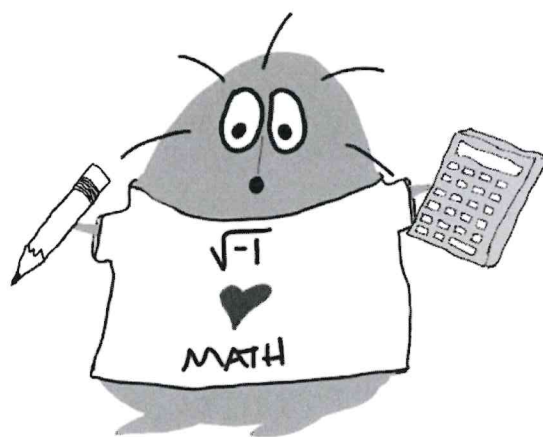


# Winter Semester 2024 Sabbatical Report

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## **Original Statement of Purpose:**

### The short version

This is a proposal about action. In short, the purpose of my sabbatical is to identify, analyze, and disrupt practices in the math learning space that disenfranchise learners. Framed in more positive language, through research and the lens of equity, I plan to investigate and develop actionable, concrete strategies to implement in college math learning spaces that will elevate and support all math learners.

### The road I've been traveling

To date, my work with equity in the math classroom has been meaningful but often informal, arising from a specific need or concern in class in the moment. For example, a student who needed to talk her way through tasks out loud, took her tests at the table outside my office during student hours—taking the tests in the classroom or the testing center were not options that would allow her to talk out loud while she processed her thoughts in order to demonstrate all that she had learned. As another example, I recently began the eye-opening task of actively examining how often each student contributes, and how often each student's voice is acknowledged, during class activities and then making necessary adjustments to bring in and validate more voices. Both of these scenarios were prompted by some challenge that had cropped up in class, and I was able to address them informally but in a manner with equity at the focus.

In addition to these types of just-in-time, informal efforts, my slightly more formal work regarding equity has been influenced by Bryan Dewsbury, a fellow with the Gardner Institute. In 2018, when I was in conference sessions with Dewsbury, I was new to formal discussions and research on equity in education. He inspired me to reframe my response to the question "what do you teach?" so that people are at the heart of the answer rather than a content area: I teach people first, math second. Dewsbury also introduced me to Ibram X. Kendi's work on antiracism, before it became more mainstream after the killing of George Floyd, and this has affected how I view things like course policies and the amount of college-going capital that individuals have. Finally, I modified Dewsbury's idea of surveying every student before the start of the semester, asking who they are as people, what their concerns, challenges, and goals are, and then thoughtfully responding to them. My takeaway from Dewsbury's sessions was that putting people first, acknowledging their challenges, goals, and

histories, will begin the essential and equity-focused task of building community in a class.

### The road ahead

While I have implemented some meaningful equitable supports in my classes as described above, there is further important and necessary work to be done in terms of equity and inclusion in math learning spaces. With this sabbatical project, I am searching for ways to intentionally implement equity-focused teaching in layers throughout courses and semesters, not just the beginning of a semester or as challenges arise. The proposed sabbatical project seeks answers to the questions:

- What do equity-focused teaching and support look like in math learning spaces?
- How do they support learners?
- How can they be adapted and implemented for KVCC math learners?

My framing topics for this proposed sabbatical project include how equity and inclusion are impacted throughout a course by:

- classroom culture and community, including the ways that diverse groups engage in mathematics and problem solving
- syllabi and course policies
- assessments and assignments
- feedback and grading

Through research and investigation, I plan to examine principles and practices that disrupt student disenfranchisement and create an improved, equity-focused space for learning mathematics—a space where each student has opportunities to contribute, to be valued, and to develop their math identity through coursework that is accessible, meaningful, and engaging for all individuals.

This sabbatical would provide the opportunity to systematically and thoroughly examine strategies for inclusion and equity and to incorporate them in math learning spaces—environments often thought of as being filled with facts or with neutral, sterile work not connected to specific individuals—to support student learning and success. The nature of the project would allow me to:

- research, organize, and develop components of the infrastructure needed for an inclusive, equitable math learning experience
- promote equity and inclusion in courses throughout the math department via shared findings, resources, and materials
- reaffirm the value of relationships and sense of community in the classroom
- reflect on and recommit to teaching as a developing practice

All of that being said, sometimes those who bring equity to the front of discussions envision themselves as saviors or experts in lifting others up, often without truly knowing the groups they are claiming to lift up. I do NOT see myself “rescuing” anyone from their communities or circumstances with this work. My priority is always to meet students where they are, how they are, and to serve as a resource and an advocate for learning mathematics.

