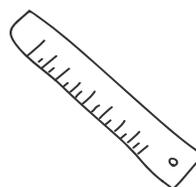
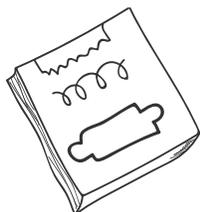


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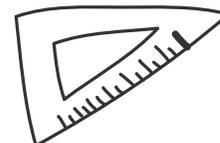


Zeroing in on Algebra II/Integrated III: A Problem-Solving Symposium Report

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August 11, 2017
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Zeroing In Symposium Report

This report attempts to summarize some of the countless insights and offerings of the "Zeroing In" conference, for attendees and those unable to join us. We are grateful to our volunteer notetakers (and we apologize for a couple of sessions that went undocumented). We hope this document leads to even more networking and learning for math improvement in our region. Please reach out to any person whose ideas intrigue you! Contact information for presenters and their session information can be found [here](#).

Executive Summary

On August 11th, 2017, over 200 high school and college educators and community members met to discuss how to best bridge the gap between high school and college-level mathematics. Too many young San Diegans are struggling in remedial and college-level math coursework once they leave our region's high schools. Too many of our San Diego youth are seeing their college and career dreams shrivel as they encounter higher level mathematics. Highly engaged attendees asked thoughtful questions of over 30 knowledgeable presenters, some of whom came from our local districts and colleges and some of whom joined us from other regions of California. Everyone was passionate, committed and eager to build more bridges and denser networks to help our local students across what has become a crisis -- the math divide. To keep the communication going: We send to you here a rich compilation of notes taken during the Zeroing In Working Symposium. Volunteer notetakers from UC San Diego's CREATE and Education Studies worked to document nearly all of the 30 sessions offered in the hopes that you (the reader) might be able to learn more about key discussions and sessions you were interested in but perhaps could not attend. You also, here, now have a running record of the sessions you did attend--we hope you will share it with others. More events sponsored by the San Diego Math Network will be forthcoming this year. Check out our website here and register for updates!

Tim McGrath, Vice President of Instruction at San Diego Mesa College

Genevieve Clark, Director, Teaching and Learning Support at San Diego Unified School District

Erica Heinzman, Lecturer of Secondary Mathematics at UC San Diego

Susan Yonezawa, Associate Director of CREATE at UC San Diego

Mica Pollock, Director of CREATE at UC San Diego, Professor of Education Studies

Introduction

Tim McGrath, Vice President of Instruction for San Diego Mesa College, and Susan Yonezawa, Associate Director of CREATE, welcomed three speakers: Superintendent Cindy Marten of the San Diego Unified School District (SDUSD), Chancellor Constance Carroll of the San Diego Community College District, and Chancellor Pradeep Khosla of UC San Diego.

Superintendent Marten began by highlighting the important distinction between simply envisioning equity and delivering on equity through actions that create the systems, structures, and supports to ensure “every student gets what he or she needs, when they need it.” She noted three points of pride in SDUSD:

- (1) effective partnerships with postsecondary institutions, which have increased the percentage of students prepared for college coursework;
- (2) improvements in monitoring student progress and increasing access to math skill-building courses; and
- (3) strong collaboration in identifying more students for advanced coursework, to improve their school experience.

Superintendent Marten emphasized, “It takes educators coming together and talking together, to partner and have good outcomes for kids. The commitment to equity lives inside our commitment to access and support for all students.”

Chancellor Carroll followed by sharing an excellent example of collaboration between Mesa College and Kearny High School on the subject of algebra, a historical point of difficulty for each. The two schools developed a joint pathway into algebra and statistics that has been successful in ensuring students fulfill math requirements for postsecondary education. She stated, “If secondary schools, primary schools, community colleges, and universities agree on the pathway and structure of programs, we can’t possibly fail. We fail when there are silos and conflicting expectations. Today’s gathering, which may seem casual to some, is really, really, extremely important to our students and their future in the field of mathematics, and specifically algebra.”

Chancellor Khosla concluded by sharing UC San Diego’s pride in educating holistic students, who graduate from college having mastered different ways of thinking about the world. He noted the importance of investing in educating teachers, as the UC system is reliant upon the high school and community college systems to deliver adequately prepared undergraduates. Ultimately, Chancellor Khosla emphasized centering the goal of equity as everyone works to equip students with mathematical thinking skills, which will prepare them for success in college and throughout life.



Igniter Fund

Mica Pollock, Director of CREATE, urged participants to view the conference as an opportunity to network with individuals across the math pipeline -- a goal central to the San Diego Math Network, a regional effort hosted inside CREATE. She outlined the Igniter Fund, a grant ranging from \$50-\$500 available to conference participants who would like to collaborate further with one another after the one-day conference. The Igniter Fund could be used for a variety of learning opportunities, including "a lunch to connect with people you met at the conference," "observing someone in action at their site," and "a group meeting about data." In addition to completing Igniter Fund applications, Mica also encouraged conference participants to share "ah-ha's" from the conference with their larger networks via twitter, using the hashtag #zerosd17. See Igniter Fund awardees on page 21.



Zeroing-In on the Problem

The goal of this talk was to capture a shared understanding before symposium attendees parted ways for the breakout sessions. Three speakers shared their expertise on issues of mathematics at different levels. Dina Burow represented the high schools in San Diego's K-12 system, Myra Snell represented community college professors of mathematics, and Janet Bowers represented San Diego State University.

Dina focused on the rising expectations for teachers to teach math differently because, "Having students understand concepts at a deeper level, instead of just the procedures for the concepts, is necessary for them to succeed in college." She spoke about the Common Core State Standards, which were established to address this need by creating consistent expectations and ensuring students are prepared to enter postsecondary institutions. The traditional sequence from algebra to geometry was changed to a sequence of integrated classes, so all students would have learning experiences that made sense from course to course. The new integrated sequence focuses on fewer concepts and bigger ideas, so students gain a stronger foundation to build math competency. All high schools in San Diego are offering the integrated sequence so students can build on conceptual understanding from year to year, no matter which schools they attend.



Myra followed with an explanation of the math placement challenges faced by the community college system. She discussed colleges' math placement tests and pointed out that "placement drives inequity." "It's fundamentally important that we think carefully about how high stakes math placements are" as students head into college, she argued. "How are we making those decisions deeming that a student is not ready for college-level math?" Myra lauded Cuyamaca College for trying a host of "high leverage strategies" to support students through college mathematics. First, "They are questioning the definition of what it means to be college ready," she argued. "Traditionally, we use standardized tests like Accuplacer" for community college placement, "which really only predicts 4% of the variation" of students' performance in college math courses. Instead, Cuyamaca faculty are using students' self-reported high school grades to place them into courses. Such placement processes "trust the prior system's grades," she said, and use "multiple measures" to assess students' math competency. In a nutshell, more students are ready (or can soon get ready) for college level math than typical placement tests show. Myra noted that the key danger is "underplacing" students in courses too easy for them, slowing students' progress egregiously. She noted that Cuyamaca is trying an additional strategy: Instead of enrolling students in lengthy

sequences of remedial courses that slow students' progress, Cuyamaca is offering "no courses below intermediate algebra" and instead placing students in intermediate algebra (for STEM majors) or statistics pathways (for non-STEM majors) with additional support. "At Cuyamaca, the beginning is intermediate algebra plus support. You can't severely underplace!"

Janet concluded by sharing how mathematics instruction is changing at San Diego State University. Executive Order 1110 is removing the Entry-Level Mathematics test, which was a high-stakes gatekeeping assessment. Second, the order eliminates non-credit bearing remedial courses, instead prioritizing support for students to succeed in credit-bearing courses. Janet stated, "The failure rates in remedial classes are abysmal—75-80%—because students feel labeled, they have no motivation, they aren't getting any credit, and they have better things to do. This is a better way to go. We looked at how many people are actually STEM majors and found out, surprisingly, 25% are STEM majors or want to be. We don't want to cut them off at the high school and start that bifurcation too early, because that's a significant number of students who are thinking about going into a STEM field." Mathematics faculty are talking about how to address these changes with two main ideas: a boot camp model or compressed model, which both involve an "early start" summer program. This may involve offering four weeks of a support course followed by a college course, or an eight week compressed core course followed by a college course. They plan to work with the SDSU Chancellor's Office to further develop a solution.

