West Texas Regional Convening
Texas Tech University
April 6, 2018
Welcome and introduction

Lawrence Schovanec, President, Texas Tech University
Martha Ellis, Director, Higher Education Strategy, Policy, and Services, The Charles A. Dana Center
Jeremy Martin, Senior Policy Analyst, Higher Education, The Charles A. Dana Center
About the Dana Center

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 three 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.

2017
Who is in the room?

Four-Year Institutions
- Angelo State University
- Texas Tech University
- The University of Texas at El Paso
- The University of Texas of the Permian Basin
- West Texas A&M University

Two-Year Institutions
- Amarillo College
- El Paso Community College
- Frank Phillips College
- Howard College
- Midland College
- Odessa College
- South Plains College
- Western Texas College

Dana Center Staff

Presenters and Guests
A Regional Approach to Scale

Regional Coordinators

- Foster connections
- Synchronize mathematics pathways information and services
## Who is in the room?

<table>
<thead>
<tr>
<th>Four-Year Institutions</th>
<th>Number of Transfer Students in Fall 2015</th>
<th>% of Transfer Students from a West Texas College</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Angelo State University</td>
<td>236</td>
<td>53%</td>
</tr>
<tr>
<td>• Sul Ross University</td>
<td>71</td>
<td>42%</td>
</tr>
<tr>
<td>• Texas Tech University</td>
<td>1,555</td>
<td>38%</td>
</tr>
<tr>
<td>• University of Texas at El Paso</td>
<td>1,205</td>
<td>94%</td>
</tr>
<tr>
<td>• University of Texas of the Permian Basin</td>
<td>312</td>
<td>65%</td>
</tr>
<tr>
<td>• West Texas A&amp;M University</td>
<td>551</td>
<td>74%</td>
</tr>
</tbody>
</table>

Source: THECB. Academic Performance of 2-Year College Transfer Students at Texas Public Universities  
http://www.txhighereddata.org/reports/performance/ctctransfer/
Goals for the day

What will we accomplish together?

1. Develop a shared understanding of math pathways regionally.

2. Learn about models of regional alignment for transfer and applicability.

3. Explore data on math pathways and transfer student success.
Agenda: Regional Coordination

• **Session 1**: Understanding math pathways & requirements

• **Session 2**: Aligning math regionally

• **Session 3**: Exploring data on transfer and mathematics pathways
The Dana Center Mathematics Pathways

A partnership of:

• The Charles A. Dana Center at The University of Texas at Austin
• All 50 community college districts in Texas, represented by the Texas Association of Community Colleges and the Texas Success Center
• Collaborating with the university systems

A systemic approach to improving student success by reforming developmental and gateway mathematics
DCMP Vision

All students have equitable access to and the opportunity for success in rigorous mathematics pathways that are aligned and relevant to their future aspirations, propelling them to upward economic and social mobility.

The DCMP seeks to ensure that ALL students in higher education will be:

- **Prepared** to use mathematical and quantitative reasoning skills in their careers and personal lives,
- **Enabled** to make timely progress towards completion of a certificate or degree, and
- **Empowered** as mathematical learners.
DCMP Principles for Pathways

Quick structural change
Mathematics pathways are structured so that:
1) All students, regardless of college readiness, enter directly into mathematics pathways aligned to their programs of study.
2) Students complete their first college-level math requirement in their first year of college.

Continuous improvement
Students engage in a high-quality learning experience in math pathways designed so that:
3) Strategies to support students as learners are integrated into courses and are aligned across the institution.
4) Instruction incorporates evidence-based curriculum and pedagogy.
The Dana Center offers the following supports...

- INSTRUCTIONAL MATERIALS
- PROFESSIONAL DEVELOPMENT
- ASSESSMENT RESOURCES
- POLICY SUPPORT
- EVALUATION

All students are prepared, enabled, and empowered.
What is the “Right Math?”

Community College Student Enrollment into Programs of Study

- Require Calculus: 20%
- Do not require Calculus: 80%

Four-Year Student Enrollment into Programs of Study

- Require Calculus: 28%
- Do not require Calculus: 72%

Many students who begin on an algebra path never reach—or never intend to reach—calculus.

Source: Dunbar, 2005.
Transfer and Applicability

Texas Transfer Data Visualized
Why approach 60x30TX regionally?

