

Teaching to the image: helping student journalists visualize environmental stories in a climate change world

Mark Neuzil and Amelia McNamara, University of St. Thomas
St. Paul, MN USA

Introduction

In 1966, two reporters from the *Chicago Tribune*, Casey Bukro and Bill Jones, wrote a series on water pollution, including problems in the North American Great Lakes, creatively called “Save Our Lakes.” The articles came at the time the modern environmental movement in the United States, sparked by the publication of Rachel Carson’s book *Silent Spring* in 1962, was gaining momentum – and increased attention from mainstream media.

The reporters’ use of visual images to help tell their story was simple, effective, and now seems from the very, very distant past.

What did Bukro and Jones do? Early in their reporting, they investigated a heavily polluted inlet into Lake Michigan called the Indiana Harbor Ship Canal. As was typical of such waterways by the 1960s, the canal was choked with an oily, scummy, stench-filled filth of mostly unknown origins. Staring at the sticky black ooze, the two men considered how to photograph it effectively.

On instinct, and at some risk, Jones plunged his hand into the gooey dreck and grabbed a handful. As Jones slid it out, dripping with toxicity and God knows what else, Bukro snapped a photograph of his partner’s hand.

“And that became our test for clean water,” Bukro recalled 30 years later. “We travelled around the country doing that, to show what stuck to our hand.” (Bowman, 1996, p. 5).

No drone shot. No photo illustrations. No grizzled fisherman staring forlornly out at the vast, empty waters. No pie charts, line graphs or other data visualizations. “I didn’t have to conduct any scientific experiments to prove that the air was black, and the water was filthy. Our pictures showed it, and your own senses proved it,” Bukro said. (Ibid).

The difficulties with images

Climate change does not stick so easily to the hand. Print media and its broadcast brethren, be they network, cable or on-line, have struggled with the transition from environmental stories that are visible – including scum-filled waterways – to coverage of issues, as Neuzil (2008, p. 205) said, “that are often invisible, complex and highly contentious.” And it may be, as Bill McKibben (2022) noted, that “the biggest news story of all time doesn’t quite fit our working definition of news.” All this is why teaching journalism students to think about images should be a top priority.

In teaching undergraduates to cover environmental issues such as climate change, Neuzil uses the Tribune's photographs as an example of creative visual storytelling; students should aspire to Jones' cleverness, but it has become much more challenging in 2022, even with a camera in everyone's pocket.

At our university, we have a foundational rule at the student-run news source, TommieMedia.com, that each story needs a graphic element. Once, one of the (frustrated) undergraduates said, "all the good images are taken!"

The student was reminded that the words "image" and "imagination" come from the same Latin: *imaginare*, "to form an image of, represent" and *imaginari*, "picture to oneself."

We were discussing nuclear power and its relationship to climate change. "Not all images are used up. Not yet," the student was told. "Think of the big chimneys in nuclear fission plants. Do those still work to move the soul?"

Bolstering that claim is American novelist Paul Theroux, who spent most of his career in England. He walked and rode around the U.K. for his travelogue *The Kingdom by the Sea*, and stumbled across a nuclear power station near Sandgate. There in front of him were its giant cooling towers, a forbidding yet representative visual image. "It was not the gigantism that was nasty – the size alone could not be fearsome," Theroux (1983, p. 46) wrote. "But the unnatural look of nuclear power stations was daunting. They could not be prettified. Their horrific aspect, to someone staring at them from across a calm bay, was their explosive shapelessness, the random swollen angles, and all the radiating power lines, like orbs of modern shock waves."

This was in the early 1980s, after Three Mile Island, but before Chernobyl and Fukushima drove the point home again. In late December 2021, Germany announced that it was pulling the plug on three of its remaining six nuclear power plants. Reuters News Agency (2022) used three photographs to illustrate its text story on the news; all three were of cooling towers and there were no people in any of them, which can be problematic (Leviston, et al, 2014).

Many of today's climate change stories, if we may generalize, are driven by extreme weather events, which are also relatively easy to photograph. Wildfires destroying homes, crops withering and dying in drought-stricken fields, floods inundating villages, and tornadoes in the winter – unknown until 2021 where we live in Minnesota – are all examples. The harder stories to visualize involve science at its microscopic level, such as endocrine disruptors, or macroscopic level, such as our Upper Midwest growing season lengthening by 11 days since 1980.

The help of big furry mammals

The journalist always must keep in mind their audience, of course, and the first audience for any story is the assigning editor. In Neuzil's experience as both an editor and reporter, a visual image of an animal included in an environmental story is a sure winner to be blessed by any editor. Not just any animal will do; the most qualified critters are what we call *charismatic megafauna*.

What do we mean by this? A simple way to think of charismatic megafauna is that if the creature can take a star turn in a Disney movie with its a merchandise campaign centered around plush toys, a member of charismatic megafauna is what you have. Think of Bambi, The Aristocats, Lion King, 101 Dalmatians, The Lady and The Tramp and you get the idea. Charismatic megafauna are usually larger mammals or pets, easily recognized, photogenic, popular, and furry. (Pixar's Finding Nemo might be the exception that proves the rule.)

