Indelible Math Moments

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Abstract: *The author discusses "indelible moments," a writing activity that can be used in any classroom to foster positive community relationships and understanding. As students engage in the activity, they write about important mathematical moments—ones that have been so instrumental that they can't be forgotten—then share them with classmates. The author shares a personal moment as an example.*

Keywords: *Writing, communication, educational policy*

1 Introduction

Writing is a vehicle for communication and shared understanding across all content areas. For instance, as a math teacher, I begin each year with a short brainstorming activity to introduce students to me and their classmates. Specifically, I give them 8 minutes to list important mathematical moments in their formal schooling—ones that have been so instrumental that they can't be forgotten. Romano (1990) refers to such events as "indelible moments." Students write a sentence or two further elaborating each bulleted item, then share their list with a partner. Without fail, the activity evokes emotion—laughter, tears, nods of acknowledgement and affirmation—as students share their experiences. *Everyone, it seems, has a story to tell about math.*

In a follow-up exercise, I ask students to further develop one or more of their moments into a short essay. In the paragraphs that follow, I share such a moment—one that was pivotal in my development as a mathematics educator. Although I've shared this story numerous times over the years to select undergraduates—particularly those who have been struggling in their mathematics coursework—I've been reluctant to publish it widely. I worry about what others will think once they realize my secret; namely, that I'm fallible as a student of mathematics. Ultimately, however, I've decided to follow the advice of my writing mentor, Tom Romano, who encourages writers to "go all the way" (Romano, 2015). "Spend it all, shoot it, play it, lose it, all, right away, every time . . . give it, give it all, give it now" (Dillard, 1989, p. 78).

2 My Story

"Gentlemen, now I am leaving. Take your time, and slide exams under the office door when you are finished." And with that, Dr. Jain left the classroom, books and a newspaper clutched in one arm, an empty cup of tea in the other. By this time, I had been sitting at a small metal desk for nearly four hours. Lunch time. My stomach gurgled and my head spun as thoughts of future career plans, abelian subgroups, and the half-finished exam that lay in front of me cycled through my head. I was twenty-five, a second year mathematics Ph.D. student chasing a dream which had become increasingly elusive and desperate. Soul-crushing.

Several years earlier, I had found my calling as a graduate assistant at the university, teaching students in remedial courses with titles like *Introduction to Elementary Algebra*, *College Algebra*, and *Precalculus*. The courses covered content that all of my students had experienced at some point in their past, often saddled with bad memories, frustration, and fear. It was my job to help them see mathematics in a new way, to help them realize that they were, in fact, mathematical thinkers and that they could make sense of numbers and variables. I did more than teach—I nursed the weak and fragile, healed the injured, and amused the disaffected. The electricity of getting in front of a group of students, sharing ideas, helping others overcome deeply-rooted fears—or misconceptions of mathematics as dry and lifeless—gave me a sense of purpose that I had not experienced in my preceding twenty-four years. "Todd. What are you going to do with your life?" my mom would often ask. "Dammit, I just don't know. I don't CARE." But now, finally, I knew my true calling.

As Dr. Jain left the room, silver bracelet jing-jang-dangling with his heavy gold watch—a present from the university for 35 years of service—the commotion distracted me from my exam. Several classmates followed behind him, like ducks in a row. Laughter in the hallway announced relief for a fortunate few, but not me. Twelve of us arrived at the cinderblock classroom at 8:00 a.m. on a bright, cold February morning. It was Saturday, a time when many of my friends were still sleeping it off, but not me. Jain didn't waste class time with exams, "Too much to do!" he barked, "Test on Saturday," Jain declared, so we opted for day-long, open book exams on the weekend.