Framing the Problem: A Closer Look at the Data

John J. Hetts, Senior Director of Data Science, Educational Results Partnership

Dr. Hetts' session was designed to further set the stage with data on the K16 math pipeline. Hetts noted that students entering CSUs and CCCs are frequently being placed in remedial, non-transferable math courses even when they have successfully completed appropriate courses in high school that should have placed them in a transfer-level course in college. While students frequently have smooth transitions between math courses within systems (i.e. MS, HS, CC), the problem often comes when students transition between systems. He pointed to three main areas of concern: transitions and trust, methods of assessment and readiness, and repetition and its effectiveness. First, different systems often lack trust in each other and in whether prior math teachers and students have done what is necessary for students to succeed at the next level. Second, single-method, single instance methods of assessment often inaccurately and unfairly place far too many students (disproportionately, students of color) in remedial courses. Third, requiring students to repeat previously successfully completed courses in mathematics has a negative impact on students' trajectories in mathematics and their overall college success, with significant real and opportunity costs for students.

To better serve our students, Dr. Hetts recommends re-examining the criteria that allow students entry into transfer-level math courses to rely more meaningfully on what the evidence shows predicts students' performance in college mathematics course. For example, colleges can use students' cumulative high school GPA - a better predictor than existing assessments - in combination with the last math course successfully completed to more accurately place students into the appropriate mathematics course. Alternatively, if colleges continue to use single instance, single method assessment tests, they might examine where they've set the cut scores for the tests. One study of changes in the Virginia Community College found that just simply changing the cut score and allowing more students into transfer-level math doubled the number of students successfully completing a transfer-math course in their first year, a key early momentum indicator of students' likelihood of completion.

One of Hetts' key takeaways was that students who successfully complete work in one system should be allowed the chance to progress to the next course in the sequence in the next system. He posited, "Students who come day after day, month after month, semester after semester, and year after year and do what is asked of them, will continue to do that at the next level." He ended by suggesting that we have been too focused solely on the risk of placing students in classes that are too challenging for them. Instead, we need to be just as focused on the risk of placing students in courses that are not challenging enough and asking them to repeat courses, often multiple courses, that they've already successfully completed. "We have been absolutely obsessed with making sure our students don't fly too high," he concluded, "but we need to do what we can to assure that they also don't start off flying too low."



The next part of the conference focused on Exciting Efforts closing gaps and supporting students to and through college mathematics.

Exciting Efforts: Power Moves for Improving Community College Math Outcomes and Equity

Myra Snell, Professor, Los Medanos Community College; Co-Founder, California Acceleration Project

Session description: Over 70% of community college students are placed into math remediation and most do not complete the math requirement for a degree. Traditional remediation also exacerbates racial inequity. Find out what happens when colleges change placement policies and curricula to enable the vast majority of students to begin in transfer-level math.

As Myra had described in her earlier panel, typically, community colleges use placement tests to determine college readiness, but the criteria are locally determined by each campus. Overall, "college ready" should mean students have the quantitative reasoning ability to pass a rigorous baccalaureate math course. However, 75% of students are placed—often unfairly—into the "underprepared" category, which has huge ramifications for their progress. "Underprepared" status could mean remediation in 1-4 math courses before students are able to take their first math course for transfer credit towards a baccalaureate degree. Only 6% of such students complete such remediation toward transferable, college level math in three years. Further, this has significant implications for equity, as over half of students who are African American/Black and Hispanic/Latinx

are placed in the lowest levels of remediation, where they are then not prepared to transfer to a four-year institution. Thus, Myra summarized: “The placement issue drives the inequity we are seeing in our system. It’s a high stakes decision, so we need to think carefully about whether we deem a student not ready for math. We can do better!” As she noted, Cuyamaca is one local community college worth celebrating, as it has implemented research-recommended high-leverage strategies at scale. To accomplish this, Cuyamaca educators are questioning the very definition of what it means to be “college ready,” and changing their practices to promote equitable access and success in math courses.

Specifically, rather than using traditional standardized tests, which Myra said poorly predict college performance, Cuyamaca uses self-reported high school grades to assess preparedness for college math. Further, Cuyamaca restructured their developmental math program by replacing the traditional long sequence of remedial classes with a sequence of simultaneous, co-requisite courses by the same instructor, in which intermediate algebra is the lowest level starter course. Cuyamaca also transformed their traditional transfer course requirements by determining individual math proficiency expectations based on each student’s planned degree pathway. Lastly, Cuyamaca instructors changed their approach to teaching by emphasizing mathematical practices, activity-based instruction, and contextualized lessons. Changes on the horizon include moving toward a multiple measures placement process and addressing issues of articulation for transfer to university.

Present in Myra’s own follow up presentation were community college colleagues from City College, Mesa College, Miramar, Cuyamaca College and Southwestern, and K12 colleagues from Palomar High School, San Diego Unified, and Grossmont Unified. Snell described the California Acceleration project’s work with community colleges statewide. “70% of kids in community college aren’t interested in math intensive fields,” she said. “So, how do we help students have a good rigorous experience in their last math class?”

The key, she argued, is to avoid having math become a barrier if you’re not going to do STEM. “We should have students go through career planning options in community college before their math pathway starts,” she said. A stats pathway supports careers in the humanities and social sciences, she argued. Still, “If you start in Stats and want to move over to advanced math pathways you can,” she argued. “Typically, we demoralize students in the remediation pathway and they quit college. Instead we’re saying, ‘let’s get you into something you think you’re interested in, so you have a successful experience with college level math. And then if you get interested in quantitative fields, you have college math behind you.’”

Much of Myra’s work has focused on designing “stats pathways,” and designing “community college curriculum with big meaty problems that provide opportunities for productive struggle” and that pay attention to the emotional side of learning math as an older student. “I don’t know how many times I hear a student ask a question and the instructor says, ‘you should know that.’ That sends the message that questions aren’t welcome and students will never ask a question again,” Snell said. “How can college-level instructors instead anticipate places where students will be struggling, and support student struggles?”

Myra called too for “Stackable degrees” – to “get more students finishing BA level math so they have more options to themselves open later.” “Instead of calculus being the onramp to the sciences, we make it the course where you weed people out,” she said. “If I want to keep the STEM door open you have to use acceleration,” noted a colleague from City College. “Otherwise it will take forever.” Snell agreed.

A hearty debate ensued over what a high school GPA measures, and whether it could really be a useful tool for placing students in math courses. “I think a high school GPA is a metric not of what

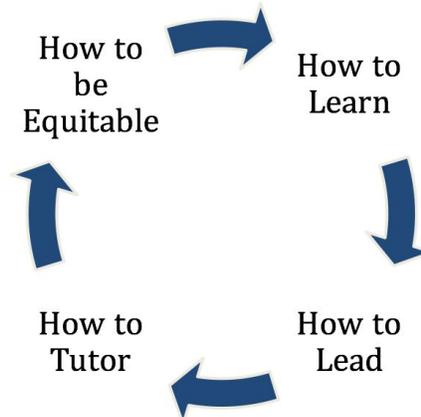
you know but of how hard you work. And that's why you succeed in college, is that you work hard," Snell mused, adding, "And most have completed Algebra II already in high school. At Cuyamaca, students who would have been in a remedial course by the Accuplacer instead are in an applied calculus course and students are doing phenomenally."

Exciting Efforts: The Professionalization of Tutoring: Building a Community for Learning Assistance Professionals Who Support Student Success

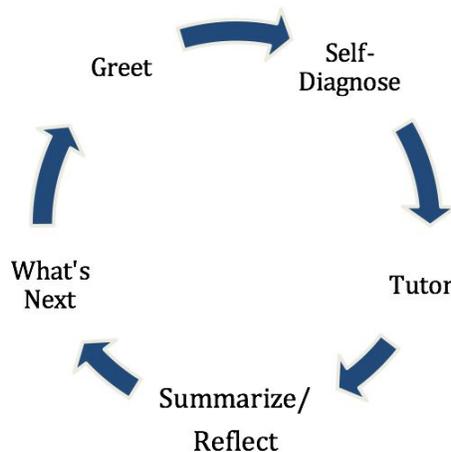
Mark Manasse, Professor and Instructional Learning Assistance Coordinator, San Diego Mesa College

In the Professionalization of Tutoring Cycle, Mark noted, tutors are treated as educational professionals. Principles used in training should be rigorous, practical and sustainable. Instructors and tutors have different but equitable roles. Tutors aren't there to teach or give answers; they're there to guide. The Standards for Tutors should be attainable and challenging and instill the purpose and empowerment in each tutor. Ultimately, Mark said, tutors aren't just there to help with a math problem, but part of something bigger. In the Cycle of Tutoring, the tutor and students are in an expert and apprentice relationship. Tutors are not teaching, giving, or appropriating student work and they are there to normalize and acknowledge confusion for their students. In addition, for embedded tutors, the faculty must train tutors if they want an in-class tutor.

