Welcome and Introductions

- Overview of E3 and MSMP Goals
- Highlights of 16-17 Program
- Overview of 17-18 Program
- Future Work
Pathways of Promise: Middle School Math Acceleration

Christine Selle
Deputy Director, P16 Strategic Initiatives
E3 Alliance

The Central Texas education system will be strong and aligned, enabling each student to succeed from “cradle to career,” thereby ensuring regional economic prosperity.

E3 Alliance uses objective data and focused community collaboration to align our education systems so all students succeed and lead Central Texas to economic prosperity.

E3 Alliance serves as the Central Texas regional P-16 Council

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Gaps in Higher Education Outcome Rates by Highest Math

Outcomes of Students in HS for 4 Years, Texas 2006 First Time 9th Grade Cohort

- Graduate High School: 92%
- Enroll in Higher Ed in TX: 92%
- Persist in Higher Ed 2nd Yr: 56%
- Complete Higher Ed in 6 Yrs: 40%
- Major in STEM or Healthcare: 18%
- Highest High School Math: 92%

Source: E3 Alliance analysis of PEIMS data at the UT Austin Education Research Center

6/8/17

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Source: E3 Alliance analysis of data at the UT Austin Education Research Center
Gaps in Higher Education Outcome Rates by Highest Math
Outcomes of Students in HS for 4 Years, Texas 2006 First Time 9th Grade Cohort

Wide Variation in Algebra I in 8th Grade Algebra Over Time is Clarion Call for Focused Strategies like MSMP
Percentage of Central Texas Students Enrolled in Algebra I in 8th Grade

Source: E3 Alliance analysis of PEIMS data at the UT Austin Education Research Center © E3 Alliance, 2017
Enrollment Gap Exists Even for Non-Low Income Black & Hispanic Students
Percentage of Students in 2012 Texas 5th Grade Cohort Enrolled in Algebra 1 by 8th Grade

<table>
<thead>
<tr>
<th>Group</th>
<th>0% - 18%</th>
<th>18% - 39%</th>
<th>39% - 58%</th>
<th>58% - 77%</th>
<th>77% - 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Low Income</td>
<td>White</td>
<td>Hispanic</td>
<td>Black</td>
<td>Asian</td>
<td></td>
</tr>
<tr>
<td>Low Income</td>
<td>16%</td>
<td>19%</td>
<td>14%</td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td>Non-Low Income</td>
<td>White</td>
<td>Hispanic</td>
<td>Black</td>
<td>Asian</td>
<td></td>
</tr>
<tr>
<td>Low Income</td>
<td>31%</td>
<td>23%</td>
<td>26%</td>
<td>73%</td>
<td></td>
</tr>
</tbody>
</table>

Using Quintiles to Study Outcomes of Students Most Prepared in 5th Grade Math
On track for CCR

<table>
<thead>
<tr>
<th>Quintile 1</th>
<th>Quintile 2</th>
<th>Quintile 3</th>
<th>Quintile 4</th>
<th>Quintile 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent range</td>
<td>0% - 18%</td>
<td>18% - 39%</td>
<td>39% - 58%</td>
<td>58% - 77%</td>
</tr>
<tr>
<td>Scaled Score range</td>
<td>&gt; 1700</td>
<td>&gt; 1600 and &lt;= 1700</td>
<td>&gt;= 1542 and &lt; 1600</td>
<td>&gt;= 1475 and &lt; 1542</td>
</tr>
<tr>
<td>Score Meaning</td>
<td>Advanced Standard</td>
<td>Passed - Bubble</td>
<td>Passed</td>
<td>Most Passed</td>
</tr>
<tr>
<td>Number of students in Texas</td>
<td>62K</td>
<td>70K</td>
<td>66K</td>
<td>66K</td>
</tr>
<tr>
<td>% Low Income Texas</td>
<td>37%</td>
<td>54%</td>
<td>64%</td>
<td>72%</td>
</tr>
</tbody>
</table>

Three-Fourths of Students at Advanced Standard in 5th Grade Reach Algebra I by 8th Grade
Percentage of Texas Students Enrolled in Algebra 1 by 8th Grade by Quintile on 2012 5th Grade STAAR Math

<table>
<thead>
<tr>
<th>Quintile Ranking on 5th Grade STAAR Math</th>
<th>1st (Advanced)</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Enrolled</td>
<td>75%</td>
<td>40%</td>
<td>17%</td>
<td>7%</td>
<td>3%</td>
</tr>
</tbody>
</table>
2/3 of Low Income Students at Advanced Standard for 5th Grade Math Were in Algebra I by 8th Grade

Percentage of Texas Students Enrolled in Algebra 1 by 9th Grade by Quintile on 2012 5th Grade STAAR Math

How Can We Serve ALL Of Our MOST PREPARED STUDENTS?

