A Three-Tiered Framework for Proactive Critical Evaluation During Online Inquiry

Elena Forzani

A new approach for evaluating relevancy and credibility can position readers as proactive judges evaluating within and across three tiers and multiple texts while researching a topic of interest.

"It could be true but not true," ninth grader Isaiah (a theoretical student) equivocated as he contemplated whether an online article from *The New York Times* (see Figure 1) about eating genetically modified (GM) foods, a topic he had chosen to research, offered trustworthy information. "It says yes, they are safe to eat, but you can’t really trust what you read online, so they’re probably not safe. And, you probably can’t trust the author because she’s just an internet journalist" (see Figure 2). This reasoning is true enough, perhaps, or maybe not. The only way for Isaiah to find out would be to learn more about the author, her ideas, and the context of those ideas. Moreover, Isaiah needs to build understanding of how multiple pieces of information about relevancy, credibility, and topic, both within and across texts, inform one another, a process known as multiple-text comprehension (Bråten, Størumse, & Britt, 2009; Perfetti, Rouet, & Britt, 1999). Only then will he be able to make an informed decision about whether he should eat GM foods, a topic he had recently been discussing with his dad, who did the family’s food shopping.

Yet, although many have proposed lists of questions, strategies, checklists, or other heuristics meant to guide students through evaluating, as Isaiah is attempting to do here, such tools appear to be largely insufficient for this task, with many students still lacking evaluation skills (Forzani, 2018; Goldman, Braasch, Wiley, Graesser, & Brodowsinska, 2012; Kiili, Leu, Marttunen, Hautala, & Leppänen, 2018). So, how do we help students develop the tools for evaluating effectively? To address this question, my aim in this article is to offer a framework to guide a comprehensive evaluation process. Unlike existing tools that position readers as somewhat unskilled and passive participants engaged in relatively superficial evaluation, this framework positions readers as proactive judges engaged in a dual process of evaluating while constructing understanding to learn more about a topic of interest.

In outlining this framework, I first offer perspectives on evaluation. I then discuss possible shortcomings with existing frameworks and offer a new, three-tiered framework for evaluating relevancy and credibility within and across three tiers and multiple texts during online inquiry. Next, I provide three possible practices for helping students engage with the framework, along with instructional strategies. Finally, I offer one example of how Isaiah used the framework, with his teacher’s support, to evaluate while reresearching GM food safety.

Critical Evaluation During Online Inquiry

The process of reading online is often thought of as inquiry because readers search for information to
Figure 1
The First Part of an Article About the Safety of Genetically Modified Food

Note. From Brody (2018). The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.
Figure 2
The “About the Author” Webpage for Jane E. Brody, the Author of the Article in Figure 1

Jane E. Brody

Jane E. Brody is the Personal Health columnist for The New York Times, a position she has held since 1976. Ms. Brody’s widely read and quoted column, which appears in The Times’s Science Times section and in scores of other newspapers around the country, earned her the title of “High Priestess of Health” from Time magazine.

She joined The Times in 1965 as a full-time specialist in medicine and biology, after serving two years as a general assignment reporter for The Minneapolis Tribune.

Ms. Brody has also written many magazine articles and lectures frequently on health issues to audiences both lay and professional. She has appeared on hundreds of radio and television shows throughout the country and has received numerous prestigious awards for journalistic excellence. In 1987, she was awarded an honorary doctorate from Princeton University. She also has honorary doctorates from Hamline University in St. Paul, the State University of New York Health Sciences University, the University of Minnesota School of Public Health and Long Island University.


Ms. Brody received her B.S. degree in biochemistry from the New York State College of Agriculture and Life Sciences at Cornell University in 1962 and a master’s degree in science writing from the University of Wisconsin School of Journalism the following year.

Ms. Brody was born in Brooklyn, N.Y., where she presently resides. Her husband, Richard Engquist, a lyricist for the musical theater, died in 2010. Their twin sons, Erik and Lorin, both married, share her enthusiasm for wholesome food and fitness. She is the proud grandparent of four boys, including a pair of Brooklyn-born twins.