Professionalization of Tutoring Cycle



Cycle of Tutoring



Exciting Efforts: Preparing Students to be Successful in College-Level Mathematics: Examples from Five Senior Level Mathematics Courses

Kyndall Brown, Exec. Director, California Mathematics Project, UCLA; Osvaldo Soto, Director/co-PI, Discrete Math Project, Center for Research in Mathematics and Science Education, SDSU, Trang Vu, Asst. Director, Discrete Math Project, Center for Research in Mathematics and Science Education, SDSU; Joy L. Salvetti, Director, Center for College & Career Readiness, CSUS; Sharon C. Furtak, Asst. Professor, Psychology, CSUS; Ravin Pan, Professor, College of Education, CSUS; Lilian Metlitzky, Professor Emerita, CSUP; Joanne Rossi Becker, Professor Emerita, SJSU, Project Director, Santa Clara Valley Mathematics Project.

Session Description: Participants will learn about five projects, statewide, that were funded to create a senior level math course that, if completed successfully, will exempt students from having to take remedial mathematics at the university level:

- *College Access through Data Science (CADS)*
- *Partnering for Success: SDSU & Sweetwater Discrete Math Partnership*
- *Do the Math: Increasing Mathematics Readiness through Collaboration and Professional Learning*
- *Mathematical Reasoning with Connections (MRWC)*
- *Transition to College Mathematics: A Mathematical Modeling Approach*

See Igniter grants, page 22, for a follow up conversation by Erica Heinzman on these pilot courses.

Exciting Efforts: Restructuring the Math Pipeline for Success

Terrie Nichols, Math Instructor, Cuyamaca College, Tammi Marshall, Chair, Mathematics Department, Cuyamaca College

Terri Nichols is a math teacher at Cuyamaca College (CC), and she discussed the success of the CC Math Pathways program. The CC Math Pathways program had a host of goals: eliminate the

achievement gap, increase the population of students completing transfer-level math courses in less time, and increase the proportion of students who transfer and/or earn a degree or certificate. Terrie noted that there were deep structural biases in placing students into remedial courses throughout the California Community College system, such that students of color were disproportionately placed into non-transfer level courses. In an attempt to meet their goals and address their problems, CC implemented three “high leverage strategies”: 1) they changed placement policies to allow more to enroll in transfer-level math, 2) they accelerated remediation, and 3) they designed and implemented concurrent enrollment support models, also known as “corequisite” models.

Starting in the fall of 2016, CC changed their placement policies, relying more heavily on high school GPA and high school math classes to determine math placement. This vastly improved the percentage of students completing transfer-level math courses in one semester or one year. In order to accelerate remediation, they placed students in math classes with support (ultimately this means that students took 6 units instead of 4 units of math) and had high levels of success. Moreover, they do not have students retake non-transferable math courses if they do not pass them. Instead, they move them to the transfer-level course with support. In other words, they keep moving students forward and give them the support they need. Terri posited that one of the keys to their success was a change in the way they taught math. Math courses at CC are taught in a more problem-based and student-centered manner, which has increased engagement and achievement in those classes.

These changes have seen massive success at CC. One example of that success: while in fall of 2013, just 4% of students who tested into a math class three levels below transfer-level went on to pass a transfer-level course. In 2016—when they implemented the changes—47% of students who initially tested three levels below transfer-level (but then were allowed access to higher-level courses) passed a transfer-level math course in the first semester. By giving more students access to transfer-level courses, more students passed these courses. Terri noted that students work harder and are more motivated when they know they will have access to transfer-level courses. She stated, “if they see the bus they will chase after it and work hard. If they are in a class three levels below transfer-level, they cannot see the bus.”

Afternoon sessions focused on additional exciting efforts and projects throughout the region.

A1: Demystifying Smarter Balanced Assessment

Constantina (Dina) Burrow, Resource Teacher, San Diego Unified School District

In this session, Dina Burrow helped participants understand different grading rubrics and the complexities of grading math problems. She introduced the Smarter Balanced Assessment for math in 11th grade. She argued that the Smarter Balanced Assessment offers a fairer way to assess students based on their answers to difficult mathematical problems, by using a different scoring system. Traditionally, math exams are scored by multiple choice, with one correct answer and no partial credits to the wrong answers. The Smarter Balanced Assessments look at each answer students pick and seeks to understand the students’ understanding accordingly.

More information on the Smarter Balanced Assessment can be found on their [website](#).

A2: Math in the Activity-Based Classroom

Terrie Nichols, Math Instructor, Cuyamaca College

The goal at Cuyamaca College is to eliminate the achievement gap and increase the proportion of incoming students who complete degree level/ transfer level mathematics courses. This was a system change including changing placement policies, placing students into only one year below or directly into transfer-level mathematics courses with accelerated remediation. Students are concurrently enrolled in support classes. For example, students move from pre-statistics to transfer level statistics with support.

Faculty found that if the math is contextualized, students can learn the math. Classes involve working on rich problems in groups of three. While the students engage in productive struggle, the teacher does formative assessment providing immediate support, sending an “ambassador” from the group to another group for support, or mixing up groups to work with different people several times in a class period. (Changing groups is done easily, with each student having a card with an animal, color, number, and letter.) Instructors strategically build a community of collaboration in the classroom, encouraging students to support each other’s learning, and students are rewarded for “cool mistakes” that help everyone learn more.

Instructors, both full-time and part-time, have professional development to change teacher expectations from deficit model “I need to teach them” to capacity-mindset, “let them struggle productively, they can learn,” and to develop classroom management for this very different style of supporting student learning. Faculty meet every Friday to debrief and plan ahead. Instructors work through the upcoming problems, plan what skills or concepts need to be frontloaded, anticipate where students are likely to struggle, and plan for immediate support.

The materials developed at Cuyamaca are available to everyone [here](#).

A3. Empower Your Students! Zero-in on Mathematical Mastery using an Integrated Formative Assessment Cycle

Kim Samaniego, Director CSU/UC Mathematics Diagnostic Testing Project, Director Math Testing and Placement, UC San Diego

This session was led by Kimberly Samaniego, who is a veteran high school math teacher and currently the director of MDTP, a mathematics diagnostic testing project at UC San Diego. She presented her experience using the MDTP formatively for 10th grade students who were repeating Algebra 1 and needed to pass the California High School Exit Exam (CAHSEE). Kim used the MDPT as a pre-post test for CAHSEE preparation because she could access data that tapped into the diagnostics of student thinking. She had shared the MDPT results with her whole 10th grade class, and asked the students to make a segmented bar graph to chart their performance. As part of this process, Kim suggested, “You can have them notice where they have strengths and where they are in a place to offer help to peers, and where they may be in a place to need support and receive help from others.” She also emphasized, “It is negligent of us as educators to assume that just because a student is repeating a 10th grade Algebra 1 class that they don’t know math. They actually know a lot—they’ve had math since kindergarten!”

After identifying their needs based on the assessment data, the students helped create their pathway of focus. For every lesson in the curriculum, Kim asked her students to identify the topic area based on the testing categories. “It was breaking it down into small pieces that they could

identify and remember, 'Hey, I need help with this!' Now students are self-monitoring. It's about shared goals, shared understanding, and developing curriculum together." Kim further noted, "Students can develop really highly proficient error detection strategies if we help with that, by looking for common errors and self-regulation." To develop these skills, she presented a multiple choice problem to her class and asked for their answers. She then provided the correct answer and asked students what errors they had made if they had chosen an incorrect option. Students talked about the problem errors in groups and shared out to their peers. She stressed, "You do less talk. Have them do more talk. You learn they know a lot of math, even if they get the wrong answer. Each answer illuminates a way of thinking conceptually, not just procedurally."

Regarding curriculum development, she encouraged teachers to think about how to implement their own creative conceptual lessons that differ from the procedural lessons a textbook offers. Kim drew attention to research showing conceptual understanding is an important component of procedural fluency. "Fluency means the students can recognize the problem, determine the tool or procedure to apply, and apply that procedure accurately. Conceptual understanding is an important complement because if the student doesn't understand what they are doing, procedural fluency is not going to be supported. When we teach procedures about concepts, we are actually counter-productive to supporting students' understanding."

