Sabbatical Report (Spring 2023)

"Finding My Way in the Rapidly Changing Landscape of Higher Education Mathematics"

Wendy Rawlinson, Mathematics

• Purpose, goals, and objectives

There were two primary goals for my sabbatical: The first was to explore higher education math reforms in California, and the second was to rekindle my exploration and appreciation of pure mathematics after many years of focusing primarily on the *teaching* of math.

Higher education math is currently undergoing dramatic, well-funded, state-by-state reforms. As institutions and states across the country are revamping the college experience with an eye to increased equity and student success, state legislatures are attempting to facilitate more students progressing through their math requirements on the way to the ultimate goal of an increased number of certificates and degrees. I strongly believe that these efforts must be balanced with innovations and design that will allow the retention of quality and rigor in our mathematics courses. We owe this to our students and to the communities that we serve.

Through my sabbatical, I sought to learn from the experiences in California, since they are several years ahead of Oregon in the major redesign of higher education math, much of which is driven by their state legislation. By learning what has and hasn't worked well in California community colleges and universities, I hope that we here in Oregon can increase our chances of balancing equity in math education with quality and academic rigor. Finding the 'sweet spot' between seemingly conflicting goals is very important to me, both professionally and personally. As one example of this struggle, I was told outright by one professor that they have 'watered down' their transfer-level STEM math class curriculum because, otherwise, very few students who are now placing into the course would be able to pass the class. I don't believe that this sort of action will ultimately serve students or our communities.

As part of math redesign, there is a movement to eliminate or drastically reduce developmental math courses in community colleges and universities, as they are seen by some as a barrier to student equity and success. One such effort, for example, has been a move away from standardized placement tests in favor of multiple measures for placement, which we have already seen at LCC. This very often results in students being placed higher than if completing a math assessment for placement purposes. Another really significant change is a nationwide effort to place the vast majority of incoming community college students directly into a transfer-level math course, sometimes along with a co-requisite course that is intended to support their success in the college level course. Efforts to legislate reform of this nature is already happening in Oregon.

California Assembly Bill 705 went into effect in January of 2018. This bill made strong recommendations to community colleges in the state regarding placement strategies and a significant reduction in developmental math class availability. I learned that many professional mathematics educators in the state had concerns about the recommendations and created models that attempted to bridge the gap between the bill's goals and the needs of their students. These models were seen by some advocates of AB 705 as violating the spirit of the legislation and, as a result, Assembly Bill 1705 was passed and signed by the governor in September of 2022 (effective July of 2023). This second bill tightens up the language of AB 705 and is very clear and strict in its directives. It applies to all students with an academic goal of a certificate, degree, or transfer and includes requirements as follows (summarized from *AB 1705* and *AB 1705 Implementation Guide*):

- All US high school graduates … who plan to pursue a certificate, degree, or transfer program, shall be directly placed into, and, when beginning coursework in English or mathematics/quantitative reasoning, enrolled in, transfer-level English and mathematics/quantitative reasoning courses.

- Students shall begin in the transfer-level English and math/quantitative reasoning coursework that satisfies a course requirement for the student's intended certificate or associate degree or a requirement for transfer within the intended major.

- STEM programs are limited to two transfer-level prerequisites prior to gateway STEM calculus after July 1, 2024. The college must validate the effectiveness of the transfer level prerequisites to gateway STEM calculus as described in §78213(f) …

- A community college shall not require students to repeat coursework that they have successfully completed in high school or college or take coursework that repeats competencies that the student has demonstrated through other methods of credit for prior learning.

- A community college shall not enroll into non-credit coursework students who have graduated from a US high school … as a substitute or replacement for direct placement and enrollment into transfer-level English and mathematics coursework.

- For students who need or desire extra academic support when enrolled in transfer-level math/quantitative reasoning or English, colleges shall provide access to tutoring, support enhanced transfer-level coursework, concurrent low-unit credit or similar contact hour noncredit corequisite coursework for transfer-level math/quantitative reasoning or English, or other academic supports.

- A college may require students to enroll in additional concurrent support … if it is determined that the support will increase the student's likelihood of passing the transfer-level math/quantitative reasoning or English course.

- High school grade point average as a composite of student performance over multiple years of high school coursework is a sufficient use of multiple evidence-based measures.