## **Objectives Accomplished and Activities Performed:**

**Objective #1:** Research equitable practices in math learning environments to impact instruction and learning at KVCC, then synthesize this research into an electronic toolkit of equity-focused resources and practices for math teaching and learning. In particular, I am interested in investigating practices in four broad areas in order to begin to develop a comprehensive approach to equity-focused teaching and learning through a semester: classroom culture/community, syllabi/policies, assignments/assessments, and grading/feedback. Based on my research in these areas, I also plan to apply what I've learned to design materials or activities for my students in at least two of these areas during the sabbatical period, with ongoing research and development in the future.

**Corresponding Activity:** During the sabbatical period, I synthesized my research and developed a website offering information and strategies for moving toward equitable math learning spaces.

The website can be accessed here:

<https://sites.google.com/view/sabbatical-final/welcome>

As of this writing, the website has pages dedicated to:

- Welcoming others to this work
- Syllabi
- Belonging
- Considering mathematics through a noneuropean lens
- Seeing diverse collections of people thriving in STEM areas
- Feedback
- Grading
- Assignments
- Further resources
- Resources from social media
- Glossaries

Within that site, I have provided some specific examples of equity-minded activities or materials which I designed based on my research, including:

- Single-point rubrics for students and instructors that move the focus toward learning and growth and away from scores

(addresses components of grading/feedback and assignments/assessments)

- An activity on traditional grading for students and instructors that highlights the inequities in our traditional grading system (addresses components of grading/feedback and assignments/assessments)
- A reframing of the formal description and objectives for MATH 160 in student-centered language to be used at the beginning of the semester to emphasize how we will extend prior knowledge to use calculus to answer big questions (addresses components of syllabi/policies)

**Objective #2:** Design a start-of-semester opportunity for students to describe their math identity and history, like a brief math origin story or other kind of narrative, and create my own version of that project as reflective practice, as an opportunity for creative experiences, and as an example to share with students.

**Corresponding Activities:** Informed by much reflection and by research on developing graphic memoir, I have created my mathography to share with students at all levels. I developed a mathography assignment for students to complete early in the semester. Sample pages from my mathography and the student assignment can be found in the Appendix.

## **Conclusions Drawn From Activities:**

In my last sabbatical report, I included the following quote:

*The greater our knowledge increases, the greater our ignorance unfolds.*

*-John F. Kennedy*

Once again, it resonates with me:

- Once a person learns about confirmation bias, they wonder about it frequently. Is an initiative truly a solid idea, or does it just mirror something I already believe?
- I originally thought I could keep the categories of classroom culture/community, syllabi/policies, assignments/assessments, and grading/feedback mostly separate. This ended up not being the case. I often struggled with deciding where to include resources or initiatives on the website since categories overlap significantly. For example, the syllabus often contains policies about things like assignments and assessments, and those policies partially set the tone for the learning experience in the classroom community.
- There were many times throughout this sabbatical period where I realized that past practices were not always best practices, even if they had been described as such by math education leaders at the time.
- Acknowledging that I've made mistakes in my teaching career was rarely fun, but learning, growing, and adapting bring hope for myself and for the students I will be working with in the coming years. I return to the classroom after this sabbatical with an abundance of hope.

As I wrap up the sabbatical period, another voice is sticking with me:

"Today, I want to argue, the most urgent social issue affecting poor people and people of color is economic access. In today's world, economic access and full citizenship depend crucially on math and science literacy. I believe that the absence of math literacy in urban and rural communities throughout this country is an issue as urgent as the lack of registered Black voters in Mississippi was in 1961."

This argument from Robert Moses in the book he co-authored with Charles E. Cobb, Jr., *Radical Equations : Organizing Math Literacy in America's Schools*, is from 2001, more than two decades ago. I would

argue that “economic access and full citizenship” STILL “depend crucially on math and science literacy,” and everyone involved in math education, at every level, has a lot of work to do to make this happen. Furthermore, I would argue that this work is not optional.

