in the popular press summary.
4. On a second day, a discussion (with groups) and further explanation of the scientific process completes the Unit.

Contents:

1. Introductory Material: Instructions for Day 1 Activity (2 pages)
2. Self-Directed Homework Assignment (2 pages)
3. Finishing Material: Instructions for Day 2 Activity and discussion (2 pages)

Other Notes: N/A

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1. Draw a diagram like the above, explaining each step in the process:
   a. Scientists do research and when they make a discovery, they write an article
   b. The article is submitted to a scientific publication venue, such as a journal, where it is peer-reviewed, and if it meets the standard of the journal, published
   c. The published articles are indexed on the Journal’s website, in Pubmed.gov if it is NIH funded research (Pubmed also indexes research published in journals that may not have been NIH-funded), and by search engines like Google Scholar
   d. Science writers for the press, read articles as they come out (or at least their summaries) and write about them in a newspaper
e. You read the newspaper, or someone tells you what they’ve read or heard from the newspaper

2. The system can be like a “game of telephone” where each step loses some precision, and might change or lose some of the important details.

3. The individual is responsible for verifying claims by going back to the original research article.

4. Give an example, by:
   a. Pulling up the NY Times health or science section
   b. Find an interesting article and read through it (e.g.,
   c. Try to find the original research article in Pubmed or Google Scholar (e.g.,
   d. Compare the research to the article summary (e.g., NY Times article leaves out that the breakfast with cake was also higher in protein).
   e. Lookup terms (e.g., Ghrelin is a hormone that affects appetite)

5. Hand out homework assignment (see next page)
Understanding Recent Findings in Health Research

Your Name:

Use one of the following websites to find an article summarizing a scientific discovery you think is interesting, **published in the month you were born** (this way, everyone won't choose the same article):

- New York Times: Health Section

- National Institute of Health: Research Matters

Write down the Title and URL of the news article you picked:

Summarize the article, and the significance (or lack of significance) of the results in your own words:

Find the full text of the **scientific article, letter, or report, which is the basis of the news article**. If you can’t find it directly through the news article, you may have to use Google Scholar ([http://scholar.google.com/](http://scholar.google.com/)) or PubMed ([http://www.pubmed.gov/](http://www.pubmed.gov/)) to find it. When you find the article (probably a PDF). Fill in this info:
Title:

Author(s):

Date Published:

Journal/Conference:

Read the abstract (very first paragraph of the article) and conclusion (last paragraph or two). Skim the rest of the article and figures. Does the news article’s summary seem to be true to the findings of the study? Why or why not?

Do you think the news article over or understate the significance of the scientists’ findings? Why or why not?

Were there concepts or domain-specific words used in the abstract (or conclusion) that were hard for you to understand? If so, list them:
Finishing Material

1. Divide kids into groups of ~5. Tell them that they should each take a turn describing the research article they studied to the rest of the group. Each group member is responsible for keeping notes (which they turn in) and grading how well their peers did their due diligence. The grade is based on the peer review system and should be one of: Accept, Accept with Minor Revisions, Accept with Major Revisions, Reject.

2. Have each group select one student to present their topic to the class. Ask some questions and have a bit of discussion about each.

3. Collect the papers

4. Proceed to a discussion of the bigger picture of scientific publication and health research
   a. Congress also reads the news, and decides funding priorities for organizations like the National Science Foundation (NSF) and National Institutes of Health (NIH) who then fund research through grants
   b. Some scientists may also get money from private industry
   c. Scientists and doctors generally produce their own, more technical, (sometimes digital) publications and databases
   d. Hopefully you communicate with your doctor and ask questions about their interpretation of scientific evidence justifying a certain treatment or procedure.
The Bigger Picture of Health Research

Drug Companies & Private Corps

Scientist

Scientists & Doctors

Technical News (e.g., ACEP, AMA, UpToDate)

Doctors and Practitioners

Press

News

You

Congress

NIH/NSF

Journal's Website, Pubmed, Google, etc.