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Science Information Literacy Lesson Plan

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Lesson Plan: Collaborative Science Information Literacy: Is It “Scholarly?”

Students need to find “primary research” articles (also known as “scholarly,” “peer-reviewed,” or “refereed” articles), but how can they tell them apart from other types of articles, and where can they find them? This lesson is designed for a 50-minute session with student access to internet-accessible devices (laptops, tablets, etc.).

NOTE: This activity is appropriate for all disciplines of science.

Materials Needed:

- Computers or other internet-connecting devices
- Copies of news article based on a peer-reviewed journal article, accessible through your institution.
- Student handout.
- Optional: whiteboards & markers
- Optional: Steelcase Mediascape (or similar) collaborative workstation, and corresponding projection capabilities

Learning Goals:

- Understand the peer-review system and how it differs from other publishing models
- Know how to seek out an original, scholarly research article from a “lead” in a popular periodical, newspaper or trade periodical article
- Know the characteristics and features that differentiate scholarly and popular periodicals
- Become familiar with strategies for finding scholarly articles through library resources

Anticipatory Set:

The students are given a brief science-related news article to read either prior to class, or at the beginning of the class session. The articles should be based on a study that appears in a peer-reviewed journal, specifically one to which the institution has access. To generate interest among the students, chosen articles could be humorous and/or timely, based on current headlines or topics currently covered in the chemistry course. In addition to the ScienceDaily news website used to obtain the two articles described here, Science News and the “Seriously, Science?” blog on the Discover Magazine website are good sources for science-related news items. The author has used the following two news articles:

10 MINUTES:

First, each table will be given copies of a brief “Science Daily” article (two articles will be used; each table will get one or the other).

NOTE: I found that allowing students to read the articles online gave them the option of just clicking a link to go to the original journal research article while on campus, so they will read them in print for this part of the lesson.

1. First scientific method to authenticate world’s costliest coffee, from the feces of the palm civet -- ScienceDaily
<http://www.sciencedaily.com/releases/2013/08/130821124552.htm>
(accessed August 4, 2015).⁵

Corresponding journal article:

Jumhawan, U.; Putri, S. P.; Yusianto; Marwani, E.; Bamba, T.; Fukusaki, E. *J. Agric. Food Chem.* **2013**, *61* (33), 7994–8001.⁶

2. Organic molecules found in Sutter’s Mill meteorite, not previously found in any meteorites -- ScienceDaily
<http://www.sciencedaily.com/releases/2013/09/130910171440.htm>
(accessed August 4, 2015).⁷

Corresponding journal article:

Pizzarello, S.; Davidowski, S. K.; Holland, G. P.; Williams, L. B. *PNAS* **2013**, *110* (39), 15614–15619.⁸

Students are only shown the news article. On my campus, I use a print copy of the article in class because online access and our link resolver will automatically link to the journal article if students click on the DOI or other hyperlink in the journal citation. Part of this lesson is to gauge the students’ ability to locate a known item, and allowing a simple click would defeat that purpose.

Input/Modeling:

Ask students to examine the “Science Daily” (popular) article provided to each group. Notice that under the Science Daily logo it says, “Your source for the latest research news.” So, this must be a research article, right? Let’s see if we can determine that.

Poll students: Do you think this is a scholarly research article? (Y/N/Not sure). Ask those who answered “no” why not? Discuss what makes this a “popular” article. (Kahoot, Socrative, etc.)

7 MINUTES:

ASK STUDENTS: What is “peer-review?” Can anybody explain what this means?

Give students time to answer; write relevant terms on the white board. If none can adequately explain, librarian will finish explanation (maybe an infographic?).

The librarian can use the student responses to lead a discussion about publication lifecycle and the peer-review process. Many students in an introductory science class are unaware of the scholarly publishing lifecycle, although some will have familiarity with the process.

Once consensus is reached that the news article is not considered scholarly, the focus then shifts to identifying the peer-reviewed study on which the news item is based.

10 - 15 MINUTES:

Next, ask students to identify “clues” in the news article that will lead them to the full original (peer-reviewed) research article. They should work within their groups to develop a search strategy. The journal articles that these news items were based on are both available in full text to GVSU authenticated users. There are multiple ways of tracking them down from the GVSU library website.

At least 2 laptops will be available at each table and connected to the large “mediascape” monitor at the head of each table. One student should be responsible for conducting the search and projecting it on the screen for the whole group.

They should keep track of their search strategies. Successful groups will be asked to share their strategies. These will be compiled by the librarian and written on the white board; alternatively, screen captures of the SMART Board can be made and shared with students.

Students are then asked to locate a PDF of the journal article. Students are encouraged to share with their table group their strategy for locating the journal article. On our campus, several paths can be used to gain full text access to these articles:

- EDS search box on library home page
 - DOI

- Article title/author
- Journal title search
- Database search
- Google Scholar search
- Google search

The Google search works because in order for a student (or anybody) to use the internet on our campus, they must first authenticate to the server, whether they are using Wi-Fi or a cable connection. The library link resolver works somewhat seamlessly to connect an authenticated user to our full-text content.

The purpose of this activity is three-fold:

1. Gauge prior knowledge about accessing known journal items.
2. Emphasize that not all of these methods would work from an off-campus setting unless the user were authenticated to the server first.
3. Provide a challenge to solve.

After several students report locating the PDF, they are asked to share their method of access, and the librarian can explain the difference between on and off-campus access, and which of the above approaches will work better than others.

Students can at this point be instructed to use classroom whiteboards (if available) to summarize the differences between the peer-reviewed journal article and the popular news article. The librarian can lead a discussion of the key elements of a peer-reviewed science journal article, as well as the peer-review process itself. In particular, a discussion of publishing practices in the sciences, including open access opportunities and constraints could be included here.

10-15 Minutes

The final part of the lesson plan is a modeling component. The librarian can demonstrate for the students how to use library resources, primarily Ulrichsweb, to verify whether a journal is peer-reviewed. This may also be verified by going to the journal's home page and locating submission guidelines and editorial policies.

Guided Practice/Check for Understanding:

Students can then be given a poll/quiz that lists several journal titles and asks them to choose which one is not peer-reviewed, according to Ulrichsweb.

Additional questions may be posed with the Socrative polling website for assessment purposes as desired.

Threshold Concepts Addressed:

This lesson plan can be mapped to the following threshold concepts presented as the frames of the ACRL's Framework for Information Literacy for Higher Education. Each component of the frames will not be addressed by the activities in the lesson plan, but this lesson touches on parts of the following concepts:

1. Authority is Constructed and Contextual

As students embark on a study within a discipline, they must soon understand who the experts of that discipline are. Level of expertise varies by discipline and information need. This lesson plan demonstrates this concept during the discussion about the news article "scholarliness," and the subsequent comparison with the peer-reviewed journal article.

2. Information Creation as a Process

The whiteboard activity and/or following discussion of the hallmarks of a peer-reviewed science article and a discussion about open access policies address the concept of information creation.

3. Information Has Value

A discussion of open access vs. traditional publishing will address this concept.

Student Handout

Locating peer-reviewed/scholarly chemistry articles through the library

CHM 109 Introductory Chemistry

For best results, start at the University Libraries home page: www.gvsu.edu/library, or the Chemistry subject guide: <http://libguides.gvsu.edu/chemistry>.

1. List 3 ways you can find a "known item" article using library resources:

1.

2.

3.

2. List two ways to identify whether or not an article is peer-reviewed (also called "refereed" or "scholarly.):

1.

2.