- Guided placement and self-placement shall not result in placement or enrollment below the transfer-level or into transfer-level coursework that does not satisfy requirements for the student's program of study.

- Placement methods based upon guided placement, including self-placement, shall not do either of the following:

    - Incorporate sample problems, assignments, assessment instruments, or tests, including those designed for skill assessment.

    - Request students to solve problems, answer curricular questions, present demonstrations and examples of coursework designed to show knowledge or mastery of prerequisite skills, or demonstrate skills through tests or surveys.

It should be noted that the 2022-23 California budget includes **$64 million** to support the implementation of equitable placement and completion policies and practices.

- **Sabbatical Methods**

Due to the specialized, discipline-specific nature of my sabbatical, I am providing several attachments to this overview report, for anyone interested in the details.

- *Attachment 1*: Sabbatical Activity Detail
- *Attachment 2*: Sabbatical Reading/Viewing with hyperlinks
- *Attachment 3*: California Models Resulting from Legislation

In advance of my sabbatical, I secured the promise of temporary office space at Sonoma State University (SSU - where I earned my undergraduate degree in mathematics) to serve as my home base during my sabbatical visit. I also got advance permission to visit two community colleges nearby: Santa Rosa Junior College (SRJC) and College of Marin (CoM).

My research was definitely limited in scope, and I make no claim to have researched the entire California community college system of 116 schools. I acknowledge that there may be institutions that have responded very differently to the statewide legislation, and where faculty may have very different opinions than those I encountered at SSU, SRJC, and CoM.

Upon my arrival at SSU, I was happily able to reconnect with several current professors/lecturers there who were classmates of mine during my undergraduate and graduate studies. There was a math colloquium on the first day of my visit, and it was attended by several retired SSU professors that I was delighted to see after many years. The colloquium was followed by a dinner and I made some really helpful sabbatical-related connections, as well as being warmly welcomed by the SSU Math Department staff. It was a wonderful start to my time at Sonoma State.

SSU weekly math colloquiums were a true inspiration to me during my sabbatical, and fulfilled one of my key sabbatical goals – to reinforce my interest in the field of pure mathematics. There is a long tradition of weekly math colloquia at SSU, and I found myself really inspired by several of the talks that I attended during my time on campus. Additionally, I participated in several SSU Math Department events, and was grateful to be included as a 'visiting professor'. See Sabbatical Activity Detail (*Attachment 1*) for more specifics on these events. Additionally, I spent a lot of my time reading legislation and articles, and viewing video presentations on the topic of higher ed math reform in California and related topics (see *Attachment 2*).

I learned a lot by regularly being in the SSU Math Department office and having many informal chats with faculty members and students. Being physically present also gave me a lot of opportunity to make new connections and arrange interviews. Attached is an outline of the many more formal, scheduled interviews, meetings, and activities that were part of my sabbatical (*Attachment 1*).

- **Sabbatical Results**

As stated earlier, the goal of my sabbatical was two-fold. One goal was achieved with great success, and the other has left me with increased knowledge but also increased concern.

My time in California provided me a much-needed professional and personal refresh and a tangible reminder of why I find the discipline of mathematics so appealing.

I thoroughly enjoyed spending time in the University environment and attending the weekly, thought-provoking math colloquia, as well as other department events. I felt welcomed into the Sonoma State Math Department, and enjoyed many hours of informal interactions with faculty, staff, and students. I made many class observations at these three institutions (see *Attachment 1*), which will help inform and improve my own teaching. In addition, I was able to make many new professional connections that I am confident will continue to be professionally and personally beneficial.

With regard to my research on higher ed math reforms in California, I'm afraid that the results were less positive. I definitely learned a lot about various strategies used to meet recent legislative requirements, but struggled to find even one single professional in higher ed math who thought that the reforms were beneficial to the education and true success of students. When it became clear how very concerned educators are about current and impending changes, I became more and more determined to find individuals on the other side of the argument. However, despite vigorously trying to get a "balanced" view of the issue, I was never able to identify any faculty member who thought that things are moving in a positive direction for students. Additionally, there has been a lot of miscommunication and confusion about the initiatives from the state and it is apparent that this has caused a lot of unwarranted stress for both math faculty and students.