Note. The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.
answer a particular question or set of questions. This is sometimes referred to as online research and comprehension and involves a process of defining questions and then locating, evaluating, and synthesizing information iteratively before communicating it to others (Leu, Kinzer, Coiro, Castek, & Henry, 2013). Evaluation occurs throughout this process, from deciding which links to click in search results, to judging website credibility, to determining what and how to communicate to others.

Here, I define online critical evaluation as the process of judging the extent to which information is relevant and credible. Relevancy evaluation involves determining whether and how information relates to a reader’s research questions (Judd, Farrow, & Tims, 2006). Credibility evaluation involves determining how accurate information is (Kiili, Laurinen, & Marttunen, 2008) and how trustworthy the source and context of that information are (Wineburg, 1991). Thus, the more accurate and trustworthy the information is, the more credible it is.

Existing Evaluation Tools

Recent work investigating adolescents' online evaluation has illuminated potential reasons for why existing evaluation tools may be relatively ineffective (Forzani & Corrigan, 2019). First, rather than positioning readers as active researchers capable of judging nuanced information with the right tools in hand, existing tools tend to oversimplify evaluation, leaving little discretion to readers and relying on the tool to do the bulk of the work. Second, and relatedly, existing tools offer little guidance for how to integrate evaluation strategies with topic understanding, resulting in evaluation within a content vacuum. This is problematic because evaluation requires knowledge and knowledge evaluation (Shanahan, Shanahan, & Misischia, 2011). Third, current tools do not help readers group information into hierarchical categories by importance. In fact, many readers place too much emphasis on less important context clues, such as publication date, presentation, and superficial author information (Coiro, Coscarelli, Maykel, & Forzani, 2015). Similarly, Isaiah focused on the author being a journalist rather than finding out the kind of journalist she was or how this information related to his topic. Checklists and similar tools may encourage superficial reading by prompting readers to gather lists of disconnected information rather than evaluating comprehensively and in relation to topic.

A New, Three-Tiered Framework for Proactive Evaluation During Online Inquiry

Alternatively, recent work has conceptualized online evaluation as requiring proactive readers to construct topic understanding within and across three hierarchical and tightly connected tiers of information (see Figures 3 and 4): content, source, and context (Forzani, 2018). Evaluating the content (the goal) refers to assessing the accuracy of ideas presented through explanations and arguments, including claims, evidence, and reasoning (Bromme, Thomm, & Wolf, 2013). Evaluating the source (Wineburg, 1991) refers to assessing the trustworthiness of the source of information (e.g., author, publisher). This involves evaluating author expertise (e.g., education, professional experience), point of view (i.e., stance), and purpose. Evaluating the context (Rieh, 2002) refers to assessing the trustworthiness of the context in which ideas are presented and includes elements such as genre (e.g., blog), presentation (e.g., is the text error-free?), URL type (e.g., .org, .com), currency (when the information was created), and endorsements such as advertisements and sponsors (Ault et al., 2017).

Although content evaluation is the goal, this is not always easy for readers who lack topic knowledge (Shanahan et al., 2011). As a result, readers may first evaluate the more accessible context and source tiers, which provide valuable information for understanding and evaluating content but which alone are insufficient for full evaluation. Instead, readers must work their way down through the tiers to systematically build deep understanding within (see the inner triangles in Figure 4) and broad understanding across (see the downward arrow in Figure 4) tiers. See Table 1 for questions that readers can ask themselves as they evaluate within each tier.

This three-tiered approach to evaluating acknowledges both the complexity of evaluation as part of a broader online research and comprehension process illustrated in Figure 3 (Leu et al., 2013) and the multifaceted nature of evaluation with multiple subcomponents that include content, source, and context (Forzani, 2018). During online inquiry, readers evaluate and construct topic understanding simultaneously, with each practice influencing the other as readers construct a web of understanding (see Figure 5). This web includes multiple perspectives and sources that readers deem more, rather than less, credible. Sources whose credibility is unclear or suspect can be moved out of the web and placed in a counterweb for the reader to refute when drawing conclusions (see the down arrow in Figure 5, representing
perspective C moving out of Isaiah’s web). Because readers construct understanding for themselves and ultimately decide what to believe and how to act, they are at the center of the web. Readers’ motivation to learn about their research question(s), as well as their prior beliefs about and understanding of the topic, drives this process.