In a decidedly non-scientific survey taken at the beginning of each environmental journalism class, Neuzil shows a slide of an image of a giant panda and asks the class, predisposed to environmental issues as they are, to identify the conservation organization it represents. Only occasionally does a student miss on the World Wildlife Fund, which has used the logo for more than 60 years. Few animals are more well thought of (in multiple cultures) than pandas.

When the student was told that images may be "used up," a better way to address it is that some visuals are so often called upon that they have veered into cliché. Such is the case, we think, with the polar bear and melting ice caps. For example, Michele Moses (2019), writing in *The New Yorker*, acknowledged that certain images of distressed bears in Russia may be misleading – who knows what caused their distress? Starvation? Disease? Injury? However, she concluded that no matter the cause of a single bear's starved,

sickly appearance (one had been poisoned by eating garbage), the overall value of the picture trumps the detail: “The photographs ... were not precisely of a species forced out of its habitat by climate change — though, as a story of human cruelty, they are no less disturbing — but the visceral reactions they inspired were arguably an appropriate response, nonetheless, given the current crisis.” (Ibid).

It is not our intent to argue the ethics of a particular image here. And perhaps cliché is the wrong word but do a quick Google search of polar bear and climate change and see how many millions of hits pop up. Many would agree that even an image as heart-tugging as a starving polar bear loses its impact upon repeated viewing.

However, let us not abandon charismatic megafauna just yet. Two examples from non-Disney, non-polar bear sources are wolves and moose and their interdependence in a climate-changing environment.

The wolves and moose of Isle Royale

Isle Royale National Park (USA) consists of 400 islands, the largest of which is 205 square miles. They sit in Lake Superior and “belong” to the state of Michigan, although the nearest island is only 18 miles from Minnesota. Scientists have studied the island wildlife, mostly moose, continuously since the 1920s. Wolves arrived in the 1940s, probably walking across the frozen lake, started eating moose and joined the laboratory. It is the most studied predator-prey relationship in the Great Lakes watershed, and perhaps the entire continent.

There are plenty of scientific reasons why the moose-wolf studies have gone on for a century, not the least of which is that a rugged island in the continent’s largest lake is a nearly contained ecosystem. But equally important, for the public’s attention, is the charisma of the two subjects. They are large, fuzzy, easily photographed, well-known, and particularly in the case of the moose, beloved. They have cultural meanings that extend their scientific value (Neuzil and Freedman, 2018).

The first Hollywood star turn for the moose came in the 1930s, when photographer Walter Hastings, an employee of the Michigan Department of Natural Resources, produced a series of films that were shown across the U.S. and Canada and eventually in Europe. By the 1960s, the wolves had become co-stars through television specials, newspaper and magazine photographs, and a popular children’s book. The largest of the canine predators received names, such as Big Jim and Old Gray Guy. It was not strictly anthropomorphizing, but the scientists, ever-seeking funding, knew what side of their bread was buttered.

Both animals are now under stress because of climate change. Warmer winters mean a deadly parasite can survive and attack a moose’s brain; a lack of lake ice means that the chances of a wolf walking from Minnesota to the park to decrease inbreeding is reduced. With perhaps only one or two wolves left, a multi-million-dollar “genetic rescue” began in 2019 to drop trapped wolves from Minnesota, Michigan and Canada on the island, mix up the gene pool and restore some biological order before the moose over-browsed the island and killed themselves off (Ibid). No doubt the widely circulated images of moose and wolves as charismatic megafauna contributed to the popularity of the plan.

Research on visual images

Much work has been done in the media effects field on text stories about climate change; in the last two decades there has appeared a growing body of literature on visual images, as well. Leiserowitz (2006) concluded from a national, representative survey of the U.S. population that public responses to climate change are influenced by psychological and socio-cultural factors, including imagery. The poor polar bear came in for a critique, or at least the overuse of its photographs did, from Wang, et al (2018), who wrote: “While there is nothing wrong with the image of a polar bear, the continued reliance on a visual cliché is problematic when engaging audiences who are not already concerned about climate change. Clichéd images do not encourage curiosity or reflection, and continue to strengthen the impression that climate change is a distant problem.” Further, there is a danger that readers and viewers lose hope upon repeated viewings (Metag, et al, 2016).

Important work is being done by Saffron O’Neill and her students in the U.K. on climate change imagery in the print media. In an in-depth, cross-cultural, and longitudinal study of climate change visual discourse,

O'Neill (2020) found that a shift occurred in about 2005 from polar bears (in general) to a more contested visual frame, fueled by the right-leaning press and its allies. "Knowing and understanding visual use is imperative to enable an evidence-based approach to climate engagement endeavours," she wrote (Ibid, p. 9). In an interview, she stressed that sometimes images and text "go in different directions" such as a story about heat waves and an photograph of people having a great time at the beach (O'Neill, 2022).

