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Communications

"Dear Math: I hate you"

MARION DEUTSCHE COHEN

"Dear Math, I hate you". Or "Dear Math, I love you". Or just plain "Dear Math". That's the nickname my students gave to the assignment to write a letter (or a poem, or a temper tantrum…) *to* math. The course is Mathematics in Literature. We study short fiction and poetry connecting to mathematics in some way (as science fiction connects to science). Students range from mathematics majors to math haters and math fearers.

Our readings have included stories like *Inflexible Logic* by Russell Maloney, about six monkeys who, way against the laws of probability, type, consistently and word for word, great works of literature. Our poems have included Rita Dove's *Flashcards*, about her childhood as a math whiz who nonetheless felt pressured by school and father when it came to mathematics. In the homework and class conversation questions, I encourage but don't require students to use the readings as points of departure for sharing their own experiences and lives.

This journal recently published "Monsters, lovers and former friends: exploring relationships with mathematics via personification" by Dov Zazkis (2015). The article describes the process of *personification*, which means attributing human qualities to non-human entities. Zazkis asked his students to "personify Math. Write a paragraph about who Math is… How long have you known each other? What does he/she/it look… act like? How has your relationship with Math changed over time?" My own "Dear Math" assignment is a special case of Zazkis's personification assignment. I had not previously given much thought to the idea of personification so I found Zazkis's article interesting and affirming.

Zazkis grouped his students' writing as envisioning mathematics as monster, lover, or former friend. In their writings, mathematics as monster was something inhuman, an enemy, to fear, avoid, and in general feel negative about. Mathematics as lover, and beloved, was something to feel comfortable with and positive about. And mathematics as former friend, and current un-friend if not downright enemy, was something or someone who had betrayed, disappointed, or refused to communicate; the relationship had deteriorated from good to bad to worse—to toxic and break-up. Zazkis's students wrote some revealing stories and, like my own students, sometimes in greater quantity than was required.

When I first introduced the Dear Math assignment, I was surprised that many, perhaps most, of my students had in their previous courses been discouraged from second-person writing. Possibly their teachers had meant to discourage second-person writing on certain occasions, but the *message* the students took away seemed to be that second-person writing was taboo. I wanted to convey my own message that, in many instances, second-person can be more than okay. We talked about the various ways in which we've all *already* used second-person—letters, email, texting, ordinary conversation, advertising, writing in (or to) a diary, songs ("You, you, you / I'm in love with…"), and self-help and guide books ("You shoulda coulda woulda…). There have also been pieces of literature written in second-person—for example, the best-selling novel *Bright Lights Big City* by Jay McInerney.

So second person is *not* taboo. To give the students further inspiration and affirmation, I read aloud to them three examples of second-person writing that were, in particular, writing to a specific field of study. Two of these were love poems; one, *An der Musik* (To Music), by Franz Schumer, a friend of Franz Schubert, who set the poem to music, and the other, *An der Mathematik* (To Mathematics), by me. The third reading was a hate letter to mathematics, that I had found on the internet. The students seemed to enjoy this third example, since it was written as though the writer had had a relationship with

mathematics—a relationship that had, as had several of Zazkis's students' relationships with mathematics, broken up.

Students did *not* groan when I announced the assignment. I told them that on the day it was due they could, if they wanted, read their "Dear Math" letters to the class. On that day everyone, even those who did not volunteer, responded to their classmates' writing and shared their own frustrations or joy with mathematics. There was considerable laughing. Moreover, although I had said their letters could be any length, even one line, most had made them at least a page long.

Most of my students' letters fit into Zazkis's three categories. Here are two examples of letters to mathematics as a former friend:

> I have a bone to pick with you, Algebra. When we met for the first time […] I fell in love with you]…] [but then] you decided to add more spice to the relationship, when you applied your word problems to the mix […] I [told] you I would leave […] unless you would simplify your behavior […] I would quit you in a heartbeat […] if you didn't stick with just one variable and that variable had to be me. (Dianna Anderson)

> Dear Math,
> All my life you had been there secretly, I […] never realized it was you until someone told me your name. When I didn't know you, I didn't mind having you around. You were discreet, non-judgmental and let me be flexible with how I used your presence. But […] when I learned your name and realized how significant you were, my whole relationship with you changed. You were like a famous person whom I couldn't see in any other light […] you were this all powerful force that so many people were fascinated by […] as the years went on […] things became more and more one-sided […] You were the […] one teaching and I was always being corrected. (Nicole Meyer)

Here is a good example of a letter to a monster:

> Dear Math,
> I'm sorry for skipping out on you all […] those times in eleventh grade in favor of band class. It's just that band's offered me a lot of things you never have. There's stability in music that there never has been with you. You switch from calculus to algebra to trig and then back again, and I never fully understand why. Music is always music.
>
> You're probably going to say, *But I hold music together! I'm the reason music makes sense!* And that's true. But I never understood the quadratic formula until my ninth grade algebra teacher sang it to me, so explain that. Oh, but when you're explaining it, don't use math because then I'll never get it. (Helen Armstrong)

One student wrote to a former "monster math teacher":

> I hate you. I mean it, I really really hate you. At least the rest of the teachers who can't teach have redeeming qualities […] Why are you here? You obviously can't teach. You don't like teenagers. You don't seem to like anything here, really. (Regina Kilcoyne)

And here is a "lover" letter:

> What lies under the Pythagorean Theorem?
> What boils within factorial equations?
> What truth can I uncover when unraveling trigonometry problems?
> What does math hide? What are you keeping from me? (Caitlin Somers, a student who, as the semester evolved, came to really love and be intrigued by mathematics)

Not all of the letters fit into Zazkis's categories. Notably, the theme of questioning emerged:

> Dear Math
> Why are you so complicated? […] why do you live by so many rules? Can't there be a simpler set of rules for all my questions so that the answers are easier to understand? (Allison Muir)
> Why would you start involving letters when we had been purely relying on numbers? I was okay with numbers. (Megan Filoramo)

I might also mention the sub-theme of *secret* lovers, as well as two phenomena that my students identified: apology and regret. And I'll quote briefly from a student who wrote a "Letter to someone who used to love math":

> What other teacher besides you would let us bring in literal pies […] on March 14th. […] one day you didn't come into class and there was a substitute in your place […] And then you kept not coming to class and they had to tell us you were sick and […] would be out for a while. We waited. We continued to learn about triangles, theorems, and inequalities, but it wasn't the same learning it from someone new. Soon "being out for awhile" turned into "being out indefinitely".
>
> I'm sorry for the times my friends and I would whisper and pass notes during class when you were going over how to find the radius of a circle […] I'm sorry someone who was so young and still had so much to do got so sick. (Kaitlyn Meholic)

After students had shared their "Dear Math" letters, we talked about the idea, in general, of second person writing and its advantages and disadvantages for both the writer and the reader.

Through reading my students' "Dear Math" letters I, as teacher and as mathematician, came to better understand how non-mathematicians feel. As someone who writes poetry about my own experience of loving mathematics, I am interested in how it feels to not love mathematics. And many of my students, in writing their "Dear Math" letters, came to understand their problems with mathematics. "I don't really *hate* math", one discovered. "It's that I don't *understand* it." Another said, "I only cherish the part that I understand." Those comments from students give me an idea for a follow-up assignment: imagine that *you're* Math, writing back.

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