With this in mind, it is also important for teachers to recognize the relationship between motivation, understanding, and mastery. When students are asked to perform a procedure, they can be motivated by an extrinsic reward, like a grade. But if students are presented with a creative problem to solve, extrinsic rewards can actually *diminish* their motivation. Rather, intrinsic motivation promotes conceptual understanding, because students want to learn the material they find interesting.

With Kim's approach to formative assessment and instruction, the class' average MDPT scores improved for every topic tested, with some students making tremendous individual gains. Her students dramatically exceeded CAHSEE scores from previous years, with 95% of students passing and 86% scoring "proficient." The MDTP is now available online for free, and Kimberly's team offers free trainings to teachers interested in using it in their classrooms.

A4. Assessment and Acceleration: Recognizing Student Capacity in the Data

Bri Hays, Senior Dean, Institutional Effectiveness, Success, and Equity, Cuyamaca College, Bridget Herrin, Assoc. Dean, Research and Planning, Institutional Research, San Diego Mesa College

This session reviewed success data in transfer math courses before/after the implementation of multiple measures for student placement, and discussed the effectiveness of accelerated approaches to increasing student throughput (1 or 2 year). Presenters shared strategies for leveraging institutional research to facilitate these important conversations and to advance collaborative inquiry related to multiple measures and acceleration on their own campuses.

The goal of this session was to explore the impact of placement on community college students' success and completion. Bridget and Bri began by sharing data regarding placement, emphasizing that the majority of California Community College students are placed into non-transferable math courses. Students of color are disproportionately placed into non-transferable courses, creating concerning opportunity gaps. The presenters also outlined "exponential attritions"—a trend in which more and more students fall away along each step in long course sequences, such as remedial math.

Urging educators to view this data as “a call to action,” the presenters called for a shift from placing blame on students to addressing what is wrong with our systems. Bridget explained, “one of the things we know about our assessment process is that it is severely limited in its ability to do what we want it to do, which is to predict if students will be successful in the class we’re placing them into.” Highlighting multiple measures of assessment as an alternative to placement exams, Bridget and Bri shared data from local community colleges demonstrating that the use of high-school level measures has led to significantly more students being placed into transferable courses. The presenters closed the session by encouraging participants to work with their respective research teams to collect disaggregated data on math pathways and placement, and to explore new approaches that may better support student success.

A5. What is Going On @ SDSU? Information on Placement Exams, Supplemental Instruction, and New Teaching Initiatives

Janet Bowers, Director, Math Learning Center, Professor, Dept. of Mathematics & Statistics, San Diego State University

Janet started her talk by asking what SDSU can do better for students in math courses. After some discussion, she noted that a few years back the math department faculty were giving too many DFWs and needed to change. As a result, they began the Precalculus to Calculus II (P2C2) Task force, and via that task force, she noted, six critical changes were made to the math department. Three changes were made within math education broadly: they increased emphasis on active learning, stronger student support, and placement. Three other changes were made to what she called the SDSU setting, focused on using prior data among faculty, increasing communication between faculty, and increasing training and support for TAs.

Faculty now are making a shift toward more active learning. Most P2C2 classes are 150 students or larger and consist of three meetings a week. The SDSU math faculty has made sure that one of the meetings during the week is a breakout group with no more than 30 students who are led by near peer mentors. Regarding student support, these courses also include an optional learning group. They are 1 unit pass/fail sessions of no more than 10 students (from the class) that meet twice a week to work on classwork and sort out any confusion. SDSU also offers Supplemental Instruction (SI) for all students, which Janet noted with a caveat: while SI is supposed to help all students, it tends to draw in more motivated students.

They have also opened a new math and learning center on campus. Regarding placement, they tend to design placement based on whether or not students are STEM majors. Students who want to be placed in Calculus I need to pass the ALEKS assessment and those who do not pass must take pre-calculus. She noted that students who test into Calculus I via ALEKS tend to do better than students who take pre-calculus. She concluded by briefly mentioning that there has been increased communication and collaboration between faculty, and strides made in training TAs. She believed that training TAs in teaching strategies has been extremely helpful in improving math achievement. All of these changes have improved math achievement and instruction at SDSU.

A6. Three Tiered Teaching – Flipping the Class for ALL Students

Alexandra Martinez, Math Induction Mentor, Sweetwater Union High School District

This presentation focused on supporting small-group instruction in a class of 30+ students. Aly Martinez focused on “Three Tiered Teaching,” a small-group instruction method for classrooms with

over 30 students. This session highlighted ways to “flip” IN the math classroom using stations and video lessons. Aly argued that this approach gives students more autonomy in their learning and allows teachers to better individualize instruction to meet the needs of all students. Participants were exposed to different variations of this model to adapt to their own classroom and teaching styles, saw sample video lessons, and explored strategies and resources to differentiate learning by using stations.

Specifically, Aly presented her model of teaching which incorporates different stations catered to different learning styles. Aly was able to notice that her average C student quickly became more involved and became an A student. The traditional model of “warm up, lecture, practice, and homework” works for many students, but not all students. Incorporating the Three Tiered Teaching model, she concluded, can help education professionals provide their students with teaching methods that work for them at an individual level.

A7. Inspiring Algebra Explorations through Paper Folding

Perla Myers, Professor, Mathematics, Director, Access and Community Partnerships, College of Arts and Sciences, University of San Diego; Amanda Ruiz, Professor, Mathematics, Department of Mathematics and Computer Science, University of San Diego

Dr. Perla Meyers and Dr. Amanda Ruiz, both mathematics professors at University of San Diego, led an engaging session on using paper folding to explore principles of geometry and algebra. The audience, consisting of university and community college math professors along with high school math teachers, shared multiple reasons for their interest in the session, from wanting to expand their repertoire of hands-on activities to improving student engagement. Before launching into paper folding, Perla explained the impetus for these activities in math courses - she wants to provide a three-part experience for students: 1) begin with a real situation, 2) lead to abstract manipulation, and 3) conclude with the findings being applied to a concrete representation, which paper folding accomplishes. The first task, trying to answer how many ways you can fold a square to divide the area in half, generated a rich discussion with answers ranging from two folds to an infinite number. Moving on, the audience was directed to make two folds and then share in the small groups questions, observations, and conjectures members had about the folds.

Perla and Amanda used these discussions to a) highlight how there is value in students identifying the problem to be solved and the information needed before solving the problem, and b) to model how to foster deeper discourse with students. In small groups, the attendees sought to prove two paper folds could divide the square into thirds, known as Haga’s Theorem. Concluding the session, Perla shared three reasons for incorporating origami into math classrooms: 1) students engage in the standards for mathematical practice, 2) the activity fosters inquiry-based learning, and 3) students learn how to respond to mistakes constructively, adding the explorations create “opportunities for laughter.”

A8. Logistics of Teaching College Courses at the High School

Jarred Collins, Chair, Accelerated College Program (ACP), Coordinator, College and Career Access Pathways (CCAP), San Diego Mesa College; Sharon Hughes, Professor, San Diego Mesa College; Dawn Swanson, College Counselor, Kearny High School

This was a Q&A session to learn about Math 96 (Intermediate Algebra), a San Diego Mesa College course being taught on a high school campus. The session covered the ways schools can concretely create a community college developmental class at a high school. Counselors and program coordinators from the high school and Mesa College presented in a panel format. There were approximately 15 audience members, mainly K-12, and some community college (e.g. Mira Costa).

Presenters first covered the importance of teaching students the drop date, so they can drop the class before failing (as it has a heavy impact on their financial aid, academic standing etc. at the two-year colleges that can come to haunt them otherwise). For example, at KHS last fall they ran two classes; one had 36 students to start and ended with 24, the other class had 36 students to start and ended with 19. In spring 2017, 40 students took the course with a better understanding of the materials and all students completed it. Overall, 83 students at Kearny completed Math 96 last school year. One key is ensuring the class does not become “a dumping ground” used by counselors to place kids into a course.

So far, the program has successfully cleared the remedial math requirement for 88% of the students who take the class to completion at Kearny.

Some key discussion points from the audience involved how much “dropping” to allow; whether students who have completed Integrated III should go into the course if they aren’t quite ready for Statistics or Precalculus; and how the course should NOT replace Integrated III.