Three Practices for Engaging Readers in the Framework

How should readers use this framework? Here, I offer three practices that teachers can use to help students approach information critically within and across tiers. As an iterative process, these practices may not occur in this sequence. Rather than a one-size-fits-all approach or a rigid set of rules, these practices offer a flexible guideline that differs among teachers and students. Allowing students to research topics of their own choosing can be motivating because students are likely to be committed to constructing understanding and taking action on topics that are personally, socially, or even academically significant to them.

Practice 1: Help Readers Position Themselves as Frontline Judges: Habits of Mind for Evaluating

Developing critical habits of mind—ways of being, thinking, and approaching text—can provide an important foundation from which to evaluate. Effective evaluators take a critical stance (Harrison, 2018), use flexible...
think (Barzilai & Zohar, 2012; Hogan & Varnhagen, 2012), triangulate evidence within and across tiers and texts (Metzger & Flanagin, 2013; Shanahan et al., 2011; Wineburg, 1991), and view evaluation as iterative (Cho, 2014; Kiili et al., 2008). Helping readers see themselves as frontline judges who approach online inquiry using these habits of mind can guide readers even when they no longer have school-based support.

Encourage Readers to Take a Critical Stance. Viewing information accuracy and source authority with skepticism rather than assuming them to be true can prime readers to question information. Such a critical stance prompts readers to consider the ways in which an author’s point of view and biases may impact meaning and to consider alternative viewpoints (Fairclough, 2013). Considering one’s own beliefs, biases, and purposes (e.g., prior stance) can also influence judgments (Ault et al., 2017). Isaiah approached his inquiry from a critical stance because he viewed online information as potentially inaccurate.

Help Readers Think Flexibly. Another valuable habit of mind that Isaiah used was approaching trustworthiness as a matter of degree rather than an all-or-nothing concept. He believed that GM foods were “probably not safe.” It may be helpful to think of information along a continuum of relevancy and credibility (see Figure 6) from not at all to highly useful and accurate (Barzilai & Zohar, 2012). Information and sources that students decide to include in their web should be relatively high on both continuums. In contrast, using rigid thinking and viewing information as either completely credible or not rather than as nuanced can make credibility less obvious and evaluating more difficult (Hogan & Varnhagen, 2012). For example, a reader may conclude from a .org URL alone (a context feature) that a website is credible. However, anyone may purchase any URL for any purpose.

Engage Readers in Triangulating Within and Across Tiers and Texts. Flexible thinking can also assist readers in constructing understanding using multiple pieces of evidence (i.e., triangulating) within and across tiers...
### Table 1