"But what if you don't know algebra?"

AB 1705 does away with virtually all developmental level math in California community colleges (even non-credit options). By providing increased access to transfer-level courses, the data provided by the California Community College Chancellor's Office shows an increased number of students successfully completing those classes, often with a co-requisite course. However, I found two notable issues with these results:

- Firstly, transfer-level math course success data shown on the California Community College Chancellor's Office site is apparently calculated with enrollment totals <u>after</u> the census date. Anecdotally, I learned of at least one such transfer class at SRJC with a high-credit co-requisite that had a great reported success rate. However, the instructor told me that the data was calculated <u>after</u> a significant number of overwhelmed students (mostly women and BIPOC students) had dropped the class. The instructor stated that these are exactly the traditionally underserved students that these reforms claim to help. If reforms are causing the most vulnerable and underserved students to give up on higher education, I think it can be argued that misleading data is actually impeding equity efforts.

- Secondly, much emphasis is placed on the increased number of students succeeding in transfer level courses (often with an accompanying co-req class), but I wasn't able to find information regarding

options for those who don't succeed in the transfer-level classes. I am concerned that this group of students may have no viable options for moving toward success in their higher education efforts, and may just give up. It does seem evident to me that there is a band of students who may have historically placed into developmental level math classes that can, indeed, succeed at a transfer-level course with support. However, this does not address the needs of many students in the community college setting who can't realistically progress to their goal without some remediation.

When visiting a SRJC Business Calculus class, the instructor introduced me to the class and gave a brief description of my research. Many of the students had previously gone through some developmental math classes at SRJC in order to move into this calculus class (prior to the eradication of those dev ed classes). Many were very surprised and dismayed to learn of the reforms, and one astute student asked, "***But what if you don't know algebra?***" This question encapsulates my main concern about the direction that higher ed math (STEM track courses, in particular) is heading, nationwide.

Community colleges are open enrollment institutions tasked with serving our communities. In my 30+ years of teaching at LCC, I've seen many students who wish to pursue STEM careers, but do actually need some remediation prior to tackling college-level mathematics. It is hard for me to understand or support this move toward putting higher education out of reach for so many of our community members.

In my discussions and observations at the three schools, I learned of several reform models that they have used and are currently considering, due to legislative directives. Please see the *California Models Resulting from Legislation* document (*Attachment 3*) for descriptions.

- **Some highlights of the unexpected results of my sabbatical**

As I anticipated, my sabbatical evolved and morphed as I met new people and learned of additional, related areas of interest.

- I learned that SSU uses the same OER Calculus textbook as we do at LCC. This led to many lively and useful discussions about strategies for Active Learning in a calculus class. I was delighted to learn that SSU professors have written a companion OER Workbook for the calculus text and I plan to pilot it in my calculus class this Fall. I was also encouraged by the SSU authors to share the workbook widely, and I have already been able to share it with colleagues at LCC and other Oregon community colleges. In addition, the SSU professors were interested to learn about some of the strategies used at LCC to support Active Learning in our classes, and are interested in incorporating these ideas into their classes at SSU.

- I was very interested to discover that none of the three institutions I visited offer online math classes (with the exception of one heavily-vetted Intro to Statistics online class at College of Marin). I was told that, in general, the math faculty believe that online math classes are "pedagogically unsound", and they would absolutely not consider any online class without proctored assessments. During a Math Department meeting that I attended, faculty pointed to studies on learning loss during Covid remote education as one piece of convincing evidence for their stance. Their concerns resonate with me and bolster my opinion that we need to revisit our online math classes at LCC, to make sure that we are doing right by our students.

- Much of my sabbatical reading led me to reforms in California State Universities (the CSU system) and California K12 education. Although the K12 level of math education was not a specific part of my sabbatical work, it was interesting to learn what math experience is being planned for students prior to them arriving at the doors of a California community college or university. I was able to meet with Professor Ford at SSU, who was one of the twelve authors of the California Math Framework for K12 students. The Framework has been very controversial and was approved in July of 2023.

