

Tools For Writing in The Field of Science

INTRODUCTION

There are a variety of different types of sciences that we have adapted and used for years here in our society. Research is conducted daily all around the world after huge experiments and groundbreaking discoveries in order to further the knowledge of mankind. How is one to share the ever-growing knowledge that science has to bring upon us in writing of course? With things like creating a good research question, using and finding credible sources to reference, and even learning to notice the structure of your writing. This display of research/data will give those who desire to write research tools to lead them in writing their very own scientific research, and will elaborate on how to properly convey said research.

Research Question: What tools can writers in the field of science use to most efficiently convey their research?

Importance!

Knowing these tools can help those going into science adapt to research writing or help current researchers better their analyses!

Creating a Research Question:

In a research paper, there is not a lot of wiggle room for creativity due to the fact that a research analysis is based on data and facts. With your research question, it is a great way to think outside the box and convey something in your research.

According to "Planning Research: A Concise Guide for the Environmental and Natural Resource Scientist" by J.C. Gordon uses chapter 1 of his text to give an explanation and importance of a good hypothesis. As he explains, he says a few things that can be helpful while creating your research question. Overall, your focus should not be on proving what you believe to be the answer, but to discover how to ask even more questions and gain new perspective. The goal is to give the reader tools and evidence that help them to understand and gain knowledge while answering your question.

Another thing to take into consideration while forming a research question are your constraints. In Nick Moore's "How to Do Research: The Practical Guide to Designing and Managing Research Projects", he mentions the importance of considering your constraints while forming and planning your research. You may lack the money needed for your research, not enough time for your desired experiment, or just the current COVID-19 Pandemic some may not have access to research materials needed to answer their research questions at home. This is something to think of while planning ahead in your research so that you know that you have the resources in order to gather the evidence to properly answer your question.

Finding Credible Sources:

After you form your Research Question, the time will come to start finding useful information on your topic to use in your analysis. When it comes to gathering research, it is essential to find and use credible sources throughout your data collection. If you use information and/or data that is not credible, you can essentially disprove your own research. Nowadays it is extremely easy to simply type in a keyword into Google and be satisfied with the first thing you see. While researching, try to look for your information through databases instead of simply searching the web. There are a multitude of different types of databases that you can use and settings to, to limit your searches and find reliable and relevant information to use in your research.

Recently personally had the opportunity to interview a woman by the name of Sara Westrick, who has received her Bachelor's degree in Biochemistry and is currently working in Science Education. I was able to get in contact with her through a video chat and she gave some valuable insight on how she personally collects, finds, and conveys research within her career.

When asked the question, "What would you say is the most important thing to remember when writing research?" Sara replied with this. "So the biggest thing is, any teacher can tell you this and any scientist can tell you this, it's that you need data." Sara elaborated on this comment as she explained her personal experience coaching Chemistry, and talked about how finding credible sources for her lesson plans is one of the first things that she does when designing and planning out her research. So finding what she will need as my first step or what I referenced from other people.

When conducting research this is one of the most important things to take note in and put effort into. Credible and reliable sources lead to convincing, accurate, and complete research papers. Sometimes it is necessary to wade through several different sources to find what you are looking for. If you are a student you can find tons of sources through your library's database and customize filters on other online databases to gather your data.

Another great way to gather data and learn how to analyze said data is by using Mentor texts. In Using Mentor Texts to Teach Writing in Science and Social Studies, the authors talk about using Mentor Texts to learn how to write from research beyond a simply factual level. This can be anything from a magazine or a textbook, to a scholarly article. They say to not only analyze the format/structure of the writing but also "the author's way with words." In doing this you are able to personally see and connect the ways in which research like yours was formed, understood, and conveyed, and draw from your findings while writing your own paper.

Peer Review & Referencing:

Throughout all of the research that I conducted and I was able to find on writing in the field of science, Peer Reviewing was mentioned in a great deal of these sources. Many researchers who write papers and convey their research find it helpful to use their peers in order to improve their work. Peer Review is used for a few different reasons:

- It can help you to catch your mistakes. - Sometimes when we work so hard for so long on a paper, we miss the seemingly insignificant but actually very important details and mistakes like spelling and grammar. When you get a fresh set of eyes on your piece, they may be able to catch things that you have missed.
- It can show you how an audience is perceiving your information. - While things may make sense to you, your research could not be clear enough to a reader. Having someone review your work can help you make sure that readers are fully understanding your evidence and seeing the answer to your question.
- You can reference your informed peers. - In some situations you may be able to share your work with someone who is also informed on your research topic. By doing this you are basically able to fast check your work and make sure that you are displaying your research in the best way.

In the text, "Research Methods in Radiology: A Practical Guide" the author, Andrea S. Dorca goes throughout the process of how a Radiologist is required to write their research. In the beginning of chapter 10, while explaining how one would conduct and publish their research, she mentions the use of Collaboration. Other people who will help you conduct and convey your data with you. If your research and/or situation allows it, having Collaboration can help you to be more than in your data collection and writing, and help you to consider different perspectives and possibilities within your research. In the other explanation, it is important that "Each investigator should have a well-defined role in the project that should be determined prior to the commencement of the study."