**Questions for Critically Evaluating Relevancy and Credibility Within and Across Tiers and Texts**

<table>
<thead>
<tr>
<th>Evaluation component</th>
<th>Relevancy or credibility</th>
<th>Kinds of practices</th>
<th>Question(s) for readers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier 1: Content:</strong> Evaluating the relevancy and credibility of the ideas presented in search engine results and webpages</td>
<td>Relevancy</td>
<td>Evaluating usefulness</td>
<td>To what extent does the information provided help me answer my research question?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Evaluating comprehensiveness</td>
<td>To what extent is the information comprehensive/are multiple perspectives represented?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Corroboration (with prior knowledge and with understandings developed from other texts)</td>
<td>To what extent do the ideas presented fit with my existing/developing understanding of this topic?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Evaluating explanation</td>
<td>To what extent do the ideas presented make logical sense?</td>
</tr>
<tr>
<td></td>
<td>Credibility</td>
<td>Evaluating argumentation</td>
<td>To what extent does the evidence provided support the claims? (To what extent is the evidence high quality and credible? To what extent does the author provide high-quality reasoning about how the evidence supports the claims?)</td>
</tr>
<tr>
<td><strong>Tier 2: Source:</strong> Evaluating the relevancy and credibility of the source (e.g., author, publisher) of the content</td>
<td>Relevancy</td>
<td>Expertise area</td>
<td>To what extent are the author and publisher qualified to discuss this particular topic area (as opposed to a different topic area)?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expertise</td>
<td>To what extent is the author an expert in this topic or in a related field (e.g., does the author have a degree/job/other professional experience or credentials in this area)?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Purpose</td>
<td>What are the author's/publisher's reasons for writing this text? Is the author employed by the organization?</td>
</tr>
<tr>
<td></td>
<td>Credibility</td>
<td>Point of view</td>
<td>What are the author's/publisher's points of view on this topic? What biases might influence these points of view (e.g., commercial or personal interests)? To what extent do the author/publisher provide multiple points of view?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rhetorical techniques</td>
<td>What rhetorical techniques does the author/publisher use to influence the reader's opinions?</td>
</tr>
<tr>
<td><strong>Tier 3: Context:</strong> Evaluating the relevancy and credibility of the context in which the content is presented</td>
<td>Relevancy</td>
<td>Genre usefulness</td>
<td>To what extent is this genre/structure useful for answering my research question?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Genre credibility</td>
<td>To what extent is this genre credible for the context of my research?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Presentation</td>
<td>To what extent is the text error-free and professional looking? Do text type and size detract from my understanding? Are images distracting?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Structure</td>
<td>To what extent is the information well organized and easy to understand? How are textual and visual elements organized?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>URL</td>
<td>What kind of URL is used?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Currency</td>
<td>When was this text created?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Endorsement</td>
<td>What kinds of advertisements are on the webpage? Are there organizations that sponsor this information? If so, who are they?</td>
</tr>
</tbody>
</table>
and texts. Triangulating within tiers and texts can help readers gain a fuller understanding of how credible a piece of information or a tier may be using multiple clues. Triangulating across tiers and texts prompts readers to seek out multiple, diverse perspectives and clues. Considering different viewpoints primes students to evaluate credibility because not all viewpoints are compatible. Such corroboration allows readers to compare new information with existing understandings, as well as with information from other websites (Shanahan et al., 2011; Wineburg, 1991). However, flexible thinking may not be enough to help readers triangulate. Although Isaiah’s flexible thinking set him on the right track, he only considered one source aspect (author’s profession) and in a superficial way disconnected from topic. To fully evaluate the author’s expertise, Isaiah needs to gather more evidence and consider it in relation to topic. Moreover, rather than looking at the source alone, he needs to examine the context and content.

Help Readers View Evaluation as an Iterative Process. Evaluation occurs throughout online inquiry, and effective evaluators understand that judgments may evolve (Cho, 2014; Kiili et al., 2008). As readers gather information from multiple sources, they integrate their evaluations with their developing topic understanding. Their views are likely to change as they weigh evidence from multiple viewpoints.
Although a reader may initially consider a particular source to be more relevant and credible, they may later decide that it is less so and remove it from their web (see perspective C in Figure 5). Despite Isaiah’s critical stance, he did not view evaluation as iterative. Instead, he had decided ahead of time that the article in Figure 1 was likely not credible because he believed that online information in general is not trustworthy.

**Practice 2: Teach Readers to Build a Case by Constructing a Web of Understanding**

As the frontline judge, a reader must develop a relatively relevant and credible set of ideas and texts. Online contexts require readers to choose their own texts from many possibilities as they navigate different links (Cho, 2014; Coiro & Dobler, 2007). Critical readers actively determine which information and texts to include in their web and which not to by evaluating within and across tiers and texts. As readers’ thinking develops, they may decide to set aside an idea or text that they had previously included (see perspective C in Figure 5) or to add one that they had discarded. They may also decide to set aside an idea or text as part of a counternarrative to refute. Readers should be able to use evidence from within and across tiers and texts to explain why they included or excluded each idea or text.