• Regions and institutions differ in many ways
• However, institutional actions and outcomes are embedded in regional context
  • High school feeder patterns
  • Transfer networks
  • Local labor market
• Institutional target-setting is improved by considering regional context
• Encourages tactical planning
Regional Transfer Convenings in Texas
What is west Texas?

Texas Transfer Context

78

138
Texas Transfer Context

...the percent of bachelor’s completers that had community college credit on their transcripts. Almost 40% had 30+ SCH.

...the average number of credits accumulated by a bachelor’s degree completers


Texas Transfer Context

Almost 40% had 30+ SCH.


Community College Students Aspiring to Earn a Bachelor’s

National Surveys of Community College Students
- 80%
- 20%

Texas Community College Students Enrolled in a Transfer Program
- 72%
- 28%

2-year to 4-year student transfer and success in Texas

Implications for Students

• **Excess SCH accumulation**
  o Equity considerations
  o Excluding flagships from the sample increases to 145 SCH
  o Matched comparison of native and community college transfer students increases to 150 SCH

• **Most students do not complete a certificate or associate’s prior to transfer**
  o 18% of Texas transfer students earn credential, national average is 29%
  o Accumulate debt, opportunity cost of work, and lost time without a credential

Almost all transfer happens between public institutions.

Figure 1: Estimated Percentage of Transfer Students by Transfer Path, Academic Years 2003-04 to 2008-09

- 2-year public → 4-year public: 26.2%
- 2-year public → 2-year public: 12.6%
- 4-year public → 4-year public: 10.6%
- 4-year public → 2-year public: 8.6%
- 2-year public → 4-year private nonprofit: 8.5%
- 4-year public → 4-year private nonprofit: 4.3%
- 4-year private nonprofit → 4-year public: 4.1%
- 4-year private nonprofit → 2-year public: 3.5%
- 4-year private nonprofit → 4-year private nonprofit: 2.9%
- 2-year public → 4-year private for-profit: 2.1%

Source: GAO analysis of 2004-2009 Beginning Postsecondary Students Longitudinal Study | GAO-17-574
Trends in core curriculum mathematics at Texas universities

![Core Curriculum Entry-Level Math Course at Texas Universities, 2010-2017](image)

- **Math 1342 Elementary Statistical Methods**
- **Math 1332 Contemporary Mathematics**
- **Math 1314 College Algebra**
## Core curriculum options for mathematics in West Texas

### Table 1
2017–18 Core Math Curriculum at West Texas Area Institutions

<table>
<thead>
<tr>
<th>2-YEAR INSTITUTIONS</th>
<th>Math 1314 College Algebra</th>
<th>Math 1324 Business Math 1</th>
<th>Math 1332 Quantitative Reasoning</th>
<th>Math 1342/1442 Elementary Statistics</th>
<th>Math 2313/2312 Precalculus</th>
<th>Math 2413 Calculus 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amarillo College</td>
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<td>Clarendon College</td>
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<td>El Paso Community College</td>
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<td>Frank Phillips College</td>
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<td>Howard College</td>
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<td>Midland College</td>
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<td>South Plains College</td>
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<td>Odessa College</td>
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<td>Western Texas College</td>
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<td>Angelo State University</td>
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<tr>
<td>Sul Ross State University</td>
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<tr>
<td>Texas Tech University</td>
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<tr>
<td>The University of Texas at El Paso</td>
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<tr>
<td>The University of Texas of the Permian Basin</td>
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<tr>
<td>West Texas A&amp;M University</td>
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Math Requirements in West Texas

Mathematics Course Requirements for Associate's and Bachelor's Degrees in the West Texas Region:

- Any Core Math: 23%
- College Algebra (1314): 18%
- Business Math 1 (1324): 16%
- Quant. Reasoning (1332): 13%
- Statistics (1342): 8%
- Teacher Math 1 (1350): 9%
- Cal 1 (2413): 8%
- Out of Department Statistics: 5%
- Other: 0%
Math Requirements in West Texas

Math Course Requirements for 2-year Colleges in West Texas

Math Course Requirements for 4-year Universities in West Texas

- Any Core Math
- Quant. Reasoning (1332)
- Calculus 1 (2413)
- College Algebra (1314)
- Statistics (1342)
- Out of Department Statistics
- Business Math 1 (1324)
- Teacher Math 1 (1350)
Results from statewide analysis of math requirements
Results from statewide analysis of math requirements for bachelor’s degrees in Texas