The group also discussed whether Math 96, supposed to be the equivalent to Integrated III, actually is; the panel agreed it was not (UCOP would not approve Math 96 as an a-g course, because it was considered an overlap with Integrated III/Algebra II). The group also discussed the crucial importance of counselors “pushing a fourth year math class.” Others noted that offering Math 96 at a high school is an exposure to a college course in a somewhat “safe” environment of the high school.

Other new models discussed included a new offering of Math 60 inside high schools in collaboration with Palomar College, also targeting the student coming out of Integrated III who needs more support; and, a Kearny offering at Mesa in period 1 and period 4. Attendees noted that community college courses offered at the high school also have the advantage of reducing class sizes among the regular high school math courses, because the contractual agreements mean that the community college offerings CANNOT legally impact hiring of the high school teachers. For example, when 40 students attend community college mathematics and do not take high school pre-calc, the class size is reduced in pre-calc for other high school students.

A9. The Stem Core: A Pathway to Calculus Readiness for Remedial Community College Students

David Gruber, Director, Growth Sector; Duncan Graham, former Vice President of Instruction, San Jose City College; Michael Venn, Asst. Dean of Math and Science, Community College of Baltimore County; Tam Nguyen, Student Support Specialist, San Jose City College

This panel shared Growth Sector’s “STEMCore” program in community colleges, designed with an NSF planning grant. STEMCore works to wrap STEM internships in real careers around the supported math coursework needed to get STEM degrees.

Gabe Hanzel-Sello of Growth Sector spoke of the “gap between skill levels that students come into community college with, and the skills needed for even entry level jobs in expanding engineering

and computer science employment.” He added that “The core skills for employment and STEM degrees are calculus readiness, computational thinking, and foundational level programming, in addition to English/communication proficiency.” And, he added, “employer partners love geometry.”

In San Jose City College, the STEMCore program offers students two simultaneous math courses per semester, accelerating students through necessary math (for example, through both geometry + intermediate algebra, or a sequence of trig + precalculus). These math courses are co-designed by math and engineering faculty who “contextualize curriculum to careers.” Students also enroll in computer programming classes, join a cohort based learning community, and get paid internship opportunities in STEM industries that use math. Over 200 students have been placed in full time, paid, 10-week internships, often funded by Strong Workforce money, according to Hanzel-Sello. “The time to calculus” in the program “is far less,” Hanzel-Sello said. In “nine months, not two years,” students move from intermediate algebra to precalculus, while learning computer science, programming, and CAD.

Duncan Graham, an administrator at San Jose City College, said he initially “wasn't interested in STEM Core” because the college “didn't have computer science/engineering as much – the college's course is really in advanced manufacturing. San Jose is one of the five cities in the U.S. earmarked as an advanced manufacturing center.” But he's now seen that “Kids who haven't been successful in math before” are saying “Not only did I do it, I did it in half the time.” “This investment is pretty cheap and cost effective,” he said. And “Internships are huge: what is better than getting into an internship and figuring out ‘I really love this,’ or ‘I really hate this?’”

Key to the program is students pursuing advanced math making STEM careers possible. “These careers really need the advanced math,” Graham said. “Tesla is looking for facilities maintenance people – that's now robotics. They want students with a foundation in calculus and physics. If I walked into a physics 4A class and said, ‘anyone want to work for Tesla at \$35 an hour?’, community college students would be amazed that they can do this having already completed that requirement.” Many “companies have education reimbursement programs,” he added, “so you can go also get your BA and MA after.”

Michael Venn offered a faculty perspective from a Baltimore community college on teaching the Accelerated Math Program of STEMCore – meaning, “Two math courses taught back to back in the same classroom on the same day with the same professor. It feels like one class but is worth two.” When teaching two classes at once to the same students, he said, “you end up teaching them the higher level class (like college algebra) and remediating just in time the material they are rusty on.” “Remediating on the spot saves so much time,” he said. And to “contextualize” the math, he noted, “the math professor can go to the engineering class once a week and see the solar panel they are designing, and then mention it in his math class without taking too much time from the actual math.” The Intermediate algebra pass rate is now 81% instead of 65% in traditional intermediate algebra courses.

STEMCore students also spend so much time together that they create natural study groups, facilitated and supported personally with workshops, field trips, and counseling by student support specialists like panelist Tam Nguyen. The STEMCore project will next spread to Mesa College, which will “Mesa-ize” it in its own tailored programming.

A healthy debate ensued over the utility of advanced math for actual family-supporting jobs. The group discussed a distinction between the math needed to *do* specific careers, vs the math needed to *get the degree needed* to get the career. Hanzel-Sello noted that one tech company he works with likes to see students completing calculus “not because you might use it in programming, but

because it's a sophistication measure for their successful employees. The calc is a measure for sophisticated analytical thinking -- not that the employee sits and integrates all day."

The group noted that some careers require *degrees* that require math, even as people don't do the math daily in their careers – like doctors, for example. Every computer science major needs calculus, too. So, "if we said only people who were going to use calc in their jobs should take calc," Hanzel-Sello said, "we'd only teach calculus to engineers and scientists who do research using rates of change. But people will still have to take calculus for STEM fields." He offered another example: "In a computer science career you might mostly work with apps or something and not math. But to get the job in the first place, you need the degree that *required* the advanced math -- a BS in computer science, a degree that required advanced math to get the BS. You won't get many STEM jobs with a history degree."

Further, more careers than you might think *do* use math in their everyday jobs. "In a job that does robotics, they want calculus to then fix that robot," said one attendee, while another mentioned an engineer whose "math is all trig."

And in equity terms, "Employers will not move away from wanting BAs most of all," Hanzel-Sello said. "So, we really don't want to remove calculus from the path because a lot of the jobs with family sustaining wages need it and the BA." "Even if you get that job with an AA," he noted, "those jobs will be less stable for people than jobs that required a BA. AA people will be the first to go in downsizing." So, he said, "if we fork too many kids off too early and say, 'do the stats path to just get the BA,' we make it so they could never get many of the growing jobs out there, including AA level degrees that require actual math, like robotics and computing."

B1. More than Meets the Eye: Technology that Transforms Learning

Audrey Mendivil, Mathematics Coordinator, San Diego County Office of Education

In this session, Audrey shared with participants about the technologies used in the classroom. The participants learned about the different ways Desmos can be used to incorporate math lessons. Demos is a free web-based software that encourages learning collaboration between students and their peers. The lessons and features allow students to better engage with materials for Integrated Math and Algebra 2. Participants dove into the underlying pedagogy and the teacher moves necessary to implement Desmos thoughtfully in classrooms. Participants also demoed different features of the program, such as pair-gaming and polygraphs. For more information, check out [desmos.com](https://www.desmos.com) and sign up for free.

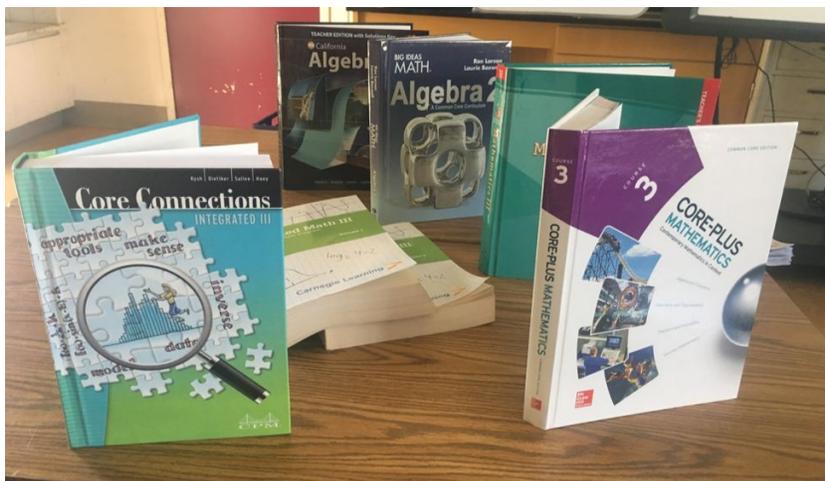
For more presentation materials, see this [Google Document](#).