**Engage Readers in a Dual Process of Evaluating and Constructing Topic Understanding.** Readers use developing topic understanding to evaluate and, in turn, use developing evaluations to determine the extent to which they should incorporate new ideas into their understanding (Cho, 2014). In this highly iterative process, readers are continuously revising their understandings of both topic and credibility during multiple-text comprehension (Bråten et al., 2009). Such a process can be challenging because readers must synthesize across multiple texts and perspectives while also evaluating and then integrate their understanding of both to construct meaning (Rouet & Britt, 2011). This forces readers to hold multiple pieces of information in their minds as they compare and contrast, which may be particularly challenging for readers who lack background knowledge.

**Expose Readers to Texts of Varying Degrees of Relevancy and Credibility.** The variety of texts and their varying degrees of quality can also present challenges (Hogan & Varnhagen, 2012). Exposing students to the same kinds of texts that they will see on the open internet will help them develop the tools they need beyond the classroom. Instead of offering vetted text sets, teaching students to navigate the internet by modeling evaluation with the framework can help them learn to think critically. If too difficult initially, providing students with a vetted text set containing varying degrees of quality offers a useful support.

**Practice 3: Give Readers the Opportunity to Deliberate, Present an Opinion, and Act**

Throughout the process of developing a web, readers need to decide when they have enough information and sources. This may depend on how familiar a reader is with a topic at the onset of research (Shanahan et al., 2011). However, having at least three or four sources representing at least two perspectives is a good rule of thumb. Once readers feel that they have a relatively relevant and credible web, they can consider all the information within it before drawing conclusions and communicating to others. Providing opportunities for readers to present and defend their opinions via discussion, writing, or multimodal tools can encourage readers to step back and further integrate their understanding (Perfetti et al., 1999; Rouet & Britt, 2011). This also gives readers a chance to reevaluate their opinions after considering others’.

**An Example: Isaiah Uses the Framework, With Support From His Teacher, to Reresearch GM Foods Proactively**

The following example illustrates how a reader might use the three-tiered framework, with support from

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**Figure 6**
A Continuum for Evaluating Relevancy and Credibility

<table>
<thead>
<tr>
<th>Relevancy</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

*Note.* 0 = not at all relevant (does not help answer the research question) and not at all credible (hoax website; information is inaccurate and/or from an untrustworthy source), respectively; 5 = highly relevant (directly answers the research question) and highly credible (information is very accurate and from a very trustworthy source), respectively. The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.
a teacher using the practices discussed in the previous section, to approach evaluation critically while constructing understanding of a topic of interest. To answer his research question, Isaiah needs to evaluate relevancy and credibility within and across tiers and texts and in relation to topic, which he did not do during his initial inquiry. During his second inquiry, Isaiah’s teacher, Ms. Rivera (also a theoretical person), helped him use the framework to reresearch, which resulted in more sophisticated inquiry. This allowed Isaiah to draw an informed conclusion about whether he should eat GM foods, which he could not do initially.

**Practice 1: Engage Readers in Critical Positioning**

Before beginning his research, Ms. Rivera encouraged Isaiah to think of himself as a skeptical judge weighing different evidence and possibilities. Because Isaiah had little understanding of GM foods, Ms. Rivera suggested that he first conduct a quick background search to gain some understanding from which to begin to evaluate. Isaiah had a slight bias against GM foods because his dad avoided buying them. However, Isaiah agreed to think flexibly and keep an open mind. First, he located the Wikipedia page for “genetically modified food.” He believed that Wikipedia would be useful because he wanted a neutral, encyclopedia-like understanding. He learned that GM foods have changes made to their DNA. He also learned of the scientific consensus that GM foods do not pose a greater risk to human health than non-GM foods. Isaiah wondered if that was true and noted to investigate it further. However, he also learned about ongoing public concern over this issue and decided to look for reasons why. Isaiah used Table 1 to guide his investigation across tiers and texts.