From synthesizing the research on equitable practices in math classrooms:

- This is heavy, heart-wrenching work that simultaneously brings a sense of hope. It requires thinking deeply about my own role in my students’ challenges, which is uncomfortable, at best. No initiative or activity or assignment is perfect, even those labeled as equity-focused, so I accept that my initiatives are also imperfect and will need modifications for specific students or groups of students. However, while everything is a work in progress, the goal is to help students develop their inner mathematicians and claim their seats at the math table, and that is the part that brings hope.
- The work of bringing equity to math learning spaces overlaps with other important initiatives in (math) education, including culturally relevant teaching and learning, universal design for learning, ethnomathematics, and trauma-informed teaching and learning. I find myself examining all aspects of teaching and learning and routinely asking, “Who does this leave out? Who does it privilege?” These are my new lenses. Recently I was perusing a syllabus online that offered students one point of extra credit for submitting their assignment three days early. That policy privileges students who have more time available for course work and students who have experienced the material before, for example. It leaves out students whose schedules do not allow for getting things done early and those students who do not work as rapidly as others.
- Not all equity-focused initiatives transfer well to math learning spaces. As an example of an equity-focused initiative that is popular in education, but that I do NOT endorse for math learners, especially very early in the semester, consider equity sticks. These are essentially popsicle sticks, each one with a student’s name on it, and a stick is drawn at random in order to select someone to call on during class. These are promoted as a way to check instructor biases at the door since students will be randomly called upon. However, how would this initiative impact students who have a history of believing that math is about speed and correct answers and that math is not for them? A possible modification here would be waiting until late in the



semester, after norms about mistakes and speed and valuable contributions have been established, to use this technique.

- Every interaction with students matters, so it is critical that that these interactions are intentionally supportive and inviting. In math learning spaces, I need to ask, am I supportive and inviting, AND am I helping students develop into independent college math learners? This includes efforts at demystifying the college experience--there is no reason why a new-to-college student should automatically know how to navigate college--and creating a syllabus that is an invitation to further learning rather than a rule-filled contract or a to-do list. It also includes recognizing and leveraging students' lived experiences and the foundational knowledge and strategies they bring with them to classes.
- Feedback, in person and on assignments, is part of how math instructors interact with students. I have a long history of leaving comments like, "this is solid work for this unit," but those types of comments, though kind, do not really help a student develop mathematically. Instead, I am working toward specific, actionable feedback, with an emphasis on action for the student. In addition, for assignments where a revision period is available, I plan to stop putting scores on the work for the first submission--once students have a score, they rarely check out the written feedback. Instead, I plan to include detailed feedback on the first submission for use during the revision period.
- Our grading scheme needs an overhaul for equity. The current grading scheme with a 'failing' category that occupies at least 60 percentage points on the 0 – 100% scale is slanted toward failing, designed in a time when grades were used to channel students into either further education or factory work. There are options for more equitable grading schemes, like making the minimum score on an assignment 50% instead of 0%, using standards-based grading or specifications grading, or moving to ungrading.
- Policies about things like late work and absences need to be carefully designed. In the past, I have been guilty of implementing policies in these areas that adversely affect students who need a little longer to complete an assignment or who are often late or absent from class due to their personal circumstances. I am currently working toward having 'target due dates' for the smaller, formative assignments in a unit of work so that students know how I think they should be keeping up throughout the unit. If a student misses a target due date, however, there is no penalty. They just need to get the work

completed by the end of the unit, before the summative assessment opens.

From designing an opportunity for students to reflect on their math identity and history and creating my own version of that project:

- As it turns out, this portion of the sabbatical grew and grew and had to be reined in. I had no idea this would happen, how I would feel about it, and how it would be simultaneously uncomfortable and rewarding. In addition, I'm still thinking about how past experiences impact how I move forward each day. There was a lot of reflection along the lines of "how did I get here, and where am I going?" I have pages and pages of notes and ideas for a longer project.
- I think this portion of the sabbatical was similar to working on a memoir. Part of that required thinking about the people that have impacted my math or teaching journey, positively and otherwise, and how those interactions affect how I move through the world. I was frequently worried about sharing my imperfect memories, and sometimes I wondered how different this work would be if certain important people were no longer a part of my life.
- My original vision of this portion of the sabbatical involved developing my mathography by drawing the illustrations with ink on paper in an old-school way. I even bought a few different sketch books and new pens. In the end, the pressure of getting things just right on the fancy new paper was too much for me, so I did this work digitally, but still using my own illustrations. My favorite tool in this kind of work is 'undo.'