How Can We Better Guide and Support BUBBLE Students?

Lower Proportion of Black and Hispanic Students at Advanced Std in 5th Grade Enrolled in Algebra 1 in MS

Percentage of 2012 Texas 9th Grade Cohort Enrolled in Algebra 1 by 8th Grade by Quintile on 5th Grade STAAR Math
Lower Proportion of Black and Hispanic Students at Advanced Std in 5th Grade Enrolled in Algebra 1 in MS
Percentage of 2012 Texas 5th Grade Cohort Enrolled in Algebra 1 by 8th Grade by Quintile on 5th Grade STAAR Math

Key Take-Aways
• Higher levels of math ‘matter’
  ▪ Math BEYOND Algebra II is key for higher education enrollment
  ▪ College Level Math drives higher education completion and STEM/IT workforce needs
  ▪ Work must begin earlier in the path, ensuring that in middle school students have opportunities to maintain and improve their achievement
• Equity gap in accelerated pathways persists even with our BEST prepared Black and Hispanic students

How Do We Get There?
• 8th Grade Algebra 1 as Lever of Change to ensure more students => especially low-income and minority
• Ensure that all 8th grade math classes are developing algebraic thinking
  1) take 4 years of math in HS, AND
  2) take as much advanced math as possible
  3) keep students in math, and support success in all math classes
How Do We Get There?

• Re-evaluate, examine policies in Elementary School and Middle School for:
  ▪ How identification of students to accelerated math pathways is conducted
  ▪ All teachers of all math classes need to be well-prepared to teach all students
  ▪ Recommendations under development by PoP Steering Committee

How Do We Get There?

• Middle School Math Partnership
  ▪ Designed to provide support for all middle grades teachers
  ▪ Drive improvements for
    - BEST prepared,
    - “Bubble” students,
    - and LEAST prepared.
  ▪ Focus on teacher knowledge, beliefs and instruction.

Pathways of Promise: Middle School Mathematics Partnership

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UT-Tyler

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Coordinator for Math Initiatives-TRC
Center for STEM Education
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"Pathways of Promise (PoP) is a research and implementation initiative in Central Texas designed to identify and scale strong college and career pathways for high school students that lead to successful transitions to and completion of a post-secondary credential."

5 Central Texas Districts:
- Bastrop ISD
- Elgin ISD
- Del Valle ISD
- San Marcos CISD
- Austin ISD

13 Middle/Intermediate Schools:
- Bastrop Middle School
- Bastrop Intermediate School
- Cedar Creek Intermediate School
- Cedar Creek Middle School
- Goodnight Middle School
- Miller Middle School
- Elgin Middle School
- Del Valle Middle School
- Dailey Middle School
- Ojeda Middle School
- Sadler Means YWLA
- Gus Garcia YMLA
- Bedichek Middle School

Goals of MSMP Professional Development:
- Support teacher content knowledge
- Increase use of problem solving lessons that focus on student thinking
- Reflect on beliefs about mathematics
- Focused, sustained professional development
- Student Achievement
  - Rich problems
  - Student engagement
  - Knowledge of student thinking
  - Purposeful questions
Goals for 2016-17

- What counts as problem solving?
- What is algebraic reasoning?
- What is proportional reasoning?
- What kinds of tasks support students’ understanding of algebra and proportionality?
- How do students solve and think about these problems?
- How can we make use of our PLC/planning time to help each other learn about problem solving lessons and formative assessment?

2016-17 Highlights

- Held 6 face to face Professional Development Days
- Teachers attended 2 embedded days
- 1 final evaluation and summary day
- Conducted 3 PLC visits per school
- Total of 54 hours of PD for teachers
- On average we had 90% attendance rates for all events.
John and Debbie by the Numbers

- 21 days of PD, approximately 160 hours
- Road Miles:
  - Debbie: 1050
  - John: 7 trips, at 528 miles round trip....

John Wins!

