HOW THE NEW MATHWAYS PROJECT ROCKED MY WORLD!

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Webinar for CRLA (Texas Chapter) and TADE
SESSION GOALS --

Participants will:
- leave more informed about The New Mathways Project with ways to learn more,
- look at data
- hear from emotional students of how this has changed their lives,
- understand how to get started with potential implementation on their campus, and
- continue to ask me many questions after the session is over (infinity and beyond)!!
ABOUT ME!

I am in my 27th year of education and year 25 was the year I participated in The New Mathways Project and it rocked my world! I am a dedicated, traditional algebra teacher and have received awards for teaching, but when I taught the Foundations of Mathematical Reasoning (FMR) and Statistical Reasoning (SR) courses during 2013-2014, they were transformational game changers in my life and in my students’ lives.

rocks my world --when someone/something makes life so much better (urbandictionary.com).
**The Dana Center Mission**

How can we enable all students—especially those who are underserved—to achieve postsecondary success? This question guides our work to develop education tools and resources that are worthy of those we serve.

“The accident of where students live should not limit their access to an excellent education or their ability to pursue their dreams.”

—Uri Treisman, Executive Director, Charles A. Dana Center, 2012
The reason I love this class is because of the **real situations** that we use for a basis of the problems we encounter. Some of these circumstances you might run into in the public/work and the class and the info we cover will come in handy!
The New Mathways Project: 4 Fundamental Principles

The NMP is a systemic approach to improving student success and completion through implementation of processes, strategies, and structures based on four fundamental principles:

1. Multiple mathematics pathways with relevant and challenging math content aligned to specific fields of study.
2. Acceleration that enables students to complete a college-level math course more quickly than in the traditional developmental math sequence.
3. Intentional use of strategies to help student develop skills as learners.
4. Curriculum design and pedagogy based on proven practice.
What is the “right math”? 

Associate's Degrees Awarded 

- Require calculus 23% 
- Do not require calculus 77% 

Bachelor's Degrees Awarded 

- Require calculus 38% 
- Do not require calculus 62% 

Estimations based on data from the Texas Higher Education Coordinating Board, 2013: Degrees Earned by CIP code.
What is the “right math”? 

Students Who Take College Algebra 

- 60% Take Business Calculus 
- 30% Do Not Take Any Form of Calculus 
- 10% Virtually no students who pass college algebra ever start Calculus III, which is a key course for STEM majors. 

Choose the right path.

Math is not a one-size-fit-all. Check with your advisor to see which path is the best fit for you.
Contemporary Math
Math 1332
If your career is:
- Humanities
- English Literature
- Language
- Music
- Art

Statistics
Math 1342
If your career is:
- Health Occupations
- Social Sciences
- Behavioral Sciences
- Social Work
- Criminal Justice
- History
- Political Science

Finite Mathematics
Math 1324
If your career is:
- Business
- Finance

College Algebra
Math 1314
If your career is:
- STEM
- Natural Science
- Computer Science
- Engineering

STOP

Math 0310
Planned Pathways

- For 2013-2014 = Statistics Pathway – FMR (Math 0309 with prealgebra prerequisite) to Math 1342 (Statistics)
- For 2014-2015 = Quantitative Pathway - Add FMR (Math 0309) to Math 1342 OR Math 1332 (Liberal Arts / Contemporary Math)
- For 2015-2016 = STEM-Prep Pathway - Continue with the two above. Add a co-requisite bridge course for continuation in college algebra called Reasoning with Functions I.
Curriculum Completion Data: Fall 2013-Spring 2015

Foundations
- Colleges: 23
- Students Enrolled: 1839
- Passing with A, B, or C: 63%

Statistics
- Colleges: 10
- Students Enrolled: 561
- Passing with A, B, or C: 74%

Quantitative Reasoning
- Colleges: 4
- Students Enrolled: 197
- Passing with A, B, or C: 73%

Frameworks
- Colleges: 11
- Students Enrolled: 3094
- Passing with A, B, or C: 76%

RF1
- Piloting Spring 2016 at 4 colleges

RF2
- Piloting Fall 2016 at 4 Colleges
Foundations Curriculum has Double the Completion Rates in Half the Time

- 65% of 244 NMP students (Fall 2013)
- 64% of 110 NMP students (Spring 2014)
- 63% of 915 NMP students (Fall 2014)
- 62% of 570 NMP students (Spring 2015)

24% of all Texas Dev Ed Students (2013-2014, 1 year)
DATA

Baseline Completion Data Compared to Students at LSC-Kingwood 2013-2014

- Baseline Developmental Mathematics Completion over two years (2010-2012)
- NMP Foundations Students (Fall 2013) at all Colleges
- NMP Foundations Students (Fall 2013) LSC_Kingwood

