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# Integration of Technical and Scientific Writing into Surface-Water Hydrology (GEOL 472/572)

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## WRITING COLLABORATIVE INQUIRY FELLOWSHIPS Closing Write-up 2007-08

**Researchers/Department:** Robert Mitchell and Niki Thane, Geology Department

**Title:** Integration of technical and scientific writing into Surface-Water Hydrology (GEOL 472/572)

**Research Question:** Do my practices improve students' writing skills and their understanding of science?

### **Method:**

My primary goal is to help students develop their scientific thinking through writing. My hope is that as students advance from project-to-project, they will discover that learning the science is highly correlated to their ability to express their thinking in writing. Naturally, I also want students to learn the mechanical and style elements that define good scientific writing, such as writing concisely, using appropriate grammar, and developing proper figures and tables; conventions which are easier to learn and teach.

I facilitate the writing process by means of four small projects where students use real data to examine a hydrologic question in the Lake Whatcom watershed (e.g., precipitation variability). Students must analyze the data, interpret the results, and summarize everything in a scientific report. Although the reports have different topics, each report follows the same scientific paper organizational format, so through repetition and feedback the students learn how to write the elements of a scientific report.

I offer writing instruction using a report template, daily writing tips, and feedback on the written reports. The template summarizes details about the sections of a typical scientific paper—Introduction, Materials and Methods, Results, and Discussion. To foster a consistent writing dialog throughout the quarter I provide a “writing tip of the day” at the beginning of each lecture. I may review a point in the template, comment on audience, style, voice, tense, or grammar, or discuss common errors after grading a set of reports.

After the quarter ended, Niki Thane (a geology undergraduate) and I collected feedback from students in GEOL 472 using an anonymous survey we developed using a web-based system called “Survey Monkey.” The survey included 10 questions that focused on my writing goals and my instruction techniques. The survey answer options were *strongly disagree*, *disagree*, *agree*, and *strongly agree*.

### **Key Findings:**

Qualitatively, from my perception, writing improved from report-to-report, especially in cases where I know students were genuinely trying to further their writing skills. I also received verbal feedback from students stating that they appreciate my approach and that their writing skills have improved. Feedback from the on-line survey was positive, and encouraging (13 of 19 students responded). In all circumstances, responses to the 10 questions were dominated by *strongly agree* and *agree*. Students found the template helpful in organizing their thoughts, and very useful as a guide for mechanical details like developing figures and tables. Students found the daily writing tips less helpful, but “agreed” that they were an appropriate use of classroom time. Also encouraging, was their belief that writing helped them think scientifically and that writing improved their understanding of the science concepts.

### **Implications for Further Study:**

My main challenge is how to quantify learning and communicate my success effectively to my peers. As a scientist, I'm developing ways to constructively teach and measure outcomes from writing pedagogy. I will continue with more surveys and would like to work more closely with the Writing Center to learn new assessment strategies.

**Implications for Teaching and Learning:**

The Fellowship, and the Center for Innovative Teaching showcase experience this year allowed me the opportunity to reflect on my writing practices. Too often professors do not take time to seriously assess their teaching and learning in courses. I now have data and a “showcase” that I can share with students. As such, my writing learning objectives will be *explicit*. Working with Niki Thane on this project also proved to be valuable. Since Niki was in the course (GEOL 472) she could experience my pedagogy and offer constructive feedback. We worked well together and were equally interested in the research.