**How Criteria for a Sabbatical Leave Proposal Were Addressed:**

The sabbatical project addressed all four of the general criteria listed in the guidelines for sabbatical leave proposals:

- Proposed activities will enhance professional effectiveness.

I will return to the classroom transformed. As mentioned earlier, the sabbatical activities provided opportunities to reflect on my past teaching practices and mathematical experiences. This reflection made me identify ways in which I have made decisions about teaching and learning without always considering the full

implications on equity in the past. I commit to doing better from here on, learning and growing from my mistakes in the same way that I encourage students to do.

The sabbatical activities highlighted the need to always thoroughly consider, "who is being excluded, and how can that be addressed?" I need to consider whether I am always standing up for what is right and necessary. These considerations, along with followup actions to adapt to the students I'm working with, positively impact a student's sense of belonging in a course, place value on their ways of knowing mathematics, and provide opportunities for applying mathematics in contexts that are meaningful to the student. This, in turn, improves interest in and access to mathematics, real mathematics in the world.

- Proposed sabbatical leave will enhance the institution's ability to fulfill its mission and/or improve service to students or other publics we serve.

In order to solve the important problems of the world, we will need diversity: diverse perspectives and diverse, capable problem solvers. The sabbatical leave provided the time to develop equity-focused initiatives for engaging and supporting all students in math learning spaces, with a goal of providing all students opportunities to thrive mathematically. These initiatives will provide enhanced opportunities for all learners to access mathematics, to experience diverse problem-solving strategies, to develop their mathematical skillsets more broadly, and to experience new successes in mathematics.

- Proposed sabbatical leave provides an opportunity for reflection and renewal.

I recently heard a story about my mom's pastor being asked what she liked to do for fun as part of her interview for her current position. Her answer was 'study,' and I thought, "oooohhhh...me, too!" I think I have always loved researching and studying and applying new ideas, so what might look like work or drudgery to others is quite rejuvenating for me. Investigating diverse authors, sources, resources, and strategies was a big component of this sabbatical, and that brings new energy to my work.

This sabbatical also provided the opportunities to reflect on my mathematical journey to now and to think deeply about how my

experiences with mathematics, both formal and informal, impact how I move through the world, including how I work with students. In particular, creating my mathography provided a creative component for my work along with opportunities to consider how I was able to embrace and love mathematics despite sometimes being marginalized. In addition, I found that there were several things that I thought were important to my experiences, but that I am not ready to share. I think this was a healthy reminder about trust: students come to my classes, and I would like them to trust me, but they will not always be ready or able to do so, and that will need to be okay.

This sabbatical leave has provided the space to recommit to the practice of teaching mathematics, and I have grown in my perspective. My previous sabbatical focused on real-life applications of mathematics, and in a sense, this sabbatical extends that work, intentionally infusing social justice principles into nearly every aspect of math learning spaces, including problem solving. I would argue that mathematics is necessary to solve all of the significant problems in the world, and all of the significant problems have a social justice component. (As an example, think of the problem of climate change, and then consider who is disproportionately impacted by climate change.)

- Proposed sabbatical leave objectives exceed expectations for routine, ongoing professional development.

This sabbatical provided the opportunity to apply the lens of equity for an active, intentional, and comprehensive review of teaching and learning in math spaces and to create something that will support others in this work. In a traditional professional development scenario, many participants would expect that someone else (the instructor) has already done the heavy lifting to gather resources, sift through them, make a plan, and then present opportunities for growth. This sabbatical required that I do that heavy lifting--gathering resources, synthesizing research, and developing examples of equity-focused initiatives or activities for sharing through the website, all while modeling principles of equity--for my own growth and so that other instructors, at any stage of their teaching journey, may also benefit.

## **Appendix**

## Create Your Mathography!

Your math identity is how you view yourself as a person who learns about and engages with mathematics. This identity changes over time as you have more experiences. This identity also impacts how you approach mathematical situations. Your mathography is like an autobiography with a specific emphasis on your experiences with mathematics, both in school and in regular life, so within your mathography you'll be reflecting on your math identity.

For this activity, consider:

- how you view your mathematical abilities
- what you think being successful in math looks like
- what strategies or behaviors you think are valued in mathematics
- how you have experienced mathematical thinking or applications outside of math classes

For this activity, create a mathography that includes examples of:

- your experiences in math classes at any level, positive or negative, including at least one specific memory related to a math class
- what you have enjoyed about mathematics in the past, and what you have disliked, and why
- how your attitude about mathematics has changed over time
- what you think mathematics is all about
- ways you have engaged with mathematics outside of the classroom

The format for your mathematical autobiography is up to you. If you want to write a letter to your inner mathematician, that would be great. If you want to make a graphic organizer or infographic or comic strip panels with your thoughts, those would be great, too. Just be sure to create something that meets the requirements.