Mathematics Course Requirements for Bachelor's Degrees at Public Texas Universities, 2017-2018

- Any Core Math
- College Algebra (1314)
- Business Math 1 (1324)
- Quant. Reasoning (1332)
- Statistics (1342)
- Teacher Math 1 (1350)
- Calculus 1 (2413)
- Out of Department Statistics

Metamajor 1 - Liberal Arts
Metamajor 2 - Social Science
Metamajor 3 - Nursing & Health
Metamajor 4 - Business
Metamajor 5 - Teaching
Metamajor 6 - STEM
Math Requirements in West Texas

Math Requirements for Associate's and Bachelor's Degrees by Metamajor in West Texas Institutions, 2017-2018

Dana Center
Mathematics Pathways
Supporting a Coherent System

Regional approach to transfer success
• Engaging all universities through regional convenings
• Different approaches for different regions

Tools and resources
• Transfer Inventory
• Toolkit for partner discipline engagement
• Program of Study Research Briefs
• Policy analysis and implementation support
Lessons Learned

Regional coordination enables institutional change

- Common mathematics pathways framework
- Ensure transferability
- Map math pathways to programs of study for applicability
Challenges

• Building ownership for change; creating new courses and requirements
• Offering new courses is no guarantee of uptake; small numbers of sections
• Mobility and transfer; advising and program alignment
Intra-Institutional Implementation

Math Pathways within an institution

Dana Center Mathematics Pathways
Inter-Institutional Implementation

Math Pathways across institutions
Session 1: Understanding Math Pathways in the West Texas Region

Martha Ellis, Director, Higher Education, The Charles A. Dana Center
Session Details

**Progressive small group discussions**
- Phase 1 - Your institution
- Phase 2 - Your sector
- Phase 3 - Across sectors

**Resources**
- Session 1 Discussion Template
- Regional Analysis Brief
- Transfer Inventory
Phase 1 – Discussion with your institution

Seating: 2

Phase 1: 4

Phase 2: 6

Phase 3: 8
Phase 2 – Discussions with your sector
Phase 3 – Discussions across sectors

Seating  Phase 1  Phase 2  Phase 3
2        4        6        8
Session 2: Cross-Departmental and Cross-Institutional Mathematics Pathways Alignment

Frank Savina, Course Program Specialist, Higher Education, The Charles A. Dana Center
Mary Ann Barber, Principal Lecturer and Assistant Chair, Department of Mathematics, University of North Texas
Matt Lewis, Mathematics Faculty and Research Analyst, San Jacinto College
Session 3: Exploring Data on Transfer and Mathematics Pathways

Jeremy Martin, Senior Policy Analyst, Higher Education, The Charles A. Dana Center
UNT is one of the nation’s largest public research universities, with nearly 38,000 students. We currently offer 103 bachelor’s, 86 master’s and 38 doctoral degree programs.

- Ranked a Tier One research university by the Carnegie Classification;
- 15 programs ranked in the Top 100 in the nation by *U.S. News & World Report*; and
- “Best in the West,” by *The Princeton Review* for nine consecutive years.
Math Pathways Evolution

2008 Fall
• MATH 1580 – Survey of Mathematics with Applications piloted;

2010 Fall
• MATH 1010 – Fundamentals of Algebra deleted from course offerings;
• MATH 1180 – College Math for Business, etc., piloted;
• MATH 1581 & MATH 1681 developed;
  o The #81 courses were initially MATH 1580/1680 and MATH 1010 content concurrently delivered;
  o The ## 81 courses – served as prerequisite for MATH 1100, MATH 1180;

2011 Fall
• MATH 1100 – renamed “Algebra” and removed from the University Core;
Math Pathways Evolution

2014 Fall
• MATH 1581 & MATH 1681 deleted;
• MATH 1580 paired with UGMT 1300, co-requisite model*
• MATH 1100 paired with UGMT 1300, co-requisite model*

2016 Fall
• MATH 1180 paired with UGMT 1300, co-requisite model**

2018 Spring
• MATH 1580 paired with UGMT 1300, co-requisite model**

*The co-requisite models are for “high” TSI incomplete level;  
**The “medium” TSI incomplete level added.
*These courses have a TSI Incomplete option which have co-requisites;
*TSI Incomplete students are main-streamed into Math 1680.
We have a partnership with North Central Texas College. NCTC faculty teach the NCTM courses on the UNT campus.
Which UNT Math Class¹ is Right for Me? (Effective Summer/Fall 2018)

- Please consult your academic advisor to ensure you select a course which fulfills degree requirements for your intended major(s).
- Students who feel prepared to take a math course beyond their placement level are encouraged to take the math placement test.
- Math placement is valid for one school year.
- This page only covers college-level courses. Students who are not TSI complete or who are unsure of their TSI status should consult the Learning Center, (940) 369-7000.

