

# *Scientific Blogs Writing Guidelines – A Living Document Guide*

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## *Rationale*

Communication is one of the key outcomes of an educated person. And in environmental issues, communication is critical to developing ways to engage and address a range of environmental issue. Using digital media has become an increasingly popular way to express our ideas and even used to communicate science – and for many an easy way to criticize science outside the peer review process.

Blogs can be used to communicate scientific information, even technical and complex concepts into digestible forms. However, as type of 'translation', the process is not easy. It requires an iterative process to hone our use of language to develop an accessible and compelling narrative.

## *Learning Objectives*

This assignment is based on the EA learning outcome for writing and communicating:

- Understand the real-world processes and implications of environmental problem-solving and decision making.
- Speak and write clearly and persuasively.

## *What is a Blog? and how can it be used effectively to communicate science?*

Usually a blog<sup>1</sup>, is a series of digital editorials. In many cases, these are used to promote a certain opinion or communicate information or act as a personal reflection.

<sup>1</sup> Must be the ugliest word in the English language.

In our case, we use the blog to communicate and discuss controversial issues in science with a hope to provide a nuanced and sophisticated view.

## *Characteristics of a Blog*

There are several characteristics of a blog. The list below is a good summary – please note that are not to be used to structure the order of the blog. I'll discuss that below.

1. Introduction, body and conclusion like other news stories
2. The use of data that can be used to confront various preconceptions about some environmental issue.
3. An objective explanation of the issue, especially complex issues
4. Opinions from the opposing viewpoint that refute directly the same issues the writer addresses

### *Data Driven Hypothesis Testing – Climate Records*

#### *Selecting a Region*

To engage and test a hypothesis and capitalizing on our experience with R, we can use weather data to determine if there are real trends. To do this, it's easiest to select a single location (and single weather station). Of course, if we add more sites, we can make a more robust analysis, but for our purposes, a single site allows us to also problematize the conclusions one might make with a limited data set.

#### *Obtaining Weather Records*

I have provided a guide to obtain weather records from NOAA, although currently the guide has only been written for terrestrial weather data, future iterations will include sea surface temperatures, sea ice, glaciers, etc.

#### *Using and Evaluating NOAA Records*

NOAA records are surprisingly inconsistent and in some cases, need significant processing before we can analyze the data. Use my second guide to help you process these data. It's important that you understand what you are doing, so be sure to read the text.

#### *Evaluating Monthly Trends and Hypothesis Testing Logic*

Analyzing the data relies on using R to test the significance of a best fit line using regression and then to plot the data. In general, the third guide I created does a pretty good job in helping you analyze temperature and rainfall. Beyond this, please come to my office hours for help!

### *Reporting the Results*

There are two steps to reporting the results – one is submitting the results to Sakai with a short guide on how to do that. The second, less trivial, is the development of the blog and I'll have more to say on this below.

### *Navigating Scientific Literature*

#### *Scholarly Databases and Peer Reviewed Literature*

One of the most important aspects of science and our blogs, is that they demonstrate a conversation with various scientific narratives. In general, if we have time, we try to engage with that literature in a thoughtful and systematic way, which usually begins with a literature survey and a written literature review.

#### *Writing a Literature Review*

#### *Confronting Data with Logic and Scientific Literature*

#### *Linkages in the Social Justice*

Although conceptually, social justice is an admirable goal. However, developing a sophisticated analysis of social justice implication and how to mitigate them demands a great deal of attention and thoughtfulness.

For example, when we talk about climate justice, we can disaggregate the term to address a range of institutional frameworks (nation-state, indigenous, etc), stakeholders (race, class, gender, age), and philosophical categories.

Thus, we need to be explicit in defining what we mean and how we use the concept of social justice.

### *Writing a Blog*

Give a concise background on the issue, but just enough to understand the objective of the blog. I see that as a teaser, how to engage your reader so they can 'buy in' to your project.

Next, try to outline a general approach that you have taken. For example, what is your goal or objective, what questions do you want to answer, and finally, if you have hypotheses, you might describe them as a way to provide some 'prediction' that the reader might be interested in.