- Additionally, while at SSU I learned that due to 2019's California State University Executive Order 1101, ***"CSU students will no longer be required to take courses that do not apply toward a degree. Instead, students will be able to earn college credit beginning day one, while receiving the academic support they need."*** In response to this new approach to math education in the CSU system, Sonoma State University has piloted several models that I researched and observed. Brief descriptions of these models can be found on the attached *California Models Resulting from Legislation* document (*Attachment 3*). These were designed to support students who may have historically taken classes that provided some needed remediation prior to their degree-applicable math classes.

- **Sabbatical goals not achieved**

In my sabbatical application, I stated that I hoped to attend a mindfulness retreat at Spirit Rock Meditation Center. Timing and cost precluded me from pursuing this.

Additionally, I had hoped to speak to representatives of other disciplines (science and engineering, for example) served by the mathematics departments in order to learn how changes in math education have or haven't impacted what they are able to do in their classes. However, I was so busy in the various math departments that I unfortunately didn't make the necessary connections in other disciplines to pursue this. I believe that I will be able research this in a modified way by seeking input from other departments here at LCC, as more reforms come to Oregon.

- **Sabbatical Reflections**

Although the developments in California higher education are very concerning to me and the math professors that I met with, I'm so grateful to have had the opportunity to learn about them in an immersive experience, and think that I am now better able to function in my role at LCC as we encounter statewide efforts to reform math education. Much of what we've already seen in Oregon has followed trends in California, so it seems wise for us to be aware of developments in states that are 'ahead' of us in the national movement.

It was evident that there was robust participation in the legislative process by faculty and students at Santa Rosa Junior College, the Faculty Association of California Community Colleges, American Mathematical Association of Two Year Colleges (AMATYC), and many other individuals and professional organizations. There were written campaigns, as well as faculty and student speakers at the legislature. Unfortunately, it was to no avail, as the well-funded reform efforts were able to successfully influence the legislators to pass their desired education bills into law. This is disconcerting since I had hoped that, since the education professionals were very unified, the politicians would naturally defer to their well-qualified opinions. This has clearly not been the case, and it brings me great concern with regard to future Oregon legislation. Advice that I consistently received from California professionals was focused on striving to retain Oregon community college students' ***access*** to developmental-level math classes. We have many students with goals that are truly attainable for them if they can begin their journey at an appropriate mathematical level. I firmly believe that providing them this opportunity is how we can best serve our students' goals and our communities.

It was refreshing to see the strong unity in the Math Departments that I visited – I think that their discipline-specific department structure and cohesiveness has helped them navigate the ongoing developments with as little disruption as possible. The view of many I spoke with is that these latest major reforms will inevitably fail, and that the pendulum will swing back. Their main disagreement seems to be how long that will take, and how many students may be harmed in the meantime. I also heard a lot of frustration from faculty who have worked very hard to make required, legislated changes, only to be told by the next bit of legislation that they must go back to the drawing board. The rampant miscommunication and confusion is very counterproductive to both student success and general morale.

The lack of support for online math classes that I observed on my sabbatical was unexpected, and has given me pause. Here at LCC, we have not stopped to reassess or course-correct after our emergency remote teaching, and I have a renewed interest in vetting our online math classes and online instructor qualifications/training, as well as our practices around teaching and assessing our online math students. Discussions around these issues are ongoing in the math department, and I plan to be very involved in those conversations.

The weekly Math Colloquia at Sonoma State University are presented on Zoom, and I plan to continue attending those next year and beyond. The challenging, specialized math topics that are presented in the colloquia are an ongoing reminder of the power and beauty of mathematics. My love of math is one of my strengths as an educator, and I look forward to nurturing that through the SSU colloquia. I am also anxious to maintain connections with the math education professionals that I met during my sabbatical. I'm glad that we can all learn from and support each other, as well as share resources and innovations.

The most economical way for me to spend months in California for my sabbatical was to stay with my parents in Marin County. A huge benefit of this lodging option was getting to spend more uninterrupted time with my parents than I have in many decades. I was also able to reconnect with old friends and explore many hiking areas that were new to me. All of this was of great benefit to me, and I feel personally enriched by and very grateful for these experiences.

I hope to present my sabbatical results and observations in greater math-specific detail to my department, perhaps in the context of our own SME Colloquium series. I plan to continue in my role at LCC for quite some time to come, and I will continue to strive for a perspective that will allow me to be personally fulfilled and proud of the work that I'm doing, and to balance true student success and equity with the retention of high-quality math courses. This will be no small feat, and I am grateful for my like-minded colleagues here at LCC.