3,696 Miles or a trip to California and back!

Professional Development
2016-17 Content

Non-Routine

Proportional Reasoning

If each side of each shape is 1 unit, what rule could be used to determine perimeter of the 100th shape in the sequence?

Looking at Student Work

Planning Lessons for Problem Solving
The Embedded Lessons

Intensive Content Study → Intensive Child Study → Purposeful Observation (s)

Successes and Challenges

Mathematics Knowledge for Teaching

- We utilized a well-researched instrument developed by the Learning Mathematics for Teaching Project.
- Pre-assessments were given during the Summer Institute.
- Post-assessments were administered after all PD was final.
What did you know then and what do you know now?

- We asked teachers to look back and see how much they knew compared to how much they know now about content, students and instruction.
- We assessed each content area separately.
Teacher Beliefs (Swan, 2007)

- **Transmission** orientation views mathematics as a series of 'rules and truths' that must be conveyed to students and teaching as 'chalk and talk' followed by individual practice until fluency is attained.
- **Discovery** orientation views mathematics as a human creation and encourages students to learn through individual exploration and reflection, while the teacher adopts a reactive, facilitating role.
- **Connectionist** orientation views mathematics as a network of ideas that the teacher and student construct together through collaborative discussion.

Beliefs in Teaching and Learning Mathematics

Instruction

- Student-Centered classrooms include lessons that bring student thinking and decision making to the forefront.
- Teacher-Centered classrooms feature an overall environment focused on control, and most decisions are made by the teacher.
- Most classrooms have a mix of both.
Instructional Practices Trending to More Student Centered

Teachers' Perceived Practices

Teachers Evaluation of the MSMP Program

- We asked the teachers to tell us about their experience in the embedded day.
  Overall, on a scale of 1 to 5, teachers rated the student interview activity as 4.25, and they rated the lesson observation as 4.44.
- We asked teachers to report on how they were using the problems we have been discussing. Teachers self-reported that they used (on average) 6 high demand tasks with their students between October and the January Embedded Day class.

“What did you learn about your students’ thinking?”

- I learned that some students I “consider lower” made the dots problem seem easy, while my “stronger” students struggled mightily. It’s interesting to witness the change in student success with non-routine questions.
- I learned a lot about ways to ask my kids questions that don’t give them too many hints.
- High level of engagement. Strategies for patterns and relationships, preparation of delivery is very important for structure and understanding of the task. Enjoy the different perspectives and sharing during class.
Some Challenges

- The time since October has been very tight--according to the planning calendar. I just have not had the time to work in these bursts.
- Time does not allow for the algebraic thinking type burst. It is easier to implement proportional relationship problem during warm-up times.
- Students have multiple ways of solving problems. It is interesting and is actually authentic learning. But given no support to try these lessons from administration, due to lack of time and district expectations, I feel this has not been as useful as it should.

2017-18 MSMP

5-Day Summer Institute

- August 3-4th and August 7-9th, 2017
- ACC Highland Campus (?)
- Content Focus:
  - Geometric Thinking,
  - Reasoning About Statistics,
  - Financial Concepts and Problem solving
- Solve problems, study student work, study instruction, planning instruction
What Counts as a Problem?

What Counts as Problem-Based Instruction?

What do we mean by Problem-Based Instruction?

- Problems defined as something in which the solution is not immediately known
- Tasks are usually posed by the teacher
- Solutions are devised by the student
- Discussion involves decisions about solving the problems
- Teachers and students spend more time on problems
- The process should reveal more student thinking than traditional instruction

PrBL

“students work with classmates to solve complex and authentic problems that help develop content knowledge as well as problem-solving, reasoning, communication, and self-assessment skills.”


Next Steps-Practical and Business Items

- Teacher and Principal Commitment Letters
- Stipends, Substitutes
- Calendar
- Assessments
- Make-Up Day
- Communication: we need your help, and
- We will send reminders via emails and postings in the Google+ Community (https://plus.google.com/u/1/communities/112954140457844204455)
More Successes and Opportunities

- CAMT 2018
- NCSM presentation submitted
- CGI Conference Accepted
- Student Data
- Future Grants?
- Proportional Reasoning Teacher Knowledge Study (NSF)
- What are your needs as far as investigating Math issues at your schools? How can we support that?

Questions?

- Contact Us:
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  - John Lamb: jlamb@uttyler.edu