**February, 1998 - Larry Thomas, Mathematics**

In this note I describe a Writing to Learn assignment that I used the first time I taught a WTL section. The assignment met with mixed success; I present it here as a cautionary tale along with a request for suggestions on how it might be improved.

Before I describe the assignment, I should say something about the class itself. The course was a core course, Finite Mathematics II, which is normally taken by freshmen. This particular section was mostly populated by upperclassmen who had either taken developmental mathematics or had failed a mathematics course in the past.

A WTL course is supposed to include the assignment of a multiple-draft paper. To meet this requirement, I decided to adapt an assignment of the typed discussed in *Lubecke*. The assignments that Lubecke proposed have several advantages:

-They are short.
-They involve several kinds of writing.
-They require some use of the library.

Lubecke required that his students do four of these short assignments; I required two, each having the same weight in the final grade as one test. Lubecke stressed the importance of making the instructions for the assignment as clear as possible since he found that his students were not inclined to follow them. Here are the instructions that I distributed to my class:

Multi-draft Reaction Papers

A reaction paper gives your reaction to something you have read, not a summary of something you have read. Here is the way to write a reaction paper for this course:

A. Go to the reserve section of the library and look over the articles I have placed there for this course. (I will distribute a list of articles.) Select an article.

B. Read the article carefully. Take notes if you want to. Summarize the article if you want to.

C. As soon as you have finished reading your selection, take some 8 ½ x 11 paper and begin writing in response to what you have read. Write continuously for at least 5 minutes. Do not go back to edit what you wrote. Do not worry about grammar or spelling errors. Follow your thoughts wherever they lead. Write anything that comes to mind. The only thing you may NOT do is to

summarize the article. You may stop writing any time after 5 minutes have passed.

D. Sometime after you have finished, write an outline of what you wrote, rearranging the topics if necessary to put them in some kind of logical order. You can add topics to the outline that were not in the original reaction if they will help express your ideas more completely.

E. Hand in your handwritten reaction and the outline. Do this by the due date that I will announce for this part of the paper.

F. I will return your notes and outline to you with comments as necessary. Using your original reactions and the outline, write a 1 ½ to 2 page (typewritten, double spaced) response to what you read. You may not summarize the article. I will not accept a summary paper. I already know what the article says; I want to know what you think about it. Hand in your original handwritten reaction, your outline, and your final typewritten paper. Do this by the due date that I will announce.

When I collected the free writing and outlines for the first paper, I found that Lubecke was correct: most of the students had not followed the instructions. After the students received my comments and handed in the second, final version of the reaction paper, I discovered that they still had not followed the instructions.

This was my first experience with assignments of this type, so I was not prepared for the frustrations I encountered while reading them. I thought that the instructions were clear, but many of the students either did not understand the instructions or chose to ignore them. Here are some of the things that went wrong.

- In spite of my repeated instructions to the contrary, many of the students summarized the article they read.
- When they did react to the paper (as opposed to summarizing it), their reactions were often ill-informed. They would, for example, disagree with an authors' conclusion, completely ignoring the evidence that the author had amassed to support the conclusion.
- The students did not produce five minutes' worth of free writing; they wrote much less than they could have in five minutes.
- The students were not adept in organizing and outlining their ideas. They did not seem to know how to construct a formal outline.

I said above that I was not prepared to deal with these problems, but I should have been prepared since these are the same problems that Lubecke had with his students' efforts. Part of the problem seems to be that students are not used to writing in mathematics classes, so they did not think I would take this

assignment seriously. As Lubecke and I both noticed, some students actively resented these assignments. These students seemed to think that writing had no place in a mathematics course, and they resented having to do something "extra" that did not have to do with the problems in the textbook.

After I returned the first assignment, I reviewed the instructions with the class to clarify the parts that many students had not followed. I reminded the students that these papers were an important part of their grades and that I was taking the assignments seriously. The second paper showed some improvement, but not as much as I would have liked. In his paper, Lubecke reports that he did not see significant improvement until the third paper. I assume that if I had assigned three or four papers, as he did, I too would have seen significant improvement.

I think that his kind of assignment has a lot of potential. I would appreciate any suggestions for speeding up the learning process so that four assignments will not be necessary in order to realize that potential. I would also appreciate suggestions for dealing with some students' negative reaction to the "intrusion" of writing in a course where students do not expect to write. If you have any ideas, please let me know.

Lubecke, Andre Michelle, "But This is NOT an English Class," Using Writing to Teach Mathematics, Sterrett, Andrew (ed), MAA Notes, Number 16 Mathematical Association of America