Climbing the Pyramid

Helping students evaluate science news sources

James Planey and Barbara Hug

Melting polar ice caps, hydraulic fracturing, hominid discoveries, "faster than light" neutrinos—science is almost always in the news. But to be scientifically literate, students need to understand that not all news sources are equal. Today's students are inundated with information—via social-networking websites, personal blogs, collaborative wikis, online-only publications, and so on—that ranges from biased personal opinions to peer-reviewed scientific papers. Some sources describe science events accurately; others don't. Students should understand how this media coverage affects their perceptions. Many students assume, for example, that the more extensively a topic is reported, the more important it is (Antilla 2010).

An enlightened media consumer analyzes and critiques a news story based on its source and the methods in which the information was collected (NRC 1996, 2011). Developing this media awareness presents unique challenges and opportunities for students and teachers (Jarman and McClune 2010).

Media awareness begins with asking questions, such as: "Where can I find scientific information?" "What sources of science news am I exposed to most often?" and "How does the information's source affect its quality?"

To help address these questions, we developed the "Source-Quality Pyramid" activity. This intuitive, student-driven activity promotes classroom discussion of science literacy and media awareness. It also helps address any student misconceptions about what makes a news source credible. (**Hint:** It's not how nice the website looks.)

Introducing the activity

Teachers can introduce the Source-Quality Pyramid activity with video footage of a science news report. We implemented this activity in a teacher workshop focused on climate change, so we played a clip from Comedy Central's *The Colbert Report* in which host Steven Colbert comically celebrates a record year of polar ice loss with a melted ice cream cake. We asked teacher participants: How does one assess Colbert's tongue-in-cheek report on polar melting? They then discussed evidence for Colbert's factual claims. They found a Canadian newspaper report online that was briefly referenced in Colbert's video clip. That report led to the website for the National Snow and Ice Data Center (see "On the web"), where a press release announcing the record ice melt was accompanied by satellite data, research, and a link to their Twitter feed.

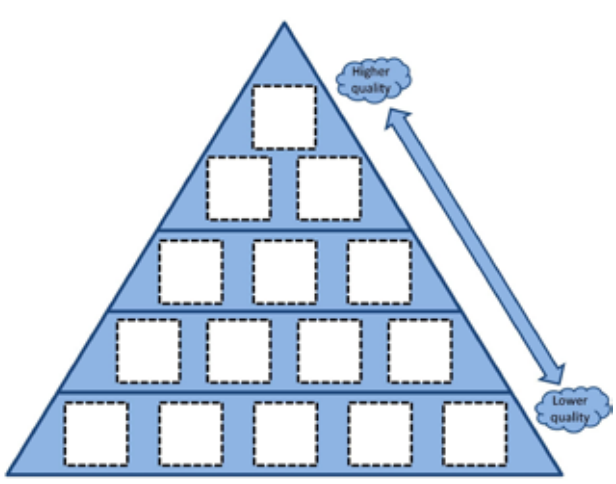
Video clips can provide relevant context when asking students questions about media's accuracy and validity: Where did the reporter get his or her information? How do you know whether the news report is accurate? Do you trust the news source? Students' responses can help teachers gauge their level of media awareness.

Another way to introduce the pyramid activity is to ask students to bring in science news articles to share with the class. Provide minimal instruction about where students should obtain articles; the reasoning behind their selections can spur classroom discussion.

FIGURE 1

The source-quality pyramid.

How do you choose where to get your scientific information? Use the source cards to build your own source-quality pyramid. Read the description of each source and decide where to place it. Lower-quality sources go toward the bottom and higher-quality sources go toward the top.



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Teacher-workshop attendees complete a source-quality pyramid.

The Source-Quality Pyramid activity

The main component of this activity is the source-quality pyramid: a hierarchical pyramid of scientific sources divided into four horizontal segments of increasing source quality (Figure 1). The segments decrease in size from the bottom to the top of the pyramid. Students might correctly interpret this to mean: Higher-quality sources are less common, less public, harder to access, or more specific than lower-quality sources.