B2. Textbooks, Standards, and Assessment

Mindy Shacklett, Mathematics Coordinator, Learning and Leadership Services, San Diego County Office of Education

In this interactive session, Mindy facilitated small-group and large-group discussions about how various textbooks cover two standards from Algebra II/Integrated III and Trigonometry. After reviewing both standards, participants worked in small teams to compare the relevant sections of several textbooks. Participants were encouraged to discuss "how students' learning experiences

might be different depending on the textbook” used in their math course. Participants raised several compelling concerns, including: how closely textbook language mirrors the language of the standards; the number of practice problems provided in the text; how heavily computation is emphasized versus interpretation/conceptual understanding; and relevance of problems to real-world situations. Mindy emphasized that no text is a perfect text, and each has its own pros and cons. Because all students will be tested on the standards, it is important for instructors to consider what should be emphasized from the textbook, and what may need to be supplemented. To close the discussion, Mindy pointed participants to resources available on the SBAC website as a potentially helpful tool for aligning instruction with standards.



B3. Math 22: Supporting Math Learning with Entering First Year Students

Jonathon Singh, Lecturer, Department of Mathematics, CSU San Marcos, Professor, Palomar College; Kheng T. Waiche, Asst. Director of Proficiency Services, CSU San Marcos

This session provided information regarding a support session called Math 22 designed to address student learning and approaches to math. Math 22 was developed at CSU San Marcos in 2009 for students completing their math remediation requirement. Math 22 is conducted in a peer-led environment in which student learning is the primary focus.

With 48% of CSU San Marcos students not college math ready, CSUSM created a college bearing math course to be taken with their Math 30 class (Intermediate Algebra). Math 22 takes a peer oriented approach that encourages their facilitators to come up with creative class lectures (e.g., jeopardy group competitions), to cater to different learning styles. Facilitators cultivate an engaging learning style: they sit in the professor’s class, come up with creative ways to address different learning styles, and analyze the “stops” in the lesson and break it down further to the address the issue that is causing confusion.

B4. Advancing Students’ Algebraic Reasoning: The Challenge and Response

Guershon Harel, Professor, Department of Mathematics, UC San Diego; Kim Samaniego, Director CSU/UC Mathematics Diagnostic Testing Project, Director Math Testing and Placement, UC San Diego

Kimberly Samaniego, veteran high school math teacher and director of the Mathematics Diagnostic Testing Project (MDTP), presented with Guershon Harel, Professor of Mathematics at UC San Diego. They have worked to address challenges of under-preparedness for math course enrollment with incoming freshmen at UC San Diego. Appropriate math placement is important, because up to 80% of freshmen enroll in a math course during their first quarter of college. Kimberly noted, "70% of the majors at UCSD require calculus. Algebra II is essential here because you cannot go on to a calculus course without a strong foundation in Algebra II. Of the six colleges at UCSD, five require a math course of some kind. This tells you we have a real need for students to be calculus ready when they come to UCSD."

UC San Diego offers two course pathways for mathematics: the Math 20 series for math, science, and engineering majors, and the Math 10 series, for biology, arts, and social sciences majors. 75-80% of students meet math placement criteria for these classes without taking a placement test, through previous test scores such as the SAT or previous coursework such as Advanced Placement calculus. The students who need to take a placement test may do so on campus or online with a remote proctor. To prepare students for their first quarter of a math class, programs such as Summer Bridge now offer a math component that includes courses for UC San Diego credit, or Extension units for students who need to take a review course. Guershon, who is an experienced pedagogue, also aims to meet underprepared students where they are through developing and teaching the new "Math 2" course of study to address these needs.

Guershon identified the instructional problem UC San Diego is facing, which is, "Implementing a more meaningful course for students who have never experienced real mathematics." He questioned, "What is going on with textbooks and teachers to cause this problem of students coming unprepared? The problem is severe and pervasive." There must be a dramatic shift in math instruction at the university level, he argued, and although UC San Diego has taken responsibility to advance students' skill-building opportunities through the Math 2 course, there has been resistance to remediation from professors who view the issue as trivial. Guershon noted two prominent philosophies: "thinking with basics" and "thinking is basic." The first philosophy represents the more common approach to ineffective instruction: to first teach students the basics and expect the thinking will follow. These instructors believe that without facts first, they cannot teach reasoning. The more successful philosophy, Guershon argued, is a manifestation of the Common Core ideals: believing teaching is a way of promoting mathematical thinking skills. "One of the biggest things about Common Core is that no more are we teaching mathematical content for the purpose of knowing the content itself. There is a way of thinking, mathematical practice, and habit of mind that we want to promote. This is a major revolutionary change," Guershon said. "For this to succeed, our teachers need to be educated in a way that they think in terms of the *ways of thinking*. It is not possible through lecture." He argued that despite all we know about the development of the human cognitive process, this research is ignored in the university classroom. He focused positive instructional examples on the idea of "modeling with mathematics" as one habit of mind. The essence of this approach is to allow the concept to arise from a problematic situation, rather than providing a collection of definitions and asking students to practice a procedure. "How do you bring students to realize there is an actual *need* to deal with this new concept of functions? Rather than defining it, you create a context in which the concept occurs. No definitions yet—you start with an *experience* in a problematic situation. Terminology must always come after conceptualization, always." Guershon concluded with the message, "The jurisdiction of the teacher lies in one thing: to bring intellectual necessity to students. My goal is to shock students to say, 'This is like something I have never seen.' The goal is not just for students to survive in the schools. The goal is for them to flourish and advance into the STEM areas."

B5. Then & Now: Integrated Math III vs. the Old Intermediate Algebra Course

Melody Morris, Mathematics Teacher, Olympian High School, Sweetwater Union High School District

Melody Morris, a math teacher at Olympian High School and 2017 Sweetwater Union Teacher of the Year, shared how Integrated III differs from Intermediate Algebra in standards and pedagogical approach. As a member of the Math Professional Alignment Council, Melody has a unique perspective from her collaboration with Southwestern Community College math professors on the transition from Integrated III to college-level math.

Melody first had the attendees - secondary math teachers, high school principals, and community college math professors - sort a sampling of problems into four categories from Integrated I to higher math in small groups. Many were surprised when Melody revealed where the standards occur in the integrated math pathway. Exponential patterns are explored in Integrated I, complex numbers are introduced in Integrated II, and the unit circle and trig functions are introduced in Integrated III, along with a de-emphasis on simplifying and solving rational expressions. The activity sparked a lively discussion with the community college professors and Melody about what they can expect students to know exiting Integrated III. Next, the audience experienced an inquiry-based approach lesson on solving systems of equations. Melody modeled having students collaborate on problem-solving, represent their thinking in multiple ways, and refine their conjectures. Melody showed techniques of how to challenge student thinking and discussed how conceptual understanding leads to procedural fluency, including when are notes given to the students. Concluding the session, Melody emphasized the reason for the switch to the integrated pathways and Common Core - to build student capacity and find a way into the mathematics! The teacher is no longer the "sage on the stage" but the facilitator for the students to engage in a productive struggle.

For presentation materials, view this [Google Folder](#).

B6. A Path to Quantitative Reasoning: Removing Exit Points in Math Completion (1 of 2) and Dual-Enrollment using Statway Curriculum (2 of 2)

Gina Abbiate, Asst. Professor, Mathematics, San Diego Mesa College; Jon Dolle, Senior Improvement Specialist and Research Lead, WestEd

Presenters noted that there is also a 1-unit bridge course that students can take with the Math 92 in case they want to veer back to a STEM pathway in mathematics. The Math 92 course is 3 hours of lecture and 3 hours of lab, which uses web assignments and is not textbook driven. In addition, the completion rates (below) are far higher than for the traditional math pathway in 96, and with far less discrepancies between White/Asian and Latino/African American students:

Completion Rate of Math 92	
White	70%
Asians and Pacific Islander	71%
Latino	71%
African American	64%

Mesa's newest effort is to figure out how to drop accelerated courses into the STEM pathway as well. They are considering the power of looping students with the same instructor over time via an 8-week course linked to another 8-week course within one traditional semester. They are developing an acceleration pathway as well that takes young people from Intermediate Algebra to Trig to Pre calc in one year.

Multiple measures will likely send more kids directly into intermediate algebra and statistics right away, noted presenters. However, the problem is that many other STEM subjects have math pre-requisites for their courses. So, those departments decide on placement policies regarding math; multiple measures for math course placement will not affect other departments' policies.

The program worked for a long time with the Carnegie Foundation (10 years) on "statway/quantway," and now is working on dual enrollment courses for high school seniors and a "bridge to STEM" curriculum that would help bridge quantway/statway students back to STEM pathways should they want that. Courses in general focus on productive struggle, explicit connections, deliberate practice, and productive persistence, plus lots of language and listening supports for English learners and consistent, engaging curriculum/instruction.