**Practice 2: Support Readers in Developing a Web of Understanding**

With this background understanding and several questions that set a purpose for his reading, Isaiah conducted a new search using the three-tiered framework and starting with his earlier article (see Figure 1). The article was highly useful (see Table 1) because it directly answered his research question: The article’s title was his research question. Ms. Rivera showed Isaiah how to keep track of his developing thinking by creating a web of understanding in a Word document (see Figure 5).

**Webpage 1: The Article From The New York Times.**

During his first search, Isaiah had not considered context, except that the information was on the internet (tier 3: context). Now, while examining currency, he noticed that the article was published on April 23, 2018. In science, having more recent information is important because new research influences our understanding of the world. Isaiah also noticed that the article was professionally presented, free of errors and distracting images, and contained only a few, unobtrusive advertisements (i.e., endorsements). Based on context, the article seemed relatively credible. However, the framework encouraged Isaiah to also look at the more important factors of source and content.

Isaiah saw that the article was published by *The New York Times* (tier 2: source), which he was not familiar with. A quick side search revealed that the newspaper was founded in 1851, had worldwide readership, and had won 125 Pulitzer Prizes. Isaiah was familiar with the prestige of the Pulitzer Prize from school. Next, at Ms. Rivera’s suggestion, he clicked on the author’s name, which he had not thought to do before. This brought him to a secondary webpage with a biography (see Figure 2) stating that the author, Jane E. Brody, has a bachelor’s degree in biochemistry from Cornell University and a master’s degree in science writing from the University of Wisconsin School of Journalism. She has been the Personal Health columnist for *The New York Times* since 1976 and has written books on health and nutrition. Isaiah determined that she looked more credible than he had originally thought because she had relevant education and experience in a field closely related to the topic. “She’s not just a journalist but actually went to school for biochemistry and science writing, so she probably knows a lot about science.” He also noted her experience in health writing (see *expertise area and expertise* in Table 1). However, after Ms. Rivera reminded him to maintain a critical stance and be skeptical, Isaiah realized that the author’s biases may influence her ideas, which he wanted to investigate for himself.

While Isaiah had not considered arguments and explanations during his first search, Ms. Rivera prompted him to do so based on the framework (tier 3: content). He noted that the author discussed several viewpoints (see *evaluating comprehensiveness* in Table 1) and that she used what he considered credible evidence to support her claims (see *evaluating argumentation* in Table 1). On the one hand, the author argued that GM foods are relatively safe because “about 90% of scientists believe [this]—a view endorsed by the American Medical Association... and the World Health Organization” (Brody, 2018, para. 6), organizations which Isaiah deemed trustworthy.
after asking Ms. Rivera, whose opinion he trusted, about them. The author also argued that farmers of GM foods can use fewer pesticides. Isaiah’s corroboration of this information with his prior knowledge that pesticides could cause adverse health effects enabled him to agree that fewer pesticides were a useful benefit.

On the other hand, the author pointed out that “it is not possible to prove a food is safe, only to say that no hazard has been shown to exist” (Brody, 2018, para. 7), and that “establishing long-term safety would require prohibitively expensive decades of study” (para. 9). Considering the logic of this explanation, Isaiah also agreed that the fact that GM foods have not been shown to be harmful did not necessarily mean that they were not. He now understood why there was public concern, a question generated during his background search. He determined that this text was relatively credible and placed it in his web for now (see perspective A in Figure 5). However, he wanted to see how others might discuss the same arguments, so he decided to seek out at least one webpage for and one webpage against GM foods. Rather than locating these articles for him, Ms. Rivera let Isaiah search online independently so as to expose him to multiple kinds of texts.

**Webpage 2: GMO Answers.** Isaiah located the websites for GMO Answers (https://gmoanswers.com/) and Non-GMO Project (https://www.nongmoproject.org/), which he rightly guessed from their URLs (a context element) were for and against GM foods, respectively (tier 1: context). (The acronym GMO stands for genetically modified organisms.) Scrolling through the GMO Answers website (see Figure 7), he found a professionally looking graphic with clear statements and numerical data, making it appear relatively credible.