In conclusion, my sabbatical experience was rich and rewarding, both personally and professionally. As I begin my 33rd year at LCC, I am feeling refreshed and enthusiastic about teaching mathematics for years to come. I am deeply grateful for the sabbatical support that our wonderful FPD program provided.

Attachments

Attachment 1: Sabbatical Activity Detail

Scheduled meetings

Sonoma State University

- SSU Math Department meetings on 04/11/23 and 05/09/23
- Met with SSU Math Department Chair (Overall view and results of reforms)
- Met with Prof. Ford (focus: K12 Math Framework)
- Met with Prof. Morris (focus: Active Calculus class and Workbook)
- Met with Prof. Lahme (focus: SSU Stretch Model for classes)
- Met with Prof. Emeritus B. Barnier (focus: Discrete Math and overall view of reforms)
- Met with Lecturer Silverman (focus: Finite Math and overall view of reforms)

Santa Rosa Junior College

- SRJC Math Department meetings on 04/07/23 and 05/05/23
- Met with SRJC Math Department Chair (focus: Overall view and results of reforms)
- Met with Prof. Gooch (focus: Impact of reforms on lower-level students)
- Met with Prof. Bunas (focus: Impact of reforms on SRJC students)
- Met with C. Valencia, Faculty (College Skills) (focus: his similar sabbatical, future of dev-level students at SRJC and elsewhere)

College of Marin

- Met with CoM Math Department Chair (focus: Overall view and results of reforms)
- Met with Prof. Nguyen (focus: Impact of reforms on precalculus students/classes)

Class Observations

Sonoma State University

- Finite Math (Silverman)
- Calculus II (Morris)
- Calculus II (Kanaana)

Santa Rosa Junior College

- Business Calculus (Bunas)
- Precalculus (Bunas)

College of Marin

- Precalculus Algebra and Trig with Companion Course (Nguyen)
- College Algebra with Companion Course (Wang)

Other Scheduled Events Attended

Sonoma State University

- Weekly Math Colloquia (03/29, 04/05, 04/12, 04/19, 05/03)
- Faculty-Student Research Symposium (where undergrads present proofs to peers and faculty)
- Math Festival (was invited to be a Poster Judge)
- Math Festival Awards Dinner
- Expanding Your Horizons (Volunteered all day on Sat., 04/15) – all day event to encourage middle school students to consider STEM fields

Readings/Video Presentations

- Much of my time was spent reading legislation, articles, etc. regarding recent developments in California and nationwide. Please see attached list of my extensive readings (and video viewing) during my sabbatical (Attachment 2).

Attachment 2: Sabbatical Readings

Community College-related

- Singh, S (April 2023) The Death of the Mathematics I Knew (blog)
- Burke, E (February 2023). Sonya Christian named Chancellor of California Community Colleges. EdSource
- Weissman, S (October 2022). New California Law Furthers Remedial Education Reform. Inside Higher Ed
- Eslamieh, S (May 2022) How AB 1705 would reduce course offerings and negatively impact community college students. San Mateo Community College Federation of Teachers
- Walton, I (May 2023) Ketchup, 57 Varieties or AB 1705 – Your Choice or NO Choice. Faculty Association of California Community Colleges (opinion)
- Burke, M (September 2022) Dozens of community colleges offer remedial classes. A bill to ban them awaits Newsom's signature. Recordnet.com/EdSource
- Cooper, D, Willett, T, Hayward, C (April 2022) Maximizing Math and English Completion: An Equitable Placement Paradigm Blooms. RP Group
- (Fall 2022) Procedures Manual for the State of Mississippi Dual Enrollment Accelerated Programs
- (March 2022) Remedial Courses in Louisiana Colleges to be Eliminated. Board of Regents, State of Louisiana
- Tornay, K (July 2022) 'We know what works': Santa Rosa Junior College ditches remedial classes amid statewide debate over student tracking. Press Democrat
- (December 2020) Still Getting There. California Acceleration Project/Public Advocates
- Jaggars, S, Bickerstaff, S (April 2018) Developmental Education: The Evolution of Research and Reform. CCRC
- Developmental Education. CCRC
- Myers, T (Fall 2022) Politics, Pendulums, and AB 1705, FACCC
- Judge, D (2022) Titanic and AB 1705 (YouTube video)
- Transfer-Level Gateway Completion Dashboard (CA Chancellor's Office site)
- Singh, S (April 2023). When Politicians Interfere with Math Education, Teachers and Students Always Suffer (blog)