Entry Level Courses open to any student TSI complete in math

- Journalism, Arts, Social Sciences, Humanities, Health and Public Service, Music, Merchandising and Digital Retailing, Hospitality, and Tourism, College of Information, College of Education (other than Interdisciplinary Studies)

These non-technical courses satisfy University core but do not meet prerequisites for higher-level math courses. Some majors & programs require or prefer Math 1580. Consult an advisor for help selecting between Math 1580 and Math 1680.

Math 1580 Survey of Math

or

Math 1680 Elementary Probability & Statistics

Business, BA Economics and Interdisciplinary Studies EC—6th Grade

Math 1180 does not meet prerequisites for Pre-calculus or other science or engineering math.

Math 1180 College Math for Business & Econ

C or better needed for 1190 and for 1350

Math, Science, Engineering and BS Economics

New students are encouraged to take the math placement test to see if they may begin in a higher level course.

Math 1100 — Algebra

Math 1100 serves only as a prerequisite course and does not satisfy the University core.

C or better needed for level 2

Interdisciplinary Studies 4th—8th Grade

College of Education

This chart does not apply to 4th—8th Grade Interdisciplinary Studies Majors. 4th—8th Grade Interdisciplinary Studies majors should always consult advisors before enrolling in any mathematics course.

Placement Level 2

Interdisciplinary Studies, EC—6th Grade

College of Education

Math 1350 Math for Elem Ed I

Math 1351 Math for Elem Ed II

Business, and BA Economics

Math 1190 does not meet prerequisites for higher-level math classes. Business students planning advanced quantitative study are encouraged to follow the science/engineering track instead.

Math 1190 Business Calculus

Math 1650 Pre-calculus

C or better needed for level 3

Math, Science, Engineering, and BS Economics

This track is also recommended for business students planning advanced quantitative study. Consult an advisor.

Placement Level 3

Placement into Level 3 requires one of the following:

(1) Placement via the math placement exam;

(2) A "3" or higher on an AP Calculus exam; or

(3) Prior college credit for Pre-calculus or Calculus I

Math 1710 Cal I

Math 1720 Cal II

Higher-level Math

Questions? E-mail <MathAdvising@unt.edu>
How to Choose Between Math 1580 or 1680 at UNT

At UNT, Math 1580 and 1680 are non-technical math courses that satisfy the mathematics requirement for the university core and are designed to efficiently provide a college-level mathematics experience to UNT students who are in majors and programs that do not require a high degree of technical algebra proficiency. These courses help UNT students build the quantitative literacy, mathematical affinity, and critical thinking skills required to fully make use of and appreciate the quantitative aspects of a typical university course experience.

**Math 1580**
Survey of Math.
Topics include probability, statistics, algebra, logic and the mathematics of finance. Additional topics are selected from geometry, sets, cryptography, fair division, voting theory and graph theory. Emphasis is on applications. Historical aspects of selected topics are also included.

The topics are not tightly connected and some topics do not make heavy use of numbers and equations.

**Math 1680**
Elementary Probability and Statistics.
An introductory course to serve students of any field who want to apply statistical inference. Descriptive statistics, elementary probability, the normal curve, confidence intervals, and hypothesis testing.

A sequential treatment of probability and statistics, where topics later in the semester build upon earlier material and with a greater use of numbers and equations.

You should always **consult your advisor** before making your choice.