For example: Based on recent fires in Idaho, the objective of this blog is to describe how climate change might be influencing the regional fire regime. Thus, I'd like to know, to what extent has fire frequency and intensity changed in recent years. Based my observations, I predict that fires have been increasing over time and that increasing summer temperatures are correlated.

After you describe your objectives and approach, I suggest you describe the data sources and data characteristics that you can use to answer the question(s) and test your hypotheses.

It's tricky to decide how much information to cover in these sections, that might be 'termed' as methods. We need enough for others to follow, but space is precious and our readers time is far from infinite. Thus, I suggest you side on a minimal approach.

For example: To test my predictions, I obtained NOAA curated temperature and precipitation records from Boise (Station: ID033204) from 1885 to 2017. This station has been moved three times during the recorded period, but have passed through the strict NOAA QA/QC process to ensure the record is unbiased as possible. Although there were several months of missing precipitation data, the data record was robust enough avoid statistical violations.

Data processing, graphics, and analyses used the R programming environment (CRAN 2019).

Reporting statistics is one of the hardest things to do in a scientific blog. We want to 'invite readers' and not turn them off with terse, complex terminology. And nothing can do this faster than having to report the results of statistical tests. There are several approaches:

*Explain All the Gory Detail*

*Explain Just Enough*

*Don't Explain Anything*

I suggest the middle ground!

*Repeatability and Rstudio/Github*

The beauty of using the Rstudio/Github platforms is that we can be explicit and transparent about the data processing and analysis. I suggest you highlight this aspect in your blogs, while at the same time not overwhelming the reader with code. See if you can give 'just enough' for the reader to have confidence that you have analyzed the data correctly.

*On headers*

When we begin a scientific blog, it's convenient to start with general headers that look like lab reports, "Introduction", "Materials and Methods", "Results", "Discussion", and "Conclusion". But I am not convinced that the general public reader will find these very compelling. In fact, I am not sure that the separation between the methods and the results is all that useful in an online context.

Thus, I suggest you start with these as headers and as you develop your blog, create more compelling headers.

For example, instead of "Methods", "Obtaining 110 Years of Boise Weather Data". This allows the reader to know what the methods is doing and this will also allow you to describe the quality and quantity of the data.

For the next section, you'll want to discuss your own results. When you begin reporting your results, think of it as a chance to introduce your data – so, if you have a figure, write some text about the results – and then cite the figure.

For example, Forest fires have increased each year (Figure 3). This is much better than Figure 3 shows how forest fires have increased each year.

*Build your argument*

A scientific expresses your point of view while a great one manages to persuade others to join your camp. To persuade people, you need a sound argument based on facts, evidence, and analogies, not vitriol and diatribe.

Once you have stated your thesis, acknowledge contradictory opinions and explain why you disagree with them. Use facts, statistics, evidence, quotations, and theoretical explanations for criticizing your opponents' views and cite your sources. Rejecting them outright without any explanation screams of cowardice and unprofessional ethics. Using external sources without citing them leaves you vulnerable to accusations that you made up the data or using the data inappropriately. Thus, cite all your sources AND use highly respected sources.

To build a foolproof argument, you will need to achieve a balance between content and style. Not only will you need substantial data, you will also need to structure it coherently. Writing with precision and clarity is a learned process and as anyone can tell you, it like a complex puzzle with lots of pieces. But unlike a puzzle, there is not perfect place for each piece – and pieces change shape you as you try to use them. So, try to have an open mind as you are working to refine your blog.

*Provide possible solutions*

It's easy to demonstrate concepts like market failure or inequality as outcomes of the system. But we need to do more. In this case, your arguments should demonstrate a practical policy outcome or action that can be used to improve the situation.

*Writing Suggestions: Style in Science Writing**Passive Voice and Passive Constructions*

Limit the passive voice. I suggest less than 1 sentence per paragraph. If possible, the only time you use passive voice is when

*Dates are rarely possessive*

Unless the year owns information, report years as 1990s not 1990's.

*Word Choice*

Don't make the subject as the figure, but the results of the figure.

*Words and Phrases to Avoid*

- In order to
- impact

*Pronouns and Contractions*

Avoid them...