<table>
<thead>
<tr>
<th>Category</th>
<th>Initial Enrollment</th>
<th>Completed Developmental Math (A-C)</th>
<th>Registered for College Level Course</th>
<th>Passed College Level Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Initially Enrolled</td>
<td>100%</td>
<td>65%</td>
<td>26%</td>
<td>19%</td>
</tr>
<tr>
<td>Students</td>
<td></td>
<td>84%</td>
<td>46%</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>54%</td>
</tr>
</tbody>
</table>
# Growth of Foundations at LSC-Kingwood

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Number of Sections</th>
<th>Number of Students Enrolled</th>
<th>% Passing with an A, B, or C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 2010-2012</td>
<td>All students registered in M 0308 in Fall 2010</td>
<td>673</td>
<td>33% (2 years)</td>
</tr>
<tr>
<td>Fall 2013</td>
<td>1</td>
<td>13</td>
<td>85% (1 semester)</td>
</tr>
<tr>
<td>Spring 2014</td>
<td>4</td>
<td>61</td>
<td>67% (1 semester)</td>
</tr>
<tr>
<td>Fall 2014</td>
<td>7</td>
<td>112</td>
<td>55% (1 semester)</td>
</tr>
<tr>
<td>Fall 2014*</td>
<td>8 sections</td>
<td>175</td>
<td>43% (12th graders)</td>
</tr>
<tr>
<td>Spring 2015</td>
<td>9 sections</td>
<td>140</td>
<td>56% (1 semester)</td>
</tr>
<tr>
<td>Summer 2015</td>
<td>3 sections</td>
<td>34</td>
<td>94% (1 semester)</td>
</tr>
</tbody>
</table>

*New Caney ISD 12th graders (2 semesters)*

Success – Percent of all students who enrolled in the course regardless of completion and earned a grade of A, B, C, or P;
Completion – Final grade given (Student did not withdraw)
Success – Percent of students who completed the course with a grade of A, B, C, or P
MATH 0309 students continuing into MATH 1342 were identified as having successfully completed MATH 0309 and completed MATH 1342 during a subsequent term.
Fall 2014 and Spring 2015 do not include New Caney cohort.
Source: AIR 1/1/2015
vdr
Completion – Final grade given (Student did not withdraw)
Success – Percent of students who completed the course with a grade of A, B, C, or P
University Participation

Seventeen Transfer Champion Universities invited by the nine co-development partners.

Transfer Champions Commitments:
- Endorse the NMP model
- Support the work of the 50 community colleges to implement differentiated mathematics pathways
- Certify that NMP college-level courses are transferable and can be *predictably* applied to specified majors
- Work to improve communication about mathematics requirements for major programs of study
- Work regionally with two-year colleges to modernize mathematics course requirements
<table>
<thead>
<tr>
<th>Two-Year</th>
<th>Four-Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin Community College</td>
<td>The University of Texas at Austin</td>
</tr>
<tr>
<td></td>
<td>Texas State University</td>
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<tr>
<td>Brazosport College</td>
<td>University of Houston</td>
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<td></td>
<td>University of Houston-Clear Lake</td>
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<tr>
<td>El Paso Community College</td>
<td>The University of Texas at El Paso</td>
</tr>
<tr>
<td>Kilgore College</td>
<td>The University of Texas at Tyler</td>
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<tr>
<td></td>
<td>Stephen F. Austin State University</td>
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<tr>
<td></td>
<td>Texas A&amp;M University-Commerce</td>
</tr>
<tr>
<td>Lone Star College–Kingwood</td>
<td>Sam Houston State University</td>
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<tr>
<td></td>
<td>University of Houston–Downtown</td>
</tr>
<tr>
<td>Midland College</td>
<td>Texas Tech University</td>
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<tr>
<td></td>
<td>The University of Texas of the Permian Basin</td>
</tr>
<tr>
<td>Northwest Vista College</td>
<td>The University of Texas at San Antonio</td>
</tr>
<tr>
<td></td>
<td>Texas A&amp;M University-San Antonio</td>
</tr>
<tr>
<td>South Texas College</td>
<td>The University of Texas-Pan American</td>
</tr>
<tr>
<td>Temple College</td>
<td>Texas A&amp;M University-Central Texas</td>
</tr>
<tr>
<td></td>
<td>University of North Texas</td>
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</tbody>
</table>
**STUDENT VOICES!!**

- **Video -- Holly starts at 4:24**

- **Kaleena --** This isn’t your typical math class. You’re not sitting there trying to work out formulas or decipher something that looks like a foreign language. **You’re working with real-life problems** that you’ve seen before and will actually use in your lifetime.