- Devlin, K (January 2017) All The Mathematical Methods I Learned In My University Math Degree Became Obsolete In My Lifetime, Huffpost
- (Sullivan, J, Schultz, C, Carlin-Goldberg, J) Letter from California Mathematics Council, Community Colleges (in opposition to AB 1705)
- (2022) FACCC (Faculty Association of California Community Colleges) Opposed Bill: AB 1705 (YouTube video – Faculty Association of California Community Colleges
- (April 2022) AMATYC Position Statement on AB 1705
- (Fall 2022) Determining When Pre-transfer English and Mathematics Meets the Needs of a Defined Population. Academic Senate of California Community Colleges
- Bezerra-Nader, R (December 2020). AB 705 and Its Unintended Consequences (FACCC blog - opinion)
- (February 2023) AB 1705 FAQ. CCCCO
- (June 2022) Senate Floor Analysis – third reading
- Jenkins, R (July 2022) 'Equity' sounds good, but it's actually a bad thing. Campus Reform
- Fowler, E (August 2022) ANALYSIS: California bill is a disservice for community college students' goals. Campus Reform
- (Spring 2022) Upholding the California Community College Mission – Oppose AB 1705 (Irwin, 2022) as of April 9, 2022 Unless Amended. Academic Senate for California Community Colleges
- Ravitch, D (July 2013) Now the Gates Foundation is Destroying Higher Education. Blog
- Jaschik, S (May 2021) Redefining "Value" in Higher Education. Inside Higher Ed
- Attridge, M (September 2022) California Poised to Cut Remedial Classes at Community Colleges. Best Colleges
- (August 2021) Maximizing Math Throughput of Students Who Did Not Complete Algebra 1 in High School. The RP Group
- Sandoval, C (April 2023) Is outdated math setting students up for failure? (video)
- Burke, M. (April 2023) California Community Colleges moving forward with bachelor's degree approvals despite lawmaker objections. EdSource
- Burke, M. (April 2023) California's next community colleges chief pushed key reforms and now faces new challenges. EdSource
- Cal. Ed. Code 78213
- Binkley, C (May 2023) "Waste of Time": Community college transfers derail students. AP News

- 50-State Comparison: Developmental Education Policies. Education Commission of the United States
- (video) Equitable Placement, Support, and Completion: Implementation and Implications of AB1705
- AB 1805, California Legislative Information
- AB1805 Fact Sheet , California Legislative Information
- California Acceleration Project (website)

California Community College Chancellor's Office Site

- AB 1705 Implementation Guide
- AB1705 FAQ
- Vision for Success
- CCCCO Memos
- CCCCO Dec 23 2022 Memo Re: AB 1705
- CCCCO April 15 2019 Memo Re AB 705
- CCCCO November 13 2020 Memo Re Data Reporting
- CCCCO AB 705 Adoption Plans (2019)
- CCCCO November 22 2022 Memo
- CCCCO November 18 2021 Memo
- CCCCO Transfer-Level Gateway Completion Dashboard
- Assembly Bill 1705 Policy Committee Analysis

Related Cal State University information

- CSU EO1101, California State University website
- CSU EO1101 FAQ, Calfornia State University website