Results & Discussion:

Any great research paper has a recap of their main points, focused information, and their findings. It is important to fill hard with your findings and the evidence that you found to support it one again, to finalize your paper and deem it credible and accurate.

RESULTS: IN THE RESULTS IT IS IMPORTANT TO MAKE SURE THAT YOU GO OVER YOUR RESEARCH AND CHECKS TO MAKE SURE THAT ALL THE INFORMATION YOU WANTED IS THERE. Think of it as a detailed summary of all of your RESEARCH WRAPPED UP INTO THIS SMALLER SECTION. THIS SECTION IS STRICTLY FOR THE READER AND DATA THAT YOU FOUND WHILE RESEARCHING YOUR TOPIC. IN YOUR RESULTS YOU WILL NOT NEED TO ELABORATE ON THE IMPORTANCE OF RESULTS OF YOUR FINDINGS. LET'S BE HONEST HERE. IN MANY SCIENTIFIC RESEARCH PAPERS, THIS SECTION CAN BE FILLED WITH MANY SMALL PIECES OF DATA WITH CAPTIONS, PICTURES, AND GRAPHS. THIS THING CAN HELP THE READER OF YOUR RESEARCH BETTER UNDERSTAND THE MEANS OF YOUR DATA AND THE CONCEPT OVERALL OF YOUR RESEARCH TOPIC.

DISCUSSION: THE RESULTS SECTION AND DISCUSSION SECTION GO HAND IN HAND, AND WORK TOGETHER TO HELP EXPLAIN YOUR RESEARCH. WHILE YOUR RESULTS FOCUS IS UPON YOUR PERSONAL FINDINGS BASED ON YOUR RESEARCH QUESTION/TOPIC, THIS SECTION IS GOING TO EVALUATE AND PARAPHRASE THE MEANING OF YOUR WORK AND ITS IMPORTANCE. ONCE AGAIN I DREW FROM ANDREA S. DORCA IN HER "RESEARCH METHODS IN RADIOLOGY" WHERE AS SHE TALKS ABOUT THINGS THAT ARE IMPORTANT TO INCLUDE IN THE DISCUSSION SECTION SHE SAYS, "TOWARDS THE NOBILITY OR UNLIKELIHOOD OF THE RESULTS OF THE PAPER. THIS IS KEY IN A GREAT SCIENTIFIC RESEARCH PAPER. YOU MUST ELABORATE UPON THE REASONS IN WHICH YOUR FINDINGS ARE NOT ONLY IMPORTANT, BUT WHY THEY CONTAIN DISTINCTIVENESS AND ORIGINALITY AMONG OTHER RESEARCH DONE ON YOUR TOPIC, UNDER SIMILAR SUBJECTS."

Tip: When writing your discussion section of your research, it is helpful to maintain your information, and how you as a scientist and how someone else who observes these observations in your research. This gives you a better sense of innovative mind and creativity, as readers are able to see why the way in which you gathered your evidence is reliable.

CONCLUSION

I have been able to look at a variety of different sources, and even interact first hand with someone who works in the field of science and uses their techniques daily. With this display of information, my steps to a great scientific research paper are ones that will no doubt lead you to success. Unlike many guides to scientific research, where they are specific to their scientific study, my research covers many different branches of science and uses the common knowledge gained from these sources in order to give hope that no one has just one and specific tool that is useful to any general science career. This data that is compiled here is of great use to anyone looking to write in any field of science.

Quick Recap!

1. One should note the thought and creativity put into a research question. The word usage, content, and overall tone of your question can greatly help you in shaping the rest of your research into unique discoveries and findings. This is a process which will include considering the constraints within your project, as you need to think about while forming your question or hypothesis to make sure you are personally able to gather all of the information you need to find your answer.
2. Finding reliable sources is one of the most important things to remember in your scientific research. Creating credibility between yourself and your reader is essential in order to provide accurate and punctual data/research.
3. Remember! Peer Review is your friend! Having a colleague or knowledgeable figure look over your work can potentially save you from mistakes that you may have missed. It is also a very great way to make sure that your work is unbiased, as you can get another set of eyes and minds on your research to give input and share their opinions.
4. Last but not least, remember to include not only your personal findings and results of your research, but their purpose. It is super important to discuss the significance of your work, and how it differs from any research that has already been done on your topic.

Anyone actively pursuing or thinking about pursuing a career in the field of science will no doubt come across a time where they must engage in some sort of activity, whether writing and/or written research. With things like creating a good research question, using and finding credible sources to reference, and even learning to notice the structure of your writing. This display of research/data will give those who desire to write research tools to lead them in writing their very own scientific research, and will elaborate on how to properly convey said research.

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