- **Beth --** I was really nervous at first about taking this class because I am not good at math, **I really wondered if it was possible to learn this math and be successful.** To my surprise, I really love this class, I am actually learning math and for the first time, I have an A average.
Curriculum Design Principles

Principle I: Structure and Organization of Curricular Materials
Principle II: Active Learning
Principle III: Constructive Perseverance
Principle IV: Problem Solving
Principle V: Context and Interdisciplinary Connections
Principle VI: Use of Terminology
Principle VII: Reading and Writing
Principle VIII: Technology
ALL NMP COURSES

- **Strengths:**
  - Constant spiraling
    - pre-assignment
    - class work
    - homework
  - Productive struggling
  - Writing
  - Real-world problems
  - Collaborative work
  - Active learning

- Typical day in class
- Sample math lessons
Organization of the class
- Loose leaf
- How I organize me and students
- Homework – previews, practices

About 80 lessons that are roughly 25 minutes each

Revised materials for fall 2014 from fall 2013 pilots

Classes meet 4 hours a week.

Online support system...Pearson this fall.

Cannot be taught like an algebra class!

Progressive reading and writing throughout the semester.

Sample student success lesson.
Lesson 1.A & 1.C – How big is a billion?
  • Successful Students
  • Setting Classroom Norms
  • Syllabus Quiz
  • Student Information Sheet
  • Math Autobiography Template
Developing numeracy and reasoning over time
Tables of Contents

Professor involvement initially and for revisions

Continued research initially and for revisions

Lessons with intentional correlation – FMR (Math 0309) to Math 1332 and Math 1342
  • Foundations (Math 0309)
    ○ Lesson 17.A – Expressing Linear Relationships
    ○ Lesson 17.B – Making the Call
  • Statistical Reasoning (Math 1342)
    ○ Lesson 7.A – Using Lines to Make Predictions
    ○ Lesson 8.A – Investigating the Numbers in the LSR Line Equation
STEM-Prep Pathway
Math 1314 and Math 0211(?)

- Courses to be piloted in select community colleges during spring 2016.

- STEM-Prep Pathway
  - *Reasoning with Functions I:*
    - Math 1314 / Math 0211 (?) -- offered as co-requisite courses
  - *Reasoning with Functions II:*
    - Math 2412 -- combination Trig/Precal
**Transferability**

- Math 1342 and Math 1332 in ACGM and in most CORE requirements as well as degree plans.
- Check (carefully) on the university websites for CORE, degree plan, **and** program of study requirements. Look closely for additional math requirements!
ADVISING

- NOT (just) for students who struggle with math!
- These are NOT easy classes.
- Student **must** know their major -- my opinion – or metamajor (broad-based areas of inquiry, such as business, health, STEM, or liberal arts)
- Well-suited programs of study (see next slide): communications, social work, criminal justice, nursing
- Student must know transfer university (or narrowed to 2 or 3 choices) -- my opinion.
Spotlight Resources available at http://www.utdanacenter.org/higher-education/higher-education-resources/policy-resources/programs-of-study-mathematics-alignment/

- Mathematics for Nursing [pdf, 2.5MB]
- Mathematics for Communications [pdf, 6.6MB]
- Mathematics for Criminal Justice [pdf, 2.9MB]
- Mathematics for Social Work [pdf, 5.2MB]
MICHAEL

You will not regret signing up for this class. If a guy like me, who has never been good at math, actually likes and understands this class then anyone can.
Dana Center’s Role: Institutional Level

Build tools and services that help colleges implement systemic reform:

- Detailed implementation guide
- Data templates
- Tools and strategies to plan for student recruitment
- Staff training
  - Upcoming Workshop Dates: November 13/14
FOR MORE INFORMATION:

http://www.utdanacenter.org/higher-education/new-mathways-project/new-mathways-project-curricular-materials/

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Phone: 512-471-6190
Fax: 512-232-1855
THANK YOU FOR YOUR TIME TODAY!
Dr. Stephanie Cockrell Doyen
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The **Charles A. Dana Center** at The University of Texas at Austin works with our nation’s education systems to ensure that every student leaves school prepared for success in postsecondary education and the contemporary workplace.

Our work, based on research and two decades of experience, focuses on K–16 mathematics and science education with an emphasis on strategies for improving student engagement, motivation, persistence, and achievement.

We develop innovative curricula, tools, protocols, and instructional supports and deliver powerful instructional and leadership development.