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February 15, 1992

Dear Steve,

Thank you for your letter of February 3 in which you shared your letter to Dr. Datta and included other information about your past teaching experiences. I especially found the concept of a team to help students with their introduction both to college and graduate mathematics courses to be very interesting. I am always glad to hear from you.

After I received your letter last fall, I thought about how I could help my students learn to read mathematics with understanding, and so I began asking them to do two-color proofs, like those that I had heard you describe in your talk to the MAA in Syracuse in the fall of 1988. But students had a lot of difficulty doing them, even though I had given them some carefully worked out examples. Things still weren't going like I thought they should.

In early October, shortly after I had received your letter last fall, I attended a workshop that was sponsored by SUNY Central and was run by Uri Treisman. I went mostly because everything was paid for. But Dr. Cateforis and another faculty member from Potsdam were there also. I learned more from him than I did from Dr. Treisman. During one break he told how he remembered you going into the first class, copying a proof onto the board and asking students to copy it into their notes. That one comment has done more for me than you would ever believe. This semester, when I began teaching my Sets, Functions and Relations course (The counterpart of Potsdam's Set Theory and Logic course.), I copied a proof onto the board the first day and asked them to hand it in. In fact, I had about six of these proofs ready to go on the first day. I planned to give one each class meeting and had thought through the order in which I would present them. They all had to do with simple inequalities but I could demonstrate all the major techniques of proof that are used in mathematics! I took my time and was very careful to make sure that my thinking would be perfectly clear to the students. At the end of each proof I would write a paragraph describing very carefully the technique used in the proof and to point out how we were able to obtain our result using that technique. I am trying to give them the simplest proofs I can think of and pointing out all the steps made so that they will understand the reasoning used and be able to follow it themselves.

I can't begin to tell you what a difference there is in this class this semester. Students who had begun this course with me before but had withdrawn for one reason or another have come up to me to tell me that those examples have helped them a lot.

And the whole tone of the class is different. Students have come to me with a kind of awe in their voice as they tell me that they thought this course was going to be so hard, but they have found that it isn't so bad. And they have smiles on their faces as they show me proofs they have done. We are one month into the course and we have covered the first chapter of the book only, the chapter on basic logic. In reality there are two courses going on: The one in the book and the one I am doing in class. I don't mind spending a little more time here because I believe that the rest of the course will be nothing more than doing the same thing over and over again, but in different settings.

I think that you would understand when I tell you that I thought it was very, very hard to come up with examples that were so simple that they exposed the entire skeleton of thought in the proof. I really felt like I was using my creative abilities to the fullest, just like when I was at the central core idea when I was in the middle of writing a paper. And I think that these students will want to help others, because they will understand what a proof is, and what is required in one. This may be a beginning for us here.

I remember when you walked us out to our car at the end of our visit to you in 1982 and you said two things to us. One was that the key is building the confidence of students. I am trying to pace this course so that I will do this. If anything, that is very near the top of my list of priorities in the course.

The other thing you told us was how, when you came to Potsdam and you told them that within a year you would have someone reading Royden, nobody believed you. Boy, that is one lonely feeling when nobody believes you. I know it well. I tell people things that have come out of my experience with my teaching, and they don't believe me. My faculty doesn't believe me and my administration is waiting for me to prove myself before they will do anything to help. Even my best friend there, a guy who shares much the same teaching philosophy doesn't believe what can happen. So it is up to me and my students. Fortunately, I have a Chairman who pretty much lets me teach what I want. I also remember some of my first discussions with other people at Potsdam who told me that you did nothing there. Your students did everything. At the time I found that hard to believe, but now I believe I understand it.

Now I have to keep my faith in the face of others disbelief. I have to let my students do the "work" for me. I believe that there will start to be a transforming effect of some kind here, but I don't know how much there will be or how much of an effect it will have. It will all depend on other faculty members and their reactions. This college is so demoralized that all they can talk about is research. And when you bring up quality

teaching as a goal, you would not believe the controversy your comment generates. I think that is true of most colleges in the country today. Anyway, I am hanging in there and hoping that what I am doing will have a good effect. When I get down in the dumps, I find that it helps me to ask myself what I would rather be doing. I can find nothing that interests me more than trying to create a positive impact through high quality teaching. So even though I get discouraged, I manage to keep going.

Thank you again for thinking of me. It always brightens my day when I get a letter from you.

Sincerely,