

Kevin Wang

StepUp- Reading and Discussion

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Mrs. Mary Newbegin

Writing A Paper

Writing a well-organized paper should be able to present hypotheses in the beginning, accumulate and analyze the data in body paragraphs and make conclusion to the end of paper. An advantage of following this instruction is that readers can clearly understand both the main idea and the purpose of your paper. In addition, drafting a well-organized paper can help people proceeding their research into process because they will notice mistakes and adjust the direction of research when they are implementing their data analysis. This is a standard format every good academic article follows. Based on these principles, the author provides some useful information to write a good paper.

To speak of the author, Dr. George M. Whitesides, who was born in 1939 is a world-renowned chemist. He is best known for his work in the areas of NMR spectroscopy, organometallic chemistry, molecular self-assembly, soft lithography, microfabrication, microfluidics, and nanotechnology. He is a prolific author and patent holder who has received many awards. In 2004, Dr. Whitesides was appointed the Woodford L. and Ann A. Flowers University Professor at Harvard, one of only 24 University Professorships at the institution (Whitesides Research Group, 2011). To sum up, it is undoubted that Dr. Whitesides is an influential reach scholar around the world. Studying his experiences and opinions about how

to write a paper is definitely worth learning.

This article was a manuscript written by Dr. George M. Whitesides in 1989 and first published in the *Advanced Magazine* in 2004. This manuscript and its guidelines were also spreading in Whitesides' *Research Group* in Harvard University. This manuscript provides Dr. Whiteside's insights into writing a science paper. In his opinion, to begin with a paper, we should construct our outline first since it is most time-saving. An outline is a concise and central structure of your research. Therefore, it will be relatively easier to write contents later as long as we assure establishing our outline. We only need to find some corresponding information putting under our outline, but not wasting time in searching other no-need information. In addition, an outline can help us to measure our research that it is catching up with its work schedule and evaluate the direction of research at any time. As a result, a complete outline is important when we are writing a paper. It should include: a title, authors, abstract, introduction, results and discussion, conclusions and experimental sections to keep our paper in organization.

How can we construct an outline? The author describes a method. In the beginning, our brain is spurred by ourselves to create many interesting ideas or thoughts regarding the paper after brainstorming. These ideas are contents about our research purpose, expectations, experiment method, protocols, and so on. First step is drawing up all ideals on a blank paper and try to organize them into three main parts as introduction, results and discussion, and conclusion. In this step, making some certain questions and asking ourselves that "Is it a useful approach?" to categorize such numerous ideals. For example, "Why did I do this work

for my research?”, “What should I do in this research?”, “How can I illustrate this experiment method in an appropriate way to let reader understood?”, and “When will I have to finish the data analysis and conclude a result?” These are all good question that can stimulate our brain to establish our outline later.

Second step is presenting the preliminary information under each of these sections by using tables, equations, figures, schemes as much as possible. This step will spend more time because we may try many times to find a perfect form presenting all complex data analysis. Final step is to summarize all information from the first and the second step.

The author makes an important point that to find someone else to check your outline as early as possible rather than postponing it. Many unexpected advices from other people which we never consider can make up and rich our outline. After these efforts, a good outline will be accomplished and lead you to easily finish the rest part of paper.

I am going to complete my research and the thesis in the next two years. As Dr. Whitesides mentioned in the article, papers are the central part of the research. Therefore, the content of the thesis is not equivalent to the paper, it is more detailed. As consequence, I completely agree Dr. Whitesides's arguments that a good outline for the paper is also a good plan for the research program. I think the aforementioned method is also practical in writing my thesis. In fact, it is very helpful to organize and present my lengthy research content more efficiently and concisely.

I also acquire other educational knowledge concerning writing a paper after reading the article. Some of them are very likely to make mistakes by myself. For example, he mentioned

that conclusions should include new and higher level of analysis, and indicate again the significance of the research. It is totally different from my opinion that the conclusion is not just a simple repetitive description of the result sections. To follow his advices, I would try to refer to the limit of the study and provide individual suggestions into the conclusion which can inspire or warn other follow-up researchers. It would certainly make my conclusion become most impressive part of article because it shows my critical thinking.

Dr. Whitesides also mentioned that the organizational structure is ranked by importance, not by time. It is because the readers usually don't care how you achieve your results, but care about what the results are. This point is another example giving a shocking blow and waking me up completely. His argument is not the same as my learning method which I am used to do. If I were going to learn a new concept, I would be used to learning the original meaning of the concept first, understand the development process, and check the present meaning finally. This old habit is likely applied to write the article. Therefore, this article makes me understand that we must abandon the old thinking and methods, and re-architect our logical thinking. Start with the most important parts which you want to instruct readers, and put the secondary parts behind. In fact, writing the outline is a way exactly helping me to present my logical thinking.

According to the author's method, writing the outline not only can help me maintain my central thinking without biasing, but also make the whole article fluently and logically. Most importantly, it can let the readers capture the parts they are interested in. In short, this article provides me many new ideas. I believe that my writing ability will improve by following his

advices, and I will save more time on writing my thesis.

References

Whitesides, G. M. (2004). Whitesides' group: writing a paper. *Advanced Materials*, 16(15), 1375-1377.

Whitesides Research Group (2011) *George M. Whitesides*. Retrieved from <http://gmwgroup.harvard.edu/content.php?page=gwhitesides>