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**Figure 7**
A Webpage on the GMO Answers Website

![GMO Answers Website](https://gmoanswers.com)

*Note. The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.*
However, Ms. Rivera reminded Isaiah to think flexibly and investigate additional tiers. He remembered to locate the “About GMO Answers” page and found that the website is funded by The Council for Biotechnology Information, which at that time included BASF (a chemical company), Dow AgroSciences, and Monsanto Company (tier 2: source). He immediately noted from the logo that BASF’s financial interests in chemicals (rather than expertise in science or health) likely meant that they favored GM foods. Isaiah decided that the authors’ purpose in creating the website was probably to support sales of their GM seeds. He began to consider that this website was probably not as credible as he had thought and did not belong in his web.

Isaiah remembered to triangulate across, not just within, tiers and took a close look at the content, too (tier 3: content). Interestingly, the webpage stated that “the overwhelming consensus of scientific experts and major scientific authorities around the world, including the World Health Organization” (GMO Answers, n.d., para. 1), was that GM foods are safe to eat. “Hmm,” Isaiah said, “that’s the same thing that The New York Times article said.” Isaiah was corroborating this information with what he had read on another website (Shanahan et al., 2011; Wineburg, 1991). He returned to thinking that this website, or at least this idea, was somewhat credible despite the financial interests and thus biased point of view of the source, and he temporarily placed it in his web (see perspective B in Figure 5). Isaiah was now even more curious to see what the Non-GMO Project website said about this claim.

**Webpage 3: Non-GMO Project.** Isaiah quickly noted that information on the Non-GMO Project website (see Figure 8) is presented in an easy-to-understand

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**Figure 8**
A Webpage on the Non-GMO Project Website

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**GMO Facts**

**What is a GMO?**
Genetically modified organisms (GMOs) are living organisms whose genetic material has been artificially manipulated in a laboratory through genetic engineering. This creates combinations of plant, animal, bacteria, and virus genes that do not occur in nature or through traditional crossbreeding methods.

Most GMOs have been engineered to withstand the direct application of herbicide and/or to produce an insecticide. However, new technologies are now being used to artificially develop other traits in plants, such as a resistance to blushing in apples, and to create new organisms using synthetic biology. Despite biotech industry promises, there is no evidence that any of the GMOs currently on the market offer increased yield, drought tolerance, enhanced nutrition, or any other consumer benefit.

Visit the What is a GMO page for more information and a list of high-risk crops.

**Are GMOs safe?**
In the absence of credible independent, long-term feeding studies, the safety of GMOs is unknown. Increasingly, citizens are taking matters into their own hands and choosing to opt out of the GMO experiment.

**Are GMOs labeled?**
Sixty countries around the world, including Australia, Japan, and all of the countries in the European Union, require genetically modified foods to be labeled. Canada does not require any GMO labeling.

GMOs are not currently labeled in the United States. However, the National Bioengineered Food Disclosure Standard (NBFDS) was published in the Federal Register on December 21, 2018. This law, which you may have heard called the “GNAR Act,” is the start of mandatory GMO labeling in the United States. It means that some—but not all—products containing GMOs will have to be labeled by 2022. In its current form, categorical exemptions prevent this law from delivering the meaningful protections Americans deserve.

Learn more.

**Which foods might contain GMOs?**
Most packaged foods contain ingredients derived from corn, soy, canola, and sugar beet — and the vast majority of these crops grown in North America are genetically modified. 1

To see a list of high-risk crops, visit the What is a GMO page.

**Animal products:** The Non-GMO Project also considers livestock, aquaculture, and aquaculture products at high risk because genetically engineered ingredients are common in animal feed. This impacts animal products such as eggs, milk, meats, honey, and seafood.

**Processed inputs:** including those from synthetic biology. GMOs also sneak into food in the form of processed crop derivatives and inputs derived from other forms of genetic engineering, such as synthetic biology. Some examples include: hydrolyzed vegetable protein corn syrup, molasses, sucrose, textured vegetable protein, flavorings, vitamins, yeast products, microbes & enzymes, flavors, oils & fats, proteins, and sweeteners.