Students work in small groups to manipulate a specific set of scientific sources, represented by cards, by placing them on the pyramid's blank spaces (see photo). All spaces must be filled.

FIGURE 2

Source cards.

The "source cards" can represent a wide variety of sources of scientific information, such as

- blogs
- social-networking sites (e.g., Twitter, Facebook)
- newspapers
- news websites
- science magazines
- weekly news magazines
- popular press books
- peer-reviewed journals
- reports from government agencies

These sources appear on the cards as either logos (e.g., CNN) or as images of the publication (e.g., *Discover* magazine) (Figure 2). (For the teacher workshop, we selected sources related to climate change.) The use of these cover images or logos helps students identify the sources when they encounter them in their daily lives.

Though many of the selected sources have broad cultural exposure (e.g., Facebook, Twitter, *National Geographic,* CNN), students may not be familiar with all of them. Therefore, we created "source information cards" with brief descriptions of the sources, including when sources were first published or founded, how people access them, and why they are major sources of information (Figure 3). These reference cards help student groups assemble their source-quality pyramids in fluid, intuitive ways, even if some of the sources are new to them.

Afterward, student groups present their results to the class, allowing students to see how their peers regarded the available sources. As groups defend their placement of the various sources on their pyramids, other students may recognize and modify their own preconceptions of those sources. This process engages students in reasoned argumentation, which is an important part of justifying claims made in science.

Extension activity

To help students further evaluate sources of scientific information, we developed an extension activity: a source assessment checklist (Figure 4, p. 40) inspired by Robert Harris's (2010) CARS (Credibility, Accuracy, Reasonableness, Support) assessment for English students. The checklist acts as a "pocket guide" that can be incorporated throughout the school year to assess scientific sources.

A supplemental worksheet guides students as they apply the checklist to five unidentified text samples from textbooks, blog posts, scientific reports, popular media publications, and interest groups. For each sample, students complete the source assessment checklist and judge—based on their experiences creating their source pyramids—where they think

FIGURE 3

Source information cards for *Scientific American,* Twitter, and the Intergovernmental Panel on Climate Change (IPCC).

FIGURE 4

Source assessment checklist.

Author: [ ] Scientist [ ] Organization [ ] Journalist [ ] Other (specify):_____

Writing Style: [ ] Professional [ ] Informal [ ] Narrative

Sources: [ ] Primary source [ ] Cites Source [ ] Mentions Source [ ] No Sources

Fairness: [ ] Personal Opinion [ ] Objective [ ] Biased

the passage originated, highlighting three critical elements in the passage that helped inform their decisions. Students then rank the five text samples according to quality and think of additional ways they can analyze the quality of a source beyond the text. This extension activity can be completed in groups or individually and provides more detailed insights into students' media awareness.

Conclusion

Teachers find the Source-Quality Pyramid activity effective in their classrooms. One reported: "It's easy to implement; the students were quite engaged in the problem and worked collaboratively, spreading their materials out on the floor. Our debrief discussions helped me learn what they think about media—and increased their own awareness." Other teachers reported using the pyramid to introduce specific curriculum components, such as issues analysis and finding value in the diversity of the media sources discussed in the activity because their students were unfamiliar with many of them.

The adaptability of the Source-Quality Pyramid activity makes it an ideal tool to address key scientific practices described in both the *National Science Education Standards* (NRC 1996) and *A Framework for K–12 Science Education* (NRC 2011). These practices (i.e., "constructing explanations," "engaging in argument from evidence," "obtaining, evaluating, and communicating information") are critical to all scientific disciplines, and with slight modifications the pyramid can be used in virtually any science course. The source-quality pyramid encourages students to think about where they find their scientific information and why media awareness is a critical life skill. ■

James Planey (planey@illinois.edu) *is a graduate research assistant and preservice teacher and Barbara Hug* (bhug@illinois.edu) *is a clinical assistant professor, both in the College of Education at the University of Illinois at Urbana–Champaign.*

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On the web

More information and additional curriculum materials: *www.life.illinois.edu/eew*

National Snow and Ice Data Center: *www.nsidc.org*

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