<table>
<thead>
<tr>
<th>Math 1680 (Elementary Probability &amp; Statistics) is <strong>REQUIRED</strong> by these programs</th>
<th>Geography, Kinesiology, Medical Laboratory Science (including Cytotechnology), Merchandising and Digital Retailing, Psychology, Audiology &amp; Speech-Language Pathology, and all degree programs in the School of Journalism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 1680 (Elementary Probability &amp; Statistics) is <strong>PREFERRED</strong> by these programs</td>
<td>Political Science, Sociology, and all degree programs in the College of Health and Public Service</td>
</tr>
<tr>
<td>Math 1580 (Survey of Mathematics) is often <strong>RECOMMENDED</strong> in these programs</td>
<td>Arts, Humanities, Music, Dance and Theatre</td>
</tr>
</tbody>
</table>
Session Details

**Goal**
Use data to create actionable steps for improving transfer and mathematics pathways implementation within and across institutions.

**Resources**
- Session 3 Discussion Template
- West Texas Transfer Metrics
- Math Pathways Data Sheets
### Transfer Student Success Metrics

<table>
<thead>
<tr>
<th>Top transfer partners</th>
<th>Developmental education prior to transfer</th>
<th>Persistence</th>
<th>Graduation rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 3 transfer institutions</td>
<td>Percentage of university's total transfer population that come from sending college cohort, Fall 2015</td>
<td>Total transfer students who took developmental education prior to transfer, Fall 2015</td>
<td>Percentage of developmental students in transfer cohort, Fall 2015</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>Institution</th>
<th>Top 3 transfer institutions</th>
<th>Total student transfers in Fall 2015 (B)</th>
<th>N/A</th>
<th>16,872</th>
<th>Persistence</th>
<th>Graduation rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>College A</td>
<td></td>
<td>36,690</td>
<td>N/A</td>
<td>16,872</td>
<td>46.0%</td>
<td>27,542</td>
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<tr>
<td>2</td>
<td>College B</td>
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<tr>
<td>3</td>
<td>College C</td>
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### Top 5 declared majors, Fall 2015 (D)

<table>
<thead>
<tr>
<th>Curriculum area</th>
<th>Student enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interdisciplinary Studies</td>
<td>24,783</td>
</tr>
<tr>
<td>2. Biology/Biological Sciences, General</td>
<td>24,708</td>
</tr>
<tr>
<td>3. Registered Nursing/Registered Nurse</td>
<td>22,806</td>
</tr>
<tr>
<td>4. Psychology, General</td>
<td>21,971</td>
</tr>
<tr>
<td>5. Kinesiology and Exercise Science</td>
<td>18,881</td>
</tr>
</tbody>
</table>

### Native v. transfer student graduation rates (E)

<table>
<thead>
<tr>
<th>Institution Specific</th>
<th>Percentage of transfer students with junior standing in Fall 2011 graduating in 4 years</th>
<th>Percentage of native students with junior standing in Fall 2011 graduating in 4 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statewide average</td>
<td>65%</td>
<td>83%</td>
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</table>
Results from statewide analysis of math requirements
Closing
Goals for the Day

What have we accomplished together?

1. Develop a shared understanding of math requirements regionally
2. Work towards regional agreement for transfer and applicability
3. Explore data on transfer and math pathways
A Closer Look:
What’s the real problem?

It’s NOT

Developmental math...
College-level mathematics courses...
Student supports...
Programs of study...
Transfer or policy...
A Closer Look: What’s the real problem?

It IS the DISCONNECT between all these things.
Next Steps

**Dana Center**
- Follow up with institutions’ point of contact
- Document institutional challenges and assets

**Institutions**
- Continue the dialogue with transfer partners
- Connect with regional coordinator
Meeting Evaluation

Contact Information

• General information about the Dana Center
  www.utdanacenter.org

• Dana Center Mathematics Pathways Resource Site
  www.dcmathpathways.org

• To receive monthly updates about the DCMP, contact us at
  dcmathpathways@austin.utexas.edu
Support your Work

Dana Center Mathematics Pathways Resource Site: http://www.dcmathpathways.org/

The Right Math for the Right Student at the Right Time

The Dana Center Mathematics Pathways seeks to ensure that ALL students in higher education will be:
- Prepared to use mathematical and quantitative reasoning skills in their careers and personal lives;
- Enabled to make timely progress towards completion of a certificate or degree; and
- Empowered as mathematical learners.

It takes coordinated action across all...
- Levels of the system (national, state, institution, classroom)
- Sectors of education (universities, colleges, K-12)
- Roles (policy, administrators, faculty, student services)

In order to...
- Redesign course and institutional structures that deter success
- Modernize mathematics content and instruction
- Eliminate policy barriers in placement, transfer, and applicability
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