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Note. The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.
structure on the “GMO Facts” webpage (a context fac-
tor). However, rather than evaluating the source next,
he evaluated the content because his developing topic
understanding gave him an idea of what he wanted to
look for. The website states, “In the absence of cred-
ible independent long-term feeding studies, the safety
of GMOs is unknown. Increasingly, citizens are taking
matters into their own hands and choosing to opt out
of the GMO experiment” (Non-GMO Project, n.d., para.
4). This was not the information that Isaiah was look-
ing for, but he had encountered this idea in The New
York Times article. He scanned the “GMO Facts” page
for the fact about the scientific consensus but did not
see it. Isaiah remarked, “This isn’t surprising because
this idea would not support their viewpoint. They didn’t
lie about it, but they left it out.” Thus, he noted the lack
of comprehensiveness.

Isaiah now had an understanding of the posi-
tions of different players within the debate. When
Ms. Rivera asked, he noted from Table 1 (rhetorical
techniques) that the word experiment was designed
to manipulate, because no one wants to be experi-
mented on. This prompted Isaiah to learn more
about the source by clicking on the “About” page. As
he had guessed from the URL, the Non-GMO Project
is a nonprofit committed to safeguarding a non-
GM food supply. When Isaiah clicked on the biography
of the executive director, Megan Westgate, he saw no
information about her education or professional ex-
perience in science or health. She has experience in
speaking about non-GM foods, serving on the board
of a food co-op, and gardening at home. Again, Isaiah
was surprised. “She has no science or even health
background! Mostly, she only offers her personal ex-
perience!” he exclaimed. “This is definitely not what
I thought at first, especially because this is a .org
site, but after looking at all three tiers, I think the
information from GMO Answers may be more trust-
worthy than the information here.” Isaiah decided to
set aside this website as part of a counternarrative
around the dangers of GM foods, which for now did
not seem supported by scientific evidence, although
he would investigate it further later (see perspective
C in Figure 5).

Practice 3: Help Readers Deliberate,
Present an Opinion, and Act

After reading multiple texts, Ms. Rivera paired Isaiah
with a classmate who had conducted research on the
same topic to give them an opportunity to discuss and
determine how to act on what they had learned. After
some initial disagreements, Isaiah and his classmate con-
cluded that eating GM foods was probably safe given
the support for this idea from many scientists and trustwor-
thy organizations. Yet, the adolescents wondered about
the long-term effects and decided to keep an eye on the
issue. This was a change from Isaiah’s initial belief that
he should avoid GM foods. He and his classmate decided
to make a brief presentation to share with their parents
that night.

Conclusion

Online evaluation involves closely examining three
tiers—content, source, and context (Forzani, 2018)—
within an online inquiry process (Leu et al., 2013). As
frontline judges, readers must proactively and criti-
cally evaluate multiple clues within and across all
three tiers rather than assuming information accu-
rracy. Such a task is challenging because readers are
integrating information across multiple texts with
potentially conflicting ideas (Rouet & Britt, 2011).
Using the framework provided can help readers learn
accurate information about topics important to them
by understanding how to evaluate content, source,
and context. Such a framework offers important di-
rection for comprehensive, rather than superficial,
evaluation.

TAKE ACTION!

1. To help readers develop a critical stance, expose
them to two websites with opposing claims, one of
which is much less credible than the other. Students
will likely be prompted to question credibility because
both claims are unlikely to be true. Ask students
which website they find more credible and why.

2. Engage readers in flexible thinking by exposing them
to multiple websites on a topic. Then, ask readers
to work in groups to place each webpage on the
continua for relevancy and credibility (see Figure 6)
and to share evidence for their decisions.

3. In addition to having students research
independently, give them the opportunity to conduct
collaborative research in a motivating context by
allowing them to work in pairs or small groups to
research a topic of their choosing.
REFERENCES


Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the internet. Reading Research Quarterly, 42(2), 214–257. https://doi.org/10.1598/RRQ.42.2.2


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