

Battling Disinformation About Climate Change in a Non-Science Majors Lecture/Lab Course One Website At a Time

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Abstract: With all of the news and social media outlets available, it is easy for anyone to post information for the world to see. This can result in misinformation being shared, especially when it comes to “hot button” topics such as climate change. It is important, therefore, to teach our students how to be both scientifically and informationally literate. This communication describes an assignment used in an environmental science class designed for non-science majors in which climate change is the overarching theme. This assignment helps students learn to identify appropriate sources of information which can then reliably inform them about the effects of climate change. Students can then expand upon this approach outside of class and use it to research any information that they find in the news or on social media. This allows them to critically analyze the sources before reaching an informed decision as to whether it is factual or misleading information.

Keywords: climate change; non-science majors; internet searches; misinformation

1. Introduction

More than in any previous point in human history, misinformation can quickly reach a large audience, often with little to no external scrutiny. “Clickbait” articles with hyperbolic or misleading headlines often get more views and traction from the general public than academic journal publications. Many times, these types of articles can be found in mainstream media or on social media websites. False news is typically transmitted faster through human activities rather than automated robots (Vosoughi et al., 2018). Even errors in artificial intelligence have been reported (Al-Raei, 2024; Zhang & Aslan, 2021). In our own class, having students search the results of melting sea ice shows mistakes in the AI Overview following a Google search. “Buyer beware” has never been more relevant when it comes to the consumption of information.

Some of the clearest examples of misinformation are in regard to climate change, which has become highly politicized and partisan. While the scientific world has long ago reached consensus on the causes and impacts of climate change (Cook et al., 2018; Ding et al. 2011; Lynas et al., 2021), a small percentage of scientists, many outside of science actively, and for self-serving reasons, dissent from and challenge this consensus. Unfortunately, they often garner a dis-proportionate amount of media attention (van der Linden et al., 2017). Misinformation campaigns from partisan sources are well funded and therefore often well produced compared to many sites trying to debunk climate change misinformation. This contributes to the disconnect between scientific consensus on climate change and public opinion (Marlon et al., 2023). This disconnect may be due to a lack of understanding when it comes to the scale of the impact, its causes, and the rate at which things are changing. This misinformation is spread through various individuals through either skeptical, denial or contrary viewpoints (Treen et al., 2020).

Being able to discern between climate misinformation campaigns and the objective presentation of data-backed research is a skill our students must possess to be informed citizens, and for our society to have a chance at diminishing the negative effects of climate change. Here we present how non-science majors taking an environmental science lecture/lab

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course can learn to be critical consumers of information and better discriminate between trustworthy and unreliable sources, applying these skills to better understand the effects of climate change on the Earth. By doing so, we are allowing them to recognize the impacts of science on a local and global scale.

2. Activity

Students overwhelmingly use Google as their main research tool (Olsen & Diekema, 2012) and evaluate search results based mainly on title and summary (Walraven et al., 2009). To encourage a more critical analysis of source material we teach our students to examine five criteria of a website.

- Authors: Who wrote the page and why?
- Authority: Is the author a credible source? What are their qualifications?
- Objectivity: Is there an opinion expressed? What is the goal of the page?
- Currency: When was it last updated?
- Coverage: Does the page cite its sources? Is the information comprehensive?

Although we are focusing on climate change, the universality of this approach is emphasized to the non-major students who will hopefully apply it to data gathering in their own discipline-specific studies.

To guide and provide practice in picking appropriate online sources, we assign our students to review three websites, each with a different goal and target audiences: *Skeptical Science* (<https://skepticalscience.com/>) an up-to-the-minute aggregator of the latest climate news aimed at debunking climate misinformation, *Climate Skeptic* (<http://www.climate-skeptic.com/>) a personal blog aimed at attacking the scientific establishment's views on climate change, and *The Environment* (<https://www.heritage.org/environment>), which presents the Heritage Foundation's view of issues, including climate change, from a libertarian point of view. Although we have chosen these websites, instructors using this assignment for their classes can choose any climate change websites they wish. This activity and the post-discussion can be completed during a class period or as a homework assignment. We typically give our students this assignment at the beginning of the semester. This way, they can use this skill as the semester progresses when they are asked to look up information relating climate change to other environmental issues, such as pollution, human population growth and sustainability of natural resources.

After students have the opportunity to peruse and analyze the three sites using the criteria listed above, we then ask them to choose which sites are the most appropriate choices for particular scenarios. Students are first asked to determine which website is the best for researching the politics of climate change, to which students all choose the site from the Heritage Foundation, a libertarian think tank (About Heritage 2023). Next, we ask the students to determine which website is the best for general climate change research and which website is best for general background research on climate change. Based on anecdotal evidence, a significant number of students choose sources based on aesthetics. For example, many students prefer *The Environment* due to its professional appearance, despite its content being ideologically driven and policy-focused. Of the three, however, only *Skeptical Science* is reliably sourced from peer-reviewed academic sources. Unfortunately, it is also the least aesthetically pleasing, and is therefore viewed by students as least reliable.

After students complete the assignment, the instructors review the answers with the students. One of the major concepts we cover is that appearances can be deceiving. Students tend not to choose the two that specifically address the underlying science is their use of the blog format which, at first blush, seems less credible than the slickly produced offering from the Heritage Foundation. The activity emphasizes that one must take time to look at the content of the website and its sources. This is a modernization of the adage that you can't judge a book (or a website) by just its looks.

3. Conclusions

We believe that following this assignment, our students' ability to choose proper websites when researching scientific concepts improves as the semester progresses. Prior to us developing this assignment, we observed our students using any website that on the surface looks like it helps answer questions when completing lab assignments. Case in point, a previous student taking our classes used *Answers in Genesis* (<https://answersingenesis.org/natural-selection/antibiotic-resistance/>), a website espousing

the idea of intelligent design, as a reference when researching the role of natural selection in antibiotic resistance. Since implementing this assignment, we have seen considerable improvement in websites being chosen by the students.

One of our students commented at the end of the semester “*I thought it was interesting to compare different websites based on the type of language and emphasis used. It also helped me understand graphs and other data better for future online use. I also think it’s important to consider who is writing the websites and if there’s any personal bias woven into the data they’re presenting.*”

It is important for teachers of non-science majors to make their students scientifically literate through information literacy. This is a key recommendation of the American Association for the Advancement of Sciences’ Science for all Americans (Rutherford & Ahlgren, 1990). We want our students to be informed citizens. This means being able to fact check news, claims on social media, or the validity of new products being sold, etc., and determine for themselves if they are all they claim to be. This ability to discern fact from fiction is particularly important when researching a scientific concept they hear about in the news or social media. We feel that this assignment allows teachers to train their students in this important skill and at the same time, combat miscommunication we continue to see about climate change.

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