I'll admit that I've fallen into the trap. As a young, bright-eyed graduate student, I believed that I was going to be the instructor to make every one of my students fall in love with mathematics but of course, that just wasn't the case. Their entire lives, students have been told that math is hard and scary and, as a result, they come into a math class with their defenses up and ready for war. For students who then believe that they are just "not good at math," entering a math class feels like playing a game they're set up to lose. My goal is to break this mentality by having alternative instruction delivery, grading schemes, and course goals that make students believe they are not even playing the same game.

Modified Recitation in *Multivariable Calculus*

In Fall 2021, I was a recitation leader for MA 213: *Multivariable Calculus*. This was the first in-person semester the University of Kentucky had since March 2020 and many students were unsure how to work in a group of their peers; after all, they'd only had experience with Zoom recitations. Beginning the semester, I used the same recitation format that I did pre-pandemic. Working in groups, my class of 25 students had 50 minutes to work through exercises from a previous lecture in whichever order they wanted, and I would provide answers in the last five minutes. However, I immediately observed that, despite the desks being in pods, my students were working independently and sitting there silent and confused. As a response, I came up with an alternative structure: at the beginning of class, each group is assigned one of the worksheet problems to start with. Everyone in the group had to agree on that one answer before moving on to the rest of the worksheet. After 25 minutes, each group sent one representative to the board to write up their completed solution while the rest kept working. With 10 minutes left in class, I would draw everyone's attention to the board and spend a couple of minutes on each problem, either outlining the steps or highlighting a particularly challenging part. Finally, students would be encouraged to take notes or photos of the problems they had not yet attempted so they had the solution for reference later. About five weeks into the semester, I adopted this new recitation style for one week then surveyed my students, asking if they would prefer to keep the class structure the same or change to this new system. The results were conclusive: 84.6% of students voted to adopt the new method, which we ended up keeping throughout the semester. In the course evaluations, one of the students had this to say about the recitation structure: "I felt like my feedback truly mattered in the way that recitation was run as well which was pretty cool to see. I enjoyed … that we got to see the answers to all of the problems on each worksheet. That has been my biggest gripe with previous recitations is that I don't know if my work is correct or not." Not only did the adjusted style address a complaint my students had from previous semesters, but taking their feedback before included them in the decision.

Specifications-based Grading in *Matrix Algebra*

In Spring 2022, I was given the opportunity to teach MA 322: *Matrix Algebra and its Applications*. After much consideration, I decided that we would use a variant of specifications-based grading with frequent, low-stakes assessment. For this course, this meant that written assignments were given one of two grades: "Pass" or "Revise" and students could revise their work as many times as necessary. Most students will learn different concepts at different times, so the revisions allowed them to revisit a problem after they felt more confident with the topic, even if that's weeks later. Throughout the semester, the response to the alternate grading style was overwhelmingly positive. Students mentioned that the existence of revisions meant that they felt less anxious and less pressure to memorize the math, allowing them to focus more on actually learning it. In particular, I had a student write to me and say this: "The '2-3 exams decide your fate' course organization has caused me a LOT of stress over the last couple years, and I can't overstate how much I appreciate the way you've organized this course. It seems much more symmetric with the way real jobs are designed, prioritizing eventual mastery over immediate

negative reinforcement, etc. I'm looking forward to taking this course and I hope the class's response is positive enough to get other professors interested in alternate grading schemes!" In the Teacher Course Evaluations, when asked about the most helpful aspect of the course, all 13 responses praised the grading scheme and revisions.

Course Design of Corequisite to *College Algebra*

After advocacy from mathematics faculty, the University of Kentucky recently established a corequisite to MA 109: *College Algebra*. While students are still officially registered for MA 109, the corequisite section of the course adds an additional credit hour and allows students who would not qualify by usual placement standards to take *College Algebra*. The students registered for the corequisite section meet with an instructor five times per week rather than the usual three. With this extra time, the class is able to get through all the usual *College Algebra* material at a slower pace and with more background math instruction to help aid in understanding. As corequisite courses are taught in lieu of developmental courses and simultaneously with required classes, they allow students to omit a semester's worth of math courses, saving time and stress. Daniel Douglas, of Trinity College, and colleagues recently released results that demonstrate the advantages of corequisite courses[1]. The authors write: "The simple takeaway is that students who took the college-level course with corequisite supports earned more degrees, earned them faster and, in the end, made more money."

The course was first offered in Fall 2020 and I was asked to co-teach the inaugural section with one of the department's lecturers, Dr. Chloe Urbanski Wawrzyniak. The students met with Chloe on Monday, Wednesday, and Friday and I met with them Tuesday and Thursday. As it had never been taught before, there were no requirements or structures in place for how the corequisite section should be run, so Chloe and I spent a few weeks prior to the start of the semester designing the course and curriculum: planning the schedule, creating and dividing lesson topics, and deciding course policies. Throughout the semester, students reported their appreciation for the additional instruction time, saying that it both kept them accountable and aided in their understanding of the material. Despite the course being entirely online, the students in the corequisite section of *College Algebra* had comparable grade outcomes to students in traditional sections of the course, despite placement markers indicating that this should not have occurred.

Mastery-based Grading in Co-requisite to *College Algebra*

I have been excited to watch the co-requisite to MA 109 continue throughout the past few years, with each new instructor learning from the previous ones. This semester, Fall 2022, I will be teaching the course again, with some modifications. First, while the students will still have class five days per week, I will be the sole instructor for my 35 students. The hope is that this will increase continuity in the instruction, strengthening the trust that my students have in me as their teacher and eliminating the possibility of conflicting pedagogy with a co-instructor. Second, following my success with alternate grading styles from *Matrix Algebra*, I will be evaluating my students using mastery-based grading with frequent, low-stakes assessment. The course has eight learning objectives, including functions and their properties, inverse functions, and polynomial and rational functions that students will be evaluated on

[1] Douglas, Daniel, et al. "Community College Students Assessed as Needed Mathematics Remediation: Seven-Year Impacts of Corequisite Remediation with Statistics." 2020, http://dcmathpathways.org/sites/default/files/resources/2021-10/dana_center_brief_douglas_logue_watanabe-rose_%5Bfinal%5D.pdf. Accessed 28 July 2022.

multiple times throughout the semester, through homework and twice-a-week quizzes. Their final letter grade is determined by the number of times they demonstrate proficiency (or "mastery") throughout these different assignments. Similar to specifications-based grading, this gives students the flexibility to understand topics at their own pace and gives them some leniency if there are life events outside the classroom that impact their learning. Unlike specifications-based grading, assignments are only taken once, putting a limit on the amount of manual grading required of the instructor and allowing the practice to be more scalable to a larger course. I am hopeful that mastery-based grading will help students understand that, when learning a new skill, a flawless first attempt is not required to eventually reach mastery.

Many of my students show up to the first day of class believing that they belong to a group of people who "just aren't good at math," as if it's an innate property of one's being. While I don't meet them early enough in their mathematical career to avoid this labeling, my hope is that by altering my classroom style to be different than everything they've ever experienced, students begin to have a mental shift about their capabilities and just maybe can begin to view themselves as someone who can "do math."