Math 92 is currently working at Southwestern, San Diego City College and Miramar and aiming to build new community college to high school partnerships via the College Futures Foundation to bridge statway into high schools. This is not about replacing AP Statistics in high school, presenters emphasized, but rather about getting students who are struggling in Intermediate Algebra another shot at the math. Lastly, the session talked about the "three legs of the stool": 12th grade math, college and career supports, and scaling and improvement capacity.

The audience discussed issues and questions, including tracking as a potential danger. (As one person put it, "I have had a knot in my stomach all day.") Getting rid of CSU remedial math placements seems like "the easy way out," this person noted, even as supports are necessary for "all the students who despite repeated efforts never seem to be able to get out of Intermediate Algebra."

B7. Implementing Standards for Mathematical Practice

Leah Kosmos, Resource Teacher, San Diego Unified School District

In this session, participants dove into the Standards for Mathematical Practice and learned how to use them in the classroom. The group did a jigsaw reading of the Mathematical Practices from the California Framework and then presented a summary of each MP to the whole group. Leah shared a handout on the Mathematical Habits of Mind, and Mathematical Habits of Interactions that she uses in planning her instruction and coaching other teachers. Each pair of participants worked together to identify which Mathematical Practices were involved in each habit. She asked the group to consider the order of the Mathematical Habits of Interactions and how that order supported student learning. The group then worked on a challenging math problem in pairs and made connections to the Mathematical Practices and Habits.

One participant commented, "I've used the Mathematical Practices in planning for instruction but never made them explicit to the students. I will post the practices and have students discuss which practices they are using."

B8. The Next Class: What Skills are Universities Hoping College Algebra Students Will Learn

Maria Zack, Professor and Chair, Department of Mathematical, Information and Computer Sciences, Chair, Department of Physics and Engineering, PLNU; Ryan Botts, Assoc. Professor, Mathematics, PLNU; Greg Crow, Professor, Mathematics, PLNU; Catherine Crockett, Assoc. Professor, Mathematics, PLNU

In a session on the skills college professors hope students arrive with, professors from Point Loma Nazarene University engaged the audience in doing a lively series of math problems from their own classrooms. The focus was on supporting students *not* pursuing STEM degrees, as “only about 30% of our students are STEM majors. The other 70% are doing something else.”

Said Ryan Botts, “lots of students put off taking their stats class until junior or senior year – at that point, the last time they had math was high school, or even their junior year in high school. Now it’s been 6-7 years. They’re thrown in a classroom where the amount of class time is nowhere near the amount of time needed to (go back over) all the material.”

At these moments, said professor Maria Zack, “the skills we are looking for in students who are not on the STEM track is a little bit of procedural knowledge, but also the ability to ask clarifying questions, to experiment, to try methods and check results. They also need the basics -- graphing a line, and algebra. They need the ability to use a formula if we give it to them. Teamwork. The use of Excel to do simple formulas. And they need reading, reading, reading, reading, reading, reading. We often need to teach students to read, in the sense of showing them what to look for in reading a problem.”

Igniter Fund Awardees

Dina Burow, High School Math Coach/resource teacher at San Diego Unified School District

I have a group of high school math teachers (Capacity Builders) that meet every other month to discuss and problem solve issues at the high school level concerning IM3/Algebra 2 and the transition to college. Having John Hetts come to one of these meetings and discuss his data about GPA's and readiness exams would greatly benefit math departments district wide here in San Diego.

Dina Burow, Adjunct Professor at San Diego State University

I teach a class at SDSU for math majors who are considering going into secondary education. Part of the requirement of the class is to do two hours of tutoring. After attending Mark Manasse's session on "The Professionalization of Tutoring" I believe this would be extremely beneficial for my students to attend one of his tutor training sessions. What a wonderful experience for the college students and the high school students.

Nemie Capacia, Co-Chair, Math Dept. at Grossmont College

A group of us from the Grossmont math department went to the STEM Core session last Friday and we would like to get more information about this program. We are piloting our accelerated algebra for Stem majors class and reviewing our Precalculus curriculum this semester to improve the pathway for our STEM majors. Providing support and internship opportunities to our STEM majors will enhance this pathway. We would like to invite Gabriel Hanzel-Sello (Program Manager) from Growth Sector and someone from a college who has been implementing the STEM core program to

come to our college for a presentation. We heard that Jeff O'Connell from Ohlone College is available for this. Jeff has taught STEM Core for 3 years and will be a good resource for us.

Cate Challen, High School Math Teacher at High Tech High Media Arts

High Tech High is a project-based learning school focused on giving all students the opportunity to attend college. The school was initially established to help encourage students into STEM fields by giving them the skills to think deeply about real-world problems and to find and evaluate solutions. High Tech High's educational paradigm can be at odds with the experience students will have when they enter college. I hypothesize that at least part of the struggle is exacerbated by placement into a low level math class based on a standardized test, rather than their ability to persevere through challenges. I also speculate that the learning environment in a first year college math class can be isolating and entirely foreign compared with the small, discussion group based classes these students are familiar with. I am curious to learn more about the utility of multiple measures for math placement as a predictor of success in college math. I would also like to understand changes to the math course pathways at various colleges so that we can share this information with students. I would like for Tammi Marshall at Cuyamaca College and Janet Bowers at San Diego State University to visit our High Tech High Media Arts math department and college counselor (6 people) to share their experiences and data about the changing environment for math placement and math pathways at two-and four-year schools. The funds requested would cover the cost of two separate catered lunches at our school site in Point Loma.

Cate Challen, High School Math Teacher at High Tech High Media Arts

I am a high school mathematics teacher and I am trying to encourage students to become interested and more knowledgeable about the world of mathematics beyond classroom content. My primary plan for doing that this year, is through a project where students investigate a mathematical concept and/or mathematician of interest to them, explore some problems involving that math, and then present their work, including new mathematical content they have learned. The process will run throughout the semester and give students the chance to think deeply about new mathematical content, and engage in discourse to make sense of it and to understand its relevance. The key objective is to help students see the relevance of math, but also to teach them how to learn new content using resources that will be helpful in college - for example study groups, tutors, experts, plus online resources. Many students transitioning to college level math struggle because the support systems can look quite different to what they're used to in high school. I want to help them develop the tools they need to be successful on their own. I could have the students present to their class, but I really want to give them a more critical and authentic audience. I am looking for mathematics professionals to help students make sense of the math as they explore their topics and to be an audience for final presentations. Funding would be used to meet with local community college staff/students and connect them with students as expert tutors through connections at local colleges including Mesa, Cuyamaca, Pt Loma Nazarene and SDSU. Funding would also be used to host a panel of experts (for example Tammie Marshall, Amanda Ruiz, Myra Snell, Jonathan Singh, Jesus Jimenez, Greg Crow) at our school to receive and respond to student presentations.

Stacy Eyton, High School Math Teacher at Vista Unified; Mission Vista High School

I would like to request up to three teachers from Mission Vista High School to meet for lunch or early dinner with up to three professors from Palomar College AND MiraCosta College. Initial conversations and agreement have already been made between me and Palomar Professor Mark Clark. We would like to bring in professors from Mira Costa (Leila Safaralian and Polo Mariscal). Our school sends students to both colleges (although Palomar is our District) so we would like to see how to best place students according to content covered when they go between systems. We would

look at the course descriptions and discuss the content covered to develop some sort of document that will help each of us understand what sequence is used and which of our courses are "equivalent." For example, I had to work today to try to figure out where a student could be placed at our high school who took Math 60 at Palomar.

Erica Heinzman, Lecturer / Supervisor in Secondary Education at UC San Diego

I'm intrigued by the five fourth year math pilot courses. Research shows that if students take four years of math in high school, they are a more competitive applicant for selective universities and are more likely to complete a post-secondary degree. In terms of equity, opening access to high quality fourth year math experiences can positively influence student success and outcomes, especially for those traditionally underserved. I would like to meet with Marcia Trott, Zee Cline, and Neal Finkelstein (PI's and evaluator) about the pilot courses. A few of the pilot courses have been running and others began this year. I'm interested in knowing the initial results. Are more students taking four years of math? How are these students faring when they attend a postsecondary institution? Also, are these courses encouraging more to pursue STEM majors? Given the innovative nature of the courses and highly engaging contexts, I'm also curious to know if the perceptions toward math changes for students enrolled in these courses. Do the students in these fourth year math experiences view math as more relevant and useful? At the conclusion of the pilot, the curriculum for these five courses, which have A-G approval already, will be published through a creative commons license. Thus, the only start-up cost for a district or school would be teacher training. Assuming these courses show great initial promise, which was hinted at during the presentation, I would love to get them into high schools far beyond the pilot sites. I would like to plan a day, coordinating with Marcia Trott, Zee Cline, and Neal Finkelstein, along with Mindy Shacklett from the county office of education, where district and charter secondary math specialists could come learn about the theory behind the five courses, initial outcomes, and practicalities of implementing one of the courses (i.e. during the presentation each of the pilots talked about the professional development for teachers). This way, many more students in the region could have access to a high quality fourth year math experience, which in the end would hopefully broaden opportunities and improve outcomes for students. I would spend the funds on meeting with PI and evaluators for the pilot study and planning the one day event.