The room was filled with small metal desks in haphazard rows and columns, and curtains that surely needed replaced back in the 1960s (it was now 1993). All objects in the room–an abandoned lectern, vinyl curtains, an enormous green teacher's desk, a dingy lemon lime fabric chair—were coated with a thin film of chalk dust. Dr. Jain's furious, 80 minute lectures were workouts for me: not so much of thinking, but of dictation. My arm typically hurt at the end of each session. Notes, copied in class—indecipherable and impenetrable to the uninitiated—were dissected in the hours (and days) that followed. *Chick-chick-chick. Chick-chick-chick*. Making mechanical noises as he wrote, Dr. Jain preached mathematics to his nodding disciples, chalk dust turning his brown skin a powdery white. "Yes. Yes. Yes." "Yes, interesting." The only rest came after Jain had transcribed a particularly important theorem. He would pause, taking off his cuff links, jangling them in one hand like dice—then stare intently at what he had written, back turned to us, punctuating key points with added jabs on the chalkboard. *Chick-chick-chick. Chick-chick-chick*. "Of course," he would exclaim, "Now you see what to do!"

Unfortunately, more often than not, I didn't know what was going on. But I *wanted* to know. More than anything else in the world. A top-rate student in my undergraduate days—summa cum laude, sis boom bah, rah rah rah—I *thought* I knew mathematics. I was told I knew mathematics by teachers and classmates, alike. I was the one that others looked to for math help in my rust belt Ohio high school. Now, however, I no longer understood. Dammit. How did I let this happen? All the while, for the past two years, sitting through classes and working on homework problems long into the night, I had this gnawing feeling that I was on the verge of getting it . . . I could sense it . . . this stuff isn't that hard . . . if I just had more time . . . if I were just a little quicker. If I wasn't so STUPID. Dammit.

One by one, the disciples finished their exams; some before Jain left for dinner, some finished as he departed, leaving the classroom with him. They were eager to debrief the exam with our leader, to discuss the challenge the problems had presented to them and their ultimate triumph. Others were left behind in the classroom. For those students, victory was elusive. Eventually, only two of the original twelve remained: Seth and me. Seth, my friend, the other guy who didn't know what was going on.

The bright February sun that had shown through dusty blinds into the classroom eight hours before was now hiding behind Morton Hall. As the room grew dim, Seth finally got up from his seat. The metal desk, scooting against the hard tile floor, disrupted my quiet defeat. I had stopped writing, but was hopeful that inspiration—or perhaps divine intervention—would strike. But, alas, a beam of light from the heavens was not to be on this cold February night. *Sigh*. Seth turned the fluorescent lights on for me and left the classroom, "Later, Todd." Now I was the only student left in the room. Alone with my thoughts. Probably the only person left in the entire building. Me, my half-finished exam, and a dream that was not to be.

3 Left Behind

The experience of being the one left behind—over and over again over the course of an entire year—left an indelible mark on me as a teacher, a learner, and an educator. One that I carry with me to this day. The experience humbled me and helped me better understand the struggles of others. It also helped me recognize my own mathematical miseducation. In the essay, *A Mathematician's Lament*, Paul Lockhart speaks of the misfortune of graduate students who discover they are just good at following directions "after a decade of being told they were 'good at math'" (Lockhart, p. 6). These words resonate with me—they hit me where I live. As a dreamer and a poet—"a creative, flexible, open-minded thinker" (Lockhart, p. 7)—I have come to understand that I was the beneficiary of a substandard mathematics education, one that denied me with "any real engagement with the subject" (Lockhart, p. 5). As a student of mathematics, I never had "the opportunity to pose my own problems, make [my] own conjectures and discoveries, to be wrong, to be creatively frustrated, or to have an inspiration" in the mathematics classroom (p. 5).

4 Conclusion

The time is now to do better for our kids. We need to provide *all* students with opportunities to engage with mathematics, and we need to provide them with support to make sense of the subject—discussing ideas with peers and professors in upper level courses, exploring proof and justification in high school courses beyond geometry. Worksheets; teaching to high-stakes, multiple-choice end-of-course exams; procedures without connections; and glorified transcription sessions in undergraduate courses must make way for sense-making at all levels of instruction.

Being left behind engendered within me a compassion for the mathematically confused and down-trodden. Students who struggle aren't necessarily lazy. They aren't stupid. Sometimes they just don't get it. And all too often, students—particularly those from underrepresented groups and economically disadvantaged backgrounds—are by-products of inferior educational systems that do too little to challenge them when they are young. Too many worksheets. Too little thinking. Too little *mathematics*. Too little, too late.

References

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