A project called Climate Visuals is an attempt to help. Launched in 2016, it is a website of images of climate change, a library of photographs by hundreds of contributors from around the world. As of late 2021, the organization had amassed more than 1,000 Creative Commons and rights-managed images, edited and published based on a seven-principle guideline. "[I]magery needs to embody people-centred narratives and positive solutions and must resonate with the identity and values of the viewer – not just environmentalists. Only then can we truly drive engagement and promote positive action against climate change," according to its website. (Climate Visuals, accessed 1-5-2022) Perhaps not by chance, there is only one image of polar bears in its library as of early 2022.

Data visualization

There is plenty of room for data visualization in climate change stories. Perhaps the most famous visual depicting climate change is the so-called "hockey stick graph," which shows a reconstruction of global temperatures over the past 1,000 years, with a marked increase in the 20th century (Brumfield, 2006). Much like the image of a polar bear, this graph has been shown so many times as to lose its impact. And beyond that, the methods used to create the graphic are beyond the understanding of much of the general public (eigenvectors and principal component analysis).

McNamara's course, Data Communication and Visualization, focuses on three types of data communication—written, oral, and visual. Of the three topics, primary focus is given to appropriate methods for visualizing data. Among the topics covered are perceptual principles, color theory, and designing visualizations for accessibility. In the course, students considered the importance of data visualization much simpler and more approachable than the hockey stick graph. Throughout the course, the class learned to deconstruct and critically examine many types of data communication, most crucially in the form of data visualization.

One recurring assignment was the weekly "data diary," where students were asked to find a representation of data in the wild and explain what they noticed, questioned, or found interesting. Students were alternately assigned to spark discussion by posting a top-level comment, or to respond to one of their classmates' posts. As a result, some posts turned into quite fruitful discussion that could be brought into the synchronous class. Data diaries could include data on any topic (students brought in data from their own fitness trackers, reflections about advertisements they had seen, and TikTok videos, among others), but data about climate was a regular occurrence. Students would screenshot a particular image they were interested in and embed the image into their post, then link out to the source (if applicable).

A particular visual form that was referenced many times throughout the course was a "temperature blanket," a type of knitted or crocheted data visualization where the creator makes a new row for each day of a year, using yarn color that corresponds to the daily temperature in a particular location. While these blankets typically depict data on a scale much smaller than the famous hockey stick graph, they give the creator and the viewer a more visceral sense of the data. There are many variations on this form. Some have made temperature blankets on longer time scales (Highwood, 2017), some incorporate other data types, like covid19 deaths (Moran-Jones, 2021), and some take the visual form and apply it to very different data, like moods. Inspired by the examples shown in data diaries, one student chose to use crochet as the visual form for another "mini-project" in the class, visualizing data about their own life.

Another strategy popular with students is the use of animation as an encoding of time. Rather than showing time on a static graphic (most commonly the x-axis on a standard time series visualization) these visualizations show the same graph over time, leveraging the ability of computers to serve us these animated images as videos or gifs.

One visualization that drew a lot of discussion early in the class was a simple animated thermometer that showed the difference in average global temperature every year since 1860 (Kaye, 2021). This visualization essentially only showed one data value per year—the difference between that year's global average temperature and the average pre-industrialization. But the animation allows the change to happen before the viewer's eyes. In response to this post, another student linked a similar piece from NASA, which shows

temperatures across the globe in comparison to a 1951-1980 mean value (Perkins, 2021). Again, time is encoded in the animation, so each frame represents one year. But in this more complex visualization, many temperature values are visualized at once, showing the variation across the globe.

Bridging the gap between photography and data visualization, another piece that drew attention from this class was an animation of the change the Pine Island Glacier over time (SiggyF, 2021). This visualization used radar images of the glacier, “transformed using [an] ice colormap into a map that resembles ice/snow.” The resulting images look like photography, and the animation allows the viewer to watch the glacier melt over time. A similar animation was shared later in the semester, depicting the deforestation of the Amazon rainforest. Animations like these drew comments from students about the juxtaposition of the beauty of the image contrasted with the dire consequences they implied.

Both crocheting data row by row over time and animating data frame by frame over time have the effect of making temporal changes more consequential. Perhaps these strategies are particularly well-suited to climate change, which happens on a scale difficult for humans to fully fathom.

Conclusion

The days of photographing a muddy hand emerging from a sludge-filled river may be over; the current challenge, in a nutshell, is to help an audience understand the significance of events such as a 1.5-degree C temperature rise due to climate change (Richels et al 2022). One of the concerns of O’Neill and her researchers is that climate solution images are quite limited, often to politicians or disasters, and as a result the audience feels helpless.

Journalists of the future, like their historic counterparts, will need to rely on creativity, problem-solving and thinking on their feet. One possible avenue is illustrated by the photo illustration project of O’Neill and Graham (2016) in which citizens use their own cameras to capture images of their engagement with climate change problems, in this case sea-level rise in Australia. Similarly, novel visualization techniques that forefront individual data points can help trends feel more human scale. Students now have more tools in their kit. Data visualization, simulation, web animation, and augmented photographs are all within the reach of an undergraduate student. While these techniques would have sounded foreign in Lake Michigan in 1966, they should be part of the core pedagogy for media instructors everywhere.

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