Tali Lerner, Math Teacher at IDEATE High Academy

To improve Integrated III I hope to learn more about applied mathematics in science and especially data science for biology or environmental research. I hope to use the money to travel to and meet researchers and teachers who teach math functions and differential math as a way to do deep investigations into data. I hope to use the time to design and prototype a project with a lab or museum in San Diego that the kids would be able to work with in the following year. The money will cover travel and prototyping of the project and product.

Philip W. Liburd, Community Organizer at Liburd & Associates

I want to do a series of three outreach sessions for educators, parents, students, athletic coaches and community leaders. The objectives will be to use data that shows the disproportionate level of performance in math of students in the San Diego Unified School District sub district E. Each session will be two hours, and will include PowerPoint presentation and questions and comments. First session will be to show the data and solicit solutions, second session will be to implement recommendations, final session will be to make assessments and establish partnership with San Diego Community College and UCSD/CREATE for medium and long term support. Funds will be used for materials, refreshments and marketing.

Alexandra Martinez, Math Induction Mentor at Sweetwater Union High School District

SUHSD Induction/Curriculum would like to host an after-school "Twilight Session" where Southwestern's Sylvia Nadalet, co-chair of math dept. and SDSU's Janet Bowers, Director of the Math Learning Center, would be invited to share with SUHSD teachers their response to the "Zeroing In: Defining the Problem at the Institution Levels" questions. Teachers invited through SUHSD induction and Curriculum would be invited to ask questions about the changing dimensions of this landscape. Funds would be used for compensating teachers for one hour of extra duty. \$500 would fund 11 participants. SUHSD Induction will cover any additional participants for their hour of extra duty if more teachers attend. The hope of induction is that this will open the dialogue and further the conversations on these topics at sites.

Alexandra Martinez, Math Induction Mentor at Sweetwater Union High School District

Rancho Del Rey Middle School math department is interested in learning more about flipping the classroom from Alexandra Martinez, math induction mentor. Recently a teacher at our site, Kristie Green-Bannister, shared that flipping the classroom might support the success of all students through differentiation of problems and extending ideas. Flipping the classroom can build interdependency because it promotes student self motivated study and research skills. We are interested in learning about how it can work in different environments and with our iPads and data that demonstrates the power of this strategy. We would like to use funding for taking interested members of the math department to lunch during a Friday minimum day. We will find a location where she can present and we can eat lunch. We expect cost per person to be around \$25, which would mean funding needs would total \$325. The event would occur this semester, but preferably this quarter on a Friday afternoon. Jesus Silva-Ibarra is the induction candidate pursuing this grant and will be contacting his department chair, Casey Jones and Principal Juan Ulloa.

Alexandra Martinez, Math Induction Mentor at Sweetwater Union High School District

San Ysidro High School Math Dept. is interested in having Audrey Mendivil share her session regarding "More than meets the eye: Technology that Transforms Learning" and Desmos Activity Builder. They are interested in seeing how this technology can be leveraged to engage students in conceptual understanding and also to better understand the teacher moves that can augment this tool. The site leader in bringing this session to SYH is Christian Welch, an integrated Math I teacher and induction candidate. The plan is to invite Audrey during one of their Pro Hour Fridays (late start Friday) and do the session in the morning.

Alexandra Martinez, Math Induction Mentor at Sweetwater Union High School District

Sweetwater Union High School IM3 PLC (as represented by Omar Polanco, IMIII teacher and induction candidate, would like to have an after school session brought to their site to support their goal of engaging students in rich activities that build conceptual understanding in IMIII. As they weren't sure which math leaders would be able to visit their site from 3:00 - 4:00 pm, they are interested in three possible options. I plan on contacting them in the order of their preference (as listed below) to facilitate this meeting. SUHSD would like to use funding for extra duty funds for teacher participants (about 5 teachers), for reimbursing mileage for the presenters, and coffee/snacks for the event. They estimate \$320 (\$220, up to \$50 for mileage, and \$50 for coffee/snacks). Our choices will be: Math in the Activity-Based Classroom by Terrie Nichols, Math Instructor, Cuyamaca College; Tammi Marshall, Chair, Mathematics Department, Cuyamaca College; More than Meets the Eye: Technology that Transforms Learning by Audrey Mendivil, Mathematics Coordinator, San Diego County Office of Education and; Advancing Students' Algebraic Reasoning: The Challenge and Response Guershon Harel, Professor, Department of Mathematics, UCSD; Kim Samaniego, Director CSU/UC Mathematics Diagnostic Testing Project, Director Math Testing and Placement, UCSD

Alexandra Martinez, Math Induction Mentor at Sweetwater Union High School District

Hilltop Middle School, as represented by their math resource teacher Angel Prado, Math 7 teacher and induction candidate, would like to invite Audrey Mendivil to their site on one/two Fridays (based on the availability of the presenter) from 2 - 3 or 2 - 3:30 to do a version of her session related to Desmos. They are specifically interested in a session that supports both sides of the spectrum (Desmos for Beginners and Desmos for Ninjas). Angel believes that by supporting his math teachers in integrating Desmos (the official SBAC calculator and powerful conceptual tool) in their day to day lessons will support students in developing long lasting understandings in graphical representations into their high school and higher level math years, if started in the critical years of Math 7 and Math 8.

Silvia Nadalet, Co-Chair Math Dept. at Southwestern Community College

We would like to organize a meeting of all community college math chairs in the SD county region. The meeting will occur in September and we will be discussing the acceleration pathways/strategies that each college is using. We will share the challenges that each of the community colleges is facing and how we will work to resolve them. In addition, we will discuss how we can improve articulation between our feeder high schools and the 4-year colleges in our area. The main goal of this gathering is to improve the communication and strengthen the relationship between the colleges by continuing to meet at least once every semester. The funds we are requesting will be used to facilitate our lunch meeting (i.e., food for approximately 12 faculty chairs).

Ivette Sanchez-Gutierrez, Mathematics English Learner Instructional Specialist at Sweetwater UHSD

UHSD Curriculum and Instruction/ Equity and Culture (5) lead teachers and admin would like to host 2-3 lunches or dinners with university partners from UCSD CREATE (Dr. Mica Pollock and Dr. Susan Yonezawa) and SDSU CRMSE (Dr. Janet Bowers) in San Diego to analyze distribution of grades for Latino and non-Latino students in SUHSD in all core content areas (data already gathered and coded). Discrepancies are visible. What next steps, questions and course of research can be taken to investigate the root causes of these discrepancies? In light of Dr. John Hetts presentation on the correlation of grades and higher education success, we feel that investigating the misalignment of grade distribution is vital and imperative. In addition, we feel that this may provide a focus for future conversations in our district and our San Diego Math Network grant. What is the best way to go about this research and how can learnings be shared with key stakeholders at the district level and at site-level?

Ovie Soto, Director, Discrete Math Project, Center for Research in Mathematics and Science Education, San Diego State University

Janet Bowers, SDSU, and I would like to have a follow-up conversation about the Sweetwater/SDSU Discrete Math Partnership. As you know, the Compact for Success guarantees admission for Sweetwater students who meet certain qualifying constraints. Our conversation will include: examining some examples of the course materials and students' difficulties, describing the course's intended/associated teaching practices, and which courses at SDSU students should take after this course (i.e., placement). I'm sure other relevant issues will arise as we talk, especially given the recent changes in CSU's remediation policies. I believe this interaction will be mutually beneficial and ultimately, Sweetwater's students will be better equipped to succeed as they transition between institutions. This conversation will begin with a planned lunch, but likely continue beyond that. For this meeting, we are requesting \$50 to cover expenses.

Thank you for attending!
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