

## Statement on teaching

With teaching experiences at institutions carrying perceptions founded in their acronymic academic labeling, HBCU, HSI, PWI, R1, R2, etc. I approach teaching along a path of scientific artistry. The framework of my teaching is to connect individuals and groups to content matter, illuminate resources both inside and outside of the collegiate environment, and share a sense of hope in growth and progress. I welcome lessons obtained through discourse on pedagogy and leadership development, adding to the empirical execution discovered through service as an instructor and advisor to students. The foundation I bring to the classroom is a willingness to care with an attitudinal resolve that each individual carries greatness; yet, the gifts and skills students possess must be cultured, and one way I promote this greatness is by setting an expectation for student and instructor to SHOWER daily! What does it mean to SHOWER daily?

Speak,  
Hear,  
Observe,  
Write,  
Explain,  
Read,

and do so every single day!

But how does a student SHOWER daily? Here I provide a sample of my teaching and mentoring journey by giving examples from the “kitchen table”, by speaking to the incorporation of results from mathematics education (scientific artistry), and by describing *Grad2Grad*, a semester-long program I designed to help graduate peers.<sup>1</sup>

### I Kitchen Table

I see the classroom as a kitchen table in a unique co-op. There is a class chef named Math, who accepts ingredients from the class and shares an intimate working history with me the instructor. In any given semester, I have to show 40-70 individuals that I have an expertise in Chef Math’s robust cuisine, able to request off-menu orders, cater for large group activities, and meet most dietary restrictions. My role means I often have to vet ingredients before cooking, while allowing time for experimentation. Concretely, I have to maintain direction towards the mathematics fit for the course.

One controlled experiment came in a linear algebra class housed in a bowling alley of a room relative to its dimensions (all pun intended) that did contain seven boards—seeing the positive features is key. The course generally centers around real vector spaces with infinitely-many elements. But I had in the works examples of vector spaces which are small enough (finite-enough) to list all the explicit calculations governed by vector addition and scalar multiplication. Plus, students asked about an addition on a set where the zero element does not look like a number. So we poured some finiteness into the dish to get our hands dirty: we constructed a binary space on the power set of “our three favorite shapes” over the field of two elements. The seventy students agreed to write out the 28 needed sums (up to commutativity) across the boards, and explored the concepts of set union, intersection, and symmetric difference, as well, the null set (as our zero) and sets containing sets, all within the context of linear algebra and applications to computer science and codes. This was not the usual order within this type of course, but I had to serve something with the appropriate zest and during a time when my students’ hunger was gauged

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<sup>1</sup>A byproduct has been in the preparation gained for further teaching experiences at the advanced undergraduate, post-baccalaureate, and graduate levels.

by their own expressed curiosity. The observing of their peers doing mathematics, the writing of the notation, and the explaining of their computations aligned with students' own aim to SHOWER linear algebra.

## II Scientific Artistry

As the behavior of light told of its particle-wave duality, the nature of teaching invites consideration as a science and as an art. A large influence on my teaching is the scientific investigation of language and its ties to the mathematical learning and general identity questions that arise in an institution. At times, such as when I teach in large auditoriums, I lead chants of “ $e$  is *the natural number*, but not a natural number!” Or, I give known etymology of terms to point to the difference between stipulated and extracted definitions as detailed in an article by Edwards and Ward.<sup>2</sup> To establish open communication lines, the first day of any course includes an ungraded assignment to email me on mathematical fears and mathematical hopes. The assignment's medium allows me to gauge the feasibility of email for students, and the content's goal is drop the facade that we are bots in a room and address the real challenge-driven rewards of mathematics. Math is challenging! Most have had a hardship in studying mathematics, so I ask my students to freely express their experiences. This creates an opportunity to write, but it often leads to conversations where the instructor can participate in the hearing aspect of SHOWER. Moreover, the development of the assignment stems from discussions with math educators and learning more about the perceptions and expectations of students at my current institution.

## III *Grad2Grad*

Given the ability, opportunity, and responsibility to engage critical thinking, I come to the purpose of teaching (mathematics) through motivating SHOWERing as a human experience and exhibiting mathematics as both a natural and potentially enjoyable conduit for individual identity and social practice in this experience. For my graduate peers, a sense of mathematical identity is already present, but the jump from undergraduate to graduate schooling is a tough adjustment. It was the creation of Grad2Grad that sparked my interest in connecting various levels of mathematics to see the pervasiveness of certain principles of learning, such as explaining to learn, in action in higher mathematics. In short, Grad2Grad operated throughout the semester to supplement the ongoing Graduate Linear Algebra and Graduate Mathematical Analysis classes, courses associated with qualifying exams. The program took place during the first iteration of the so-called Bridge Program at my institution and relied on a two-week partnership between a graduate student who had passed the pertinent qualifying exam and someone in the course (or studying for the exam) preparing a pseudo-lecture with problem sets.

It is not always the case that graduate mathematics education considers the traditional arc of learning mathematics, but a program such as Grad2Grad recalibrated my own understanding on learning higher mathematics through the feedback of my peers. It also created a setting where teaching and learning happened under a new set of dynamics. Stepping away from traditional classrooms, experiencing both a student-teacher and a peer-to-peer exchange, highlighted underlying goals to learn and to disseminate; at the same time, nuance in “Excellence with Caring”, my Alma Mater's motto, could be seen in noting the differences in the participants. Overall, the preparation for each session led to plenty of reading and speaking—more SHOWERing!

Teaching is an ongoing work. I hope my statement on teaching sees changes throughout my career. I do expect to SHOWER in order for these changes to be based in the science and in the art of instruction. While my abilities will increase, what should remain consistent is my belief in the good of teaching and willingness to do so.

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<sup>2</sup>Edwards, B., & Ward, M. B. (2001). The Role of Mathematical Definitions in Mathematics and in Undergraduate Mathematics Courses. *science*, 165.