Submit your work as a link to your google slides. Be sure to set your sharing preferences so that anyone with the link can view your work. These formats allow you to add further items later in the semester. By the end of the semester, we'll want to have a collection of items like this that showcase learning, growth, and reflection.

If you would like some guidance on setting up your portfolio through Google slides, you can check here:

[Some suggestions for using Google Slides for our portfolio work](#)

I have provided an example of my own mathography as a reference and so that you can get to know me a bit better:

Google slides version: [SGN 2024](#)

Audio version: [Audio with screencast for Nicole's Mathography](#)

I am your only audience for this assignment right now. I will keep your reflections confidential. However, there may be opportunities in our class to volunteer a bit about your math identity with the larger group, so be prepared for that.

We will likely revisit the mathography later in the semester, so I encourage you to provide plenty of details.

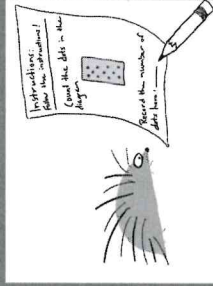
Here is a checklist (rubric) of the objectives I'm looking for:

Areas for improvement	Criteria	Areas that have exceeded expectations
	Describe a few of your experiences in math classes at any level, positive or negative, including at least one specific memory related to a math class.	
	Describe what you have enjoyed about mathematics in the past, and what you have disliked, and why.	
	Describe how your attitude about mathematics has changed over time.	
	Describe at least two ways you have engaged with mathematics outside of the classroom. In my mathography, I call these 'ways of knowing mathematics.'	

	Describe what you think mathematics is all about.	
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# Part Two The Land of K-12 Math



- Early elementary math learning goals:
- ~~Flexible thinking~~
  - ~~Multiple ways of solving~~
  - ~~Patterns~~
  - Following instructions



Early elementary math learning goal:

~~Mathematical ideas can be discovered and explored~~

Math is about following arbitrary rules

Always subtract the smaller number from the bigger number! Always! It's the rule!

Stop being difficult, and follow the rules.

So...  $5 - 13$  is okay...?

But  $5 - 13$  is not?  
Font size matters?  
 $5:18$  has no meaning?

???

Write your own K-12 math learning goal for each panel.

TOO SLOW!

Just stop I did!


Ugh! Just do it like me!

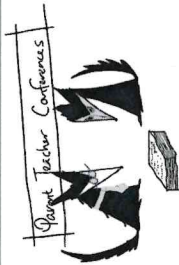
I'm the teacher, so:  
 $418 + 75 = -14$   
Any questions?  
I didn't think so.

Too slow!  
Bored for all to see!

A quick break  
for a positive  
thought - I did  
learn some  
important strategies  
for solving problems.

A technique I learned in  
high school math class  
that is actually  
very useful and  
adaptable.

$$\frac{5 \text{ cm}}{\text{sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hour}} \times \frac{1 \text{ in}}{2.54 \text{ cm}} \times \frac{1 \text{ ft}}{12 \text{ in}} \times \frac{1 \text{ mile}}{5280 \text{ ft}}$$




"She's pretty good at math,  
for a girl."

Oh, so you ARE able  
to get my pronouns  
right.

Also, list the boys who are  
so great at math.  
You don't have any on the list?  
Shocking.

Compute the result for the parent teacher conference quotation equation!

"She's so opinionated!"



"She's so outspoken!"



?

Bonus quotation:

"She has low self esteem"

Give two possible reasons why.

A person could go through K-12 math class experiences and come out thinking that success in math means...

Being the fastest

Needing only one type of explanation

Staying in the same math lane as the teacher

Not making mistakes

Memorizing formulas

And that math is ...

Only for  
some  
people

Not a  
creative  
pursuit

Inflexible

A bunch of problems at  
the end of the chapter  
that somebody already  
figured out, so why  
bother?

Unrelated to  
anything except  
maybe science

So much of that is FALSE!

Somehow my love of mathematics  
survived these harsh conditions, and  
I could hardly wait for...

Part Three

These college math classes  
are the best!