K12 mathematics education

- Boaler, J (April 2023)Let's move past the acrimony and create a mathematics framework that works for all students. EdSource
- Evers, W and Wurman, Z (July 2021) Replace the Proposed New California Math Curriculum Framework. Independent Institute
- Fensterwald, J (March 2022) California revises new math framework to keep backlash at bay. EdSource
- Fensterwald, J (July 2022) Deep divisions, further delay for California's math guidelines. EdSource
- Caffrey, M (January 2023) California Pushes to Release Math Framework in 2023 After Long Fight. Edweek Market Brief
- Hong, J (March 2023) Bolstering criticism of math framework. The Observer
- Ruffalo, R and Hernandez, M (April 2023) It's time to stop stalling action on the state math framework, EdSource (opinion)
- Devlin, K (January 2017). Number Sense: the most important mathematical concept in 21st Century education, Huffpost
- Raleight, H (May 2023) San Francisco's Algebra War. City Journal
- Keshavan, M (April 2023). SFUSD's numbers game is leaving its most vulnerable students behind (opinion). San Francisco Examiner
- Tucker, J (May 2023) S.F. could bring back algebra in eighth grade. Here's what you need to know about city's math wars. San Francisco Chronicle
- Bagdasarian, T (April 2022) Stanford and Cal professors level accusations as debate over state math curriculum rages, The Stanford Daily
- Boaler, J (March 2023) Crossing the Line: When Academic Disagreement becomes Harassment and Abuse. Stanford Blog

Older articles (as listed in my sabbatical application)

- Zachry Rutschow, E., Sepanik, S., Deitch, V., Raufman, J., Dukes, D., Moussa, A. (November 2019) Gaining Ground: Findings from the Dana Center Mathematics Pathways Impact Study. Community College Research Center.
- Melguizo, T., Ching, C., Ngo, F, & Harrington, D. (2021). AB 705 in the Los Angeles Community College District: Results from Fall 2019. Pullias Center for Higher Education

- Hong, J (November 2021). Understanding the debate behind California's new math framework. Cal Matters
- Fortin, J (November 2021). California Tries to Close the Gap in Math, but Sets Off a Backlash. The New York Times
- Bezerra-Nader, R (February 2020). AB 705 and Its Untended Consequences. Academic Senate for California Community Colleges
- Rutan, C. (October 2018). A Year Later: Where We Are with AB 705 for Mathematics and English. Academic Senate for California Community Colleges
- Almy, J. (October 2017). The Fast Lane to Nowhere. Inside Higher Ed
- (January 2021). A Qualitative Exploration of AB 705 Implementation: Report of Statewide Interview Results. The RP Group
- Spear, E. How California Community Colleges Can Satisfy AB 705. Precision Campus
- Hern, K., Snell, M., Henson, L. Still Getting There: How California's AB 705 is (and is not) Transforming Community College Remediation and What Needs to Come Next. Public Advocates
- Mindfulness in Schools and Higher Education, Brown School of Public Health

Attachment 3: Models

Sonoma State University

"Stretch" courses (spreads course over 2 semesters) – developed prior to being necessitated by policy. University funds a "Stretch Coordinator".

- 131 A&B Intro to Finite Math
- 150 A&B Modern Geometry
- 161 A&B Differential and Integral Calculus I
- 165 A&B Elementary Applied Statistics
- 211 A&B Differential and Integral Calculus II

"Extended" courses (6 units)

- 161X Differential and Integral Calculus I Extended
  (Calc 1 with algebra review) - Incorporates 'just in time' remediation. Primarily used by Physics and Engineering majors who aren't ready for Calc 1, but want to finish in four years.

- 165X Elementary Applied Statistics Extended
  (Elem. Applied Stats. 1st time freshman, based on test score) – For students who failed the "A" part of the stretch course take it. But, it was so unsuccessful that they're retiring it.

"Workshops" (1 credit) – **no longer offered** (optional and too poorly attended).

- 160W Precalculus
- 161W Calculus I Workshop
- 211SW Calculus II-S Workshop
- 211W Calculus II Workshop

Santa Rosa Junior College

"Concurrent Support" courses

- Math 200 (2 units) accompanies Math 9 (Finite Math), 16 (Intro to Math Analysis), 27 (PreCalc Algebra and Trig), 74 (Number Systems)
- Math 215 (2 units) accompanies Math 15 (Elem. Stats)
- Math 225 (4 units) accompanies Math 25 (PreCalc Algebra) – They believe they'll have to lower to 2 units for this in the near future.

College of Marin

"Companion courses" (0.5 – 1.0 units)

- Math 105C – Companion to Math 105 (College Algebra)
- Math 109C – Companion to Math 109 (PreCalc College Algebra and Trig)

In my observation, I saw that the 'Companion course' time was tacked on to regular class meetings and used in a variety of ways. One instructor just used it for extended class meetings, and another took the class to the Math Lab for group/independent work while he made himself available to answer questions and give hints.