

(This essay was written by a student who was a biology major.)

The Scientific Writing Discourse Community

When someone picks up a scientific journal or a book that contains scientific articles, they are stepping into a completely different world from the one of essays, fiction, or any type of writing that they are probably familiar with. Many people have a hard time reading and deciphering the ideas in scientific papers. As a scientist myself, I have struggled to write scientific papers so that they appear professional and follow the correct structure and style that are expected in the scientific community. Understanding scientific writing is important for everyone if they want to be aware of the remarkable breakthroughs that are happening in the scientific community every day. In order to understand this community of writers and readers, people must first understand the attitude that is prevalent in the scientific community, the importance of statistical soundness in a paper, and

the writing style and structure of a scientific paper.

One thing to keep in mind when reading or writing scientific papers is the attitude of the scientific community. The scientific community is made up of a wide variety of people and can include any type of personality, race, gender, or religion. Instead, the people in the science writing community are held together by a shared knowledge and history. Every scientist made it through the same classes as an undergraduate and graduate student. Even though they might specialize in different fields such as biology, chemistry, or physics, they all share that general knowledge of the sciences. For example, when someone talks about moles, other scientists should know that they aren't referring to the small, furry rodents that dig up your lawn. Scientists are also taught to never accept anything that they read as the truth. One of my Biology professors once said that the greatest breakthroughs in the sciences were all discovered by people who asked stupid questions. For example for over twenty years, the

human genome was thought to contain at least one hundred thousand genes. Since the human was such a complex organism, it stood to reason that many genes were required for us to function. Many books, articles, and papers were written by distinguished scientists about this information, but it turned out that they were all wrong. Not only were they wrong, but their percent error was over 300%. The human genome actually contains only about twenty-five thousand genes. So when writing a scientific paper, the audience should have a clear idea of what the methods of the experiment are and what conclusions were drawn from the results in order to determine the validity of the experiment.

In order to understand scientific writing, readers also have to understand the importance of statistical soundness in the experiment. My sister works in a graduate lab in Montana, and when she runs one test on a virus or protein, she must also do two or three other tests in order to verify her results and calculate the

percent error in the test. Repetition is also very important in the scientific community. In order for an experiment to be valid, it must be able to be repeated. The more times an experiment is repeated the less chance there is for error and the more statistically sound the experiment is. For example, currently I am working to determine the ripeness of sturgeon eggs with near infrared spectroscopy. When we use near infrared spectroscopy, a light is shone through the fish. Some light is reflected back to a sensor on the instrument, and by analyzing the light that we collect back, we can determine if the eggs in the fish are ripe or not. In order to account for all the variations between fish such as differences in water content, amount of lipids, or differences in blood, thousands of spectra will have to be collected before the method can have any real world application. With similar methods, such as things like ultrasound (which basically uses the same technique), the instrument needs to collect millions of spectra before it can be used in any hospital. When presenting papers that deal with instruments and tests like these, they must reflect the statistical soundness and

percent error present in the experiment. As a reader of a science journal or paper, the statistical soundness of the experiment and the error should be present in the paper.

A third thing that the reader needs to understand in order to read scientific writing is the structure and style of technical paper. Scientists have a very specific, ordered way of writing papers. They begin with the abstract and introduction then going on to explain the materials and methods, analysis and results, and conclusion. A scientific paper will always begin with an abstract that summarizes the experiment and explains briefly what was done and what conclusions were drawn. By studying the abstract alone, the reader should be able to decide if they want to read the rest of the paper. The introduction explains all the relevant background information about the method or experiment, previous studies, and other relevant information. The materials and methods section goes into detail about what exactly happened in the experiment, what instruments were used, and how many tests

were done. Basically, it answers the questions of who, what, when, where, and how. After reading this section, any scientist should be able to reproduce the experiment on their own. In the analysis and results section, the data from the experiment is presented through writing, graphs, tables and other materials. Finally, in the conclusion of the paper, the results are discussed and any further studies are briefly explained. This type of structure is very specific to scientific writing and is important because if readers know what to expect from the paper, then they will be able to understand more of the information in the paper.

The sentence style, word usage, and syntax are also very different in scientific papers. Scientific papers are primarily written in the third person and the past tense. Words like “I” or “we” are never used in a scientific paper. For example if an English writer were writing the paper, they might say “I boiled the tea bag in hot water to remove the caffeine.” A scientist might describe the same action by saying “boiling water was used to

extract the caffeine from the tea bag.” The writer is expected to use concise, factual details to describe the experiment and analyze the results. There should be no elaboration or embellishment upon the methods unless it is necessary for the reader to understand the experiment. This type of objective writing style is often hard to read because it contains so much information with so little description. Readers can become accustomed to this type of writing by reading small amounts at a time and trying to pick out the relevant information.

By understanding the expectations of the people in the community, the value of repetition in an experiment, and structure and style of written papers, people can begin to write and objectively read scientific papers. Learning to understand scientific writing is very important because science is an important part of our everyday lives. For example if you turn on the TV, you will probably see at least one advertisement for a new drug. Even though many people don't encounter the type of technical

scientific writing that is done in peer-reviewed journals, it is still an important discourse community to understand because of all of the scientific developments for medicine, drugs and chemicals for various other products. Often these scientific breakthroughs are not presented to the public in the form of a technical scientific paper. Instead they are written in a more conventional essay format with an introduction, body paragraphs, and conclusion. Though this type of scientific writing follows the more traditional form of an essay, it still has many similarities to technical scientific writing. For example in both types of scientific writing, it is important for the reader to adopt a questioning attitude. Often the writing style is also similar in both types of scientific papers. Scientific writers don't use words like "I" or "we" and write with many details and facts about the experiment and results.

By understanding these basic concepts about the scientific writing community, people can learn to appreciate the importance

of technical writing and can begin to determine which drugs, products or